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Connecting the Goals

Magda Mostafa
Ruth Baumeister
Mette Ramsgaard Thomsen
Martin Tamke *Editors*

Design for Inclusivity

Proceedings of the UIA World Congress of Architects Copenhagen 2023

Springer

Sustainable Development Goals Series

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Design for Inclusivity

No individual deserves to experience space in a manner that is less safe, less comfortable or less accessible as a result of their identity or challenges. Sustainability, in its most holistic definition, cannot be achieved without a collective act. This collectiveness is impossible without the inclusion of all members of society, yet our current policies and practices in architecture do not yet meet this threshold of inclusion.

This statement framed the establishment of the Design for Inclusivity panel, a scientific and academic track within the International Union of Architects (UIA) World Congress for Architecture in Copenhagen, Denmark in 2023. This volume is a collection of works from academics, advocates, artists, practitioners and policy-makers around the world in response to this call to action, and hopes to frame the global discourse around the role architecture can and should play in our quest for a more just, livable, diverse and accessible world.

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Panel 1: Design for Climate Adaptation
Billie Faircloth, Research Director KieranTimberlake, Adjunct Professor University of Pennsylvania
Maibritt Pedersen Zari, Educator and Researcher, Associate Professor, Auckland University of Technology

Panel 2: Design for Rethinking Resources
Carlo Ratti, Professor and Director of the Senseable Lab, MIT, Founding Partner of Carlo Ratti Associati
Mette Ramsgaard Thomsen, Professor and Head of CITA (Centre for Information Technology and Architecture), Royal Danish Academy—Architecture, Design, Conservation

Panel 3: Design for Resilient Communities
Juan Du, Professor and Dean of the John H. Daniels Faculty of Architecture, Landscape and Design, University of Toronto
Anna Rubbo, Senior Researcher, Center for Sustainable Urban Development (CSUD), The Climate School, Columbia University

Panel 4: Design for Health
Arif Hasan, Chairperson Urban Resource Center Karachi, former Visiting Professor NED University Karachi, former member of UNs Advisory Group on Forced Evictions (PA)

Christian Benimana, Co-Executive Director and Senior Principal MASS Design Group Principal and Managing Director at MASS Design Studio

Panel 5: Design for Inclusivity

Magda Mostafa, Autism Design Principal, Progressive Architects. Professor of Design, Department of Architecture, The American University in Cairo

Ruth Baumeister, Associate Professor of Theory and History of Architecture, Aarhus School of Architecture

Panel 6: Design for Partnerships for Change

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Preface

Introduction

In the autumn of 2022, as part of the preparations for the UIA World Congress of Architects 2023 Copenhagen, we invited Panel Chair and MASS Design Group architect Christian Benimana to Copenhagen to speak to our collegiate and students. In his introduction, he outlined the dramatic land use change in Rwanda following the country's population growth over the last 50 years. Pointing to the maps he argued that we have passed a tipping point and that our given societal infrastructures cannot simply be extended or optimised to support this new situation. We cannot build 500 universities or 600 hospitals, he said, instead we need systemic change to rethink what a university is, what a hospital can be. We need to question how our institutions, infrastructures and communities can change in the way they address those in need and what access can be, and therefore also how architecture, its practices, embedded knowledge and products can be methods of instigating change.

The present proceedings present six volumes examining the knowledge foundation for such change. As proceedings for the Science Track of the UIA World Congress of Architects 2023 Copenhagen Sustainable Futures—Leave No One Behind, they contain a total of 296 papers investigating, show casing and arguing for how change can be imagined across the built environment. By asking how architecture can help achieving the UN Sustainable Development Goals (SDGs), the presented papers collect the research- and practice-based results of a global community. Together they ask what the future of the built environment can be and how design as action and as knowledge can create new roles for architecture and the communities it serves.

This preface starts with the articulation of our profound gratitude to the Scientific Committee and the community of submitting authors and peer reviewers that have been part of this effort. During the last two and half years we have worked together with the Scientific Committee's Panel Chairs and Special Advisors to form a vision for the Science Track. The process has been an education. Not only in our understanding of the SDGs, the transformative power of design creation or the wider societal role of the built environment, but also in keeping our minds open to the many positions that architecture can be thought through and its critical role in engaging—interfacing, informing and developing—different knowledge cultures and perspectives. We therefore start by thanking the 17 members of the Scientific

Committee, the contributing 656 authors of the 296 accepted papers, the 1486 authors of the more than 750 paper submissions and the 536 peer reviewers that have all made this project possible.

Platform

The UIA World Congress 2023 Copenhagen starts with an ambition. Pitched in 2017, only one year after the launch of the UN Sustainable Development Goals, the central nerve is the articulation of the profound agency of architecture and how it plays an acute role in achieving the SDGs. In the congress, the Science Track is given a particular role. Initiated early in the planning process, the aim has been to place the Science Track at the heart of the congress in order to collect its underpinning knowledge foundation and shape its criticality through a broad outreach to a global community. Sustainability, like architecture, is a wicked problem. Its solutions are dependent on the way we ask, the methods we use and the contexts in which we work. To ask how architecture can be part of the dynamic fulfilment of the UN SDGs is to ask: who are the communities we design with and for, what is the knowledge we draw upon and how can its sharing change how we think about what our built environment can be.

One of the central drivers in our preparatory work for the Science Track has been the realisations of the blindness of the UN SDGs to the agency of architecture. The SDGs seek to steer behaviour both through impacting legislation as well as wider societal value sets. They establish priorities and galvanise efforts across communities by identifying targets and providing shared yard sticks in the form of indicators. In doing so they inscribe a world view of its defining actors; the governmental bodies, industries and communities that can be leveraged upon to instigate change. And in this world view architecture is strangely absent. At present, none of the UN SDGs declare targets that directly articulate architecture as a driver for change nor are there any indicators that evaluate its role. The built environment is only mentioned as a driver for resilient communities but without real value setting of the role of planning and design. This despite the extensive and complex impact architecture holds on human and non-human wellbeing; the way we live our lives, shape equity and use our resources.

For us this realisation has led to the overarching aim of using the congress to build awareness. To argue for and demonstrate how architecture has the ability to afford change in the way we understand and construct the world around us and therefore how it as a situated practice engaging directly with both legislation, industry and the communities in which architecture *takes place* can become a direct way of effecting change.

Vision

The Science Track is formed around six panels of which this volume is one. The vision of the six panels is to articulate six differentiated perspectives onto how architecture can be part of achieving the SDGs while reinforcing their interconnectedness. The panels are in part mapped to existing fields while at the same time suggesting new. By bringing together otherwise fragmented knowledge across the breadth of architecture's research and practices, the aim is to bring together knowledge across research, practice and education to provoke new perspectives, new alliances and concrete action. In articulating the panels, the Scientific Committee asks pertinent and provocative questions that challenge the field and position the SDGs as active goal posts. These questions form the chapters of each volume asking how architectural knowledge creation can innovate the thinking, design and making of architecture.

- ***Design for Climate Adaptation*** With profound urgency, global communities are acting and adapting to the earth's changing climate. Our built environment, the most common habitat of humans, should interact with the earth's ecosystems and climates in a sustainable and regenerative way. 'Design for Climate Adaptation' emphasises people, multiple forms of research, knowledges and action for high and low-tech solutions that make buildings, neighbourhoods, landscapes, cities, and regions regenerative, resilient and adaptive to climate change impacts.
- ***Design for Rethinking Resources*** Design shapes our world, from the places we live in to objects we use every day. As we grow more aware of the limits of our planet's resources shifting from an exploitative to a restorative, regenerative and circular design ideology becomes fundamental. 'Design for Rethinking Resources' examines approaches to resourcefulness in architecture; how sustainability challenges the foundations of our material practices and how they can change with it.
- ***Design for Resilient Communities*** A resilient community anticipates, adapts to and recovers from adversity. Climate change, the global pandemic and political upheavals in many countries have revealed social, economic and environmental inequalities that threaten communities worldwide. These fault lines disproportionately impact the poor, people of colour, the racially or ethnically marginalised and women. 'Design for Resilient Communities' encourages innovative solutions and facilitates the development of knowledge and skills necessary for adaptation and recovery.
- ***Design for Health*** Architecture and health are inseparable. From the direct design of hospitals and places for healing to the strategic design of infrastructures and city planning, architecture affects physical and mental health of individuals and communities. 'Design for Health' asks how architecture can reconceive health as a design issue. How land rights impact healthy living, how legislation, planning and building impacts inequality and access to water and how single buildings and the civic construction of hospitals, health clinics and community buildings can

operate in unison with local environments and ecologies to create a safe and healthy space for all.
- ***Design for Inclusivity*** No individual deserves to experience space in a manner that is less safe, less comfortable or less accessible as a result of their identity or challenges. Sustainability, in its most holistic definition, cannot be achieved without a collective act. 'Design for Inclusivity' aims to critically define the constructs and categories of who exactly we are excluding, and why, in order to mindfully develop strategies to mitigate this exclusion.
- ***Design for Partnerships for Change*** 'Design for Partnerships' is about recognising the asymmetrical relationships between states, public spaces, civil societies and private domains to find new balances for the existing power structures. By challenging the ontology of universalism, it examines how architecture and the built environment can play an essential role in creating a ground for care through local governance, space making practices, imaginaries and scenarios of plural(istic) political, socially and ecologically sustainable futures.

Critical Positions

The two and half years of preparation has been an inspiring experience through which we have witnessed the power of architectural thinking in action—its interweaving of the critical and the creative ideation as well as its inherent inventiveness orientation towards the future. As part of the curation of this work, we have defined a series of critical positions by which to understand the correlation between architectural thinking and the UN SDGs. A first position has been to challenge the inherent anthropocentrism and perceived lack of hierarchy between the goals; the Tabula Rasa effect as Johan Rockström names it Rockström 2016. The SDGs have been criticised for failing to recognise that planetary, people and prosperity concerns are interconnected Kotzé 2022. In forming the six panels of the Science Track we seek to position a rupture to the modernist axiom that the environment is situated outside of us. Instead, we understand the SDGs as a balancing between planetary and human needs which needs to be holistically addressed.

A second position is the critical appreciation that the SDGs retain an adherence to an underlying model of growth. The Science Track asks what the future practices of architecture can be, what the ethical roles of architectural design are and how architecture knowledge can create change in how architecture is produced both within and without of models of growth. It seeks to identify who the partners of architecture practice can be both through grassroot community action and through industry-based models.

A third position is the challenge of the embedded universalism within the SDGs. The SDGs maintain a universalism that is common to the UN system and underlies much of UN's work. However, this fundamentally modernist position of understanding sustainability as 'a problem to be solved' and placing agency with legislation leaves questions of agency, voice and power

unchallenged. The Science Track seeks to incorporate this criticism through the panel calls and their associated sub-questions by provoking reflection on the perceived neutrality of architecture's own humanist traditions and insist on the query of how architecture is produced, by people and for people.

The challenge to universalism has also led to a review of the scientific practice of knowledge dissemination. The call for papers deliberately encourages exchanges and learnings across different knowledge and practice silos. This is effected through differentiated publication formats that include scientific knowledge production as well as design-based knowledge production, narrative formats such as oral history, visual essays, as well as dialogue-based exchanges and argumentative essays. The aim of these formats is to expand the possibility of transdisciplinary knowledge exchange and include voices that are not commonly part of academic and professional discourse.

The fourth and final position is to understand the SDGs as part of a changing world. The SDGs set out a 14-year-long project. Any project of that length needs to build in methods of reviewing its own fundamental value sets and core conceptual foundation. The intensifying and accumulating effects of climate change, the aftermath of the COVID-19 pandemic, the continued stress on the world's resources and the increasingly multi-partisan war in Ukraine have deep and unequal repercussions on global communities. To engage with the SDGs is to correlate the goals to a changeable understanding of both needs and means. It is to commit to a continual address of both the contexts and instruments of change-making. In the Science Track our focus on the concrete and the actionable through presentations of cutting-edge research, real-world case studies and near future focussed arguments, argue for a situated understanding of the SDGs. This emphasis contextualises the SDGs within the multiple and diverse practices of architecture as well as the disparate places in which architecture takes place. The perspectives, methods and means are purposefully broad. They seek to represent the breadth of the solution space needed for the systemic change needed. They also purposefully include different voices and different styles to make present the different actors, different knowledge streams and different institutions that create this change.

Perspective

The result is six volume proceedings tracking a wide and multifarious interpretation on how architecture can be part of achieving the SDGs. Across their individual chapters we see a breadth of enquiries asking who the communities are, who the actors are and what the means of architectural production are. They ask how we can shape the methods of architectural thinking we well as their associated technologies, how they can be distributed and what is the consequence of their sharing.

The proceedings instantiate a moment in time. As research strands, they are part of larger trajectories of knowledge creation. Where our aim for the World Congress is to facilitate new discussions and exchange enabling

synergy across silos and geographies, it is clear that the full potential of this conversation is only just beginning. The World Congress coincides with the half-way mark of the SDGs. Launched in 2016 and with a projected completion date of 2030, we need to transition from a place of planning and speculating to one of action. The work of the Science Track is therefore marked by a sense of urgency. The desire is to define the effort of this work not in terms of their individual results, but more as a launch pad for future exchange and collaboration. We hope that what is created here is a community of dedicated actors all with a shared stake in the well-being of future generations. Our hope is that the legacy of this project will be that we can retain this commitment and grow its stakeholders to mature these propositions into actionable change.

We profoundly thank the Scientific Committee for their immense effort and profound engagement in shaping the Science Track. Thank you to Billie Faircloth, Maibritt Pedersen Zari, Carlo Ratti, Anna Rubbo, Juan Du, Arif Hasan, Christian Benimana, Magda Mostafa, Ruth Baumeister, Sandi Hilal, Merve Bedir, Katherine Richardson, Chris Luebkeman, Thomas Bo Jensen and Camilla Ryhl.

Copenhagen, Denmark

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Editorial

A Room Available to All

A Projective Cast for the Future of Architecture

For it is that the world we currently live in has, almost simultaneously, progressed in its social constructs beyond historical normative discriminatory practices of exclusion and prejudice yet, in the same moment, still grapples with the very inequalities that our social progress hoped to have eradicated in some cases decades and centuries ago. In the preparation of this text, and to introduce this important volume of voices from around the world, we were greatly influenced by Virginia Woolf's essay 'A Room of One's Own' (1928/1929). In that moment of inspiration we were curious to investigate, if and how the words of a feminist author can still be relevant for us today, almost 100 years after they were first written.

As we began to contemplate how to introduce our broad topic of *Design for inclusivity* we were struck by the versatility in Woolf's seemingly 'only' feminist lens—one that in actuality applied to all forms of exclusion discussed in this book. Her room, and her experience as a woman, applied to all the notions our work has examined and encouraged us to frame our work through her construct of the room, as an embodiment of the conditions of exclusion and othering found woven throughout the works present here, and, to reflect on the situation we find ourselves in today.

We take this room as a frame to reflect on exclusivity beyond the theme of gender, trying to embrace the various different themes that are addressed in this volume. And yet, our reflection shall not only be about the present and the past. We will create an imaginary room, into which we invite contemporary figures such as the disability rights activist Judith Heuman, the Oscar-nominated screenplay writer Hanif Kureishi, the activist Ari Newman, animal-behaviour scientist Temple Grandin, and others into a fictitious dialogue, one that we hope will frame our future room. And in doing so we present a view through the room's only window, as it is there, because this is where we hope we can envision an imaginary future.

As authors, we are affiliated with what the academic world would classify as privileged institutions, but we dedicated much of our scholarship to the understanding of the mechanics of exclusion in our built environments—through their policies, practices, traditions and values. For one of us through the lens of history, and for the other through that of applied research and practice. We do not directly identify with neither a single nor the entirety of all the lenses of exclusion presented in this book—exclusions on the basis of race and ethnicity, ability, neurodiversity, age, gender, socio-economy and poverty or the non-human experience—like all of us we intersect with multiple lenses and if we do not, we at least try to be empathic and give agency to those who are perhaps excluded from this privilege. We are aware of the fact that we have bias and prejudice and one of the notions that unites us as we write this text is our conscious knowledge of our privilege. When we talk about privilege, we do not think of it as an advantage that we have because of our position or status and which is denied to others. We consider it as a number of rights and responsibilities that were and still are available to us. We are aware of the fact that many of our readers would consider us to be 'included' and be in a position from which we would call others to join with the call to 'Leave no one behind'! And yet, this is precisely what we do not want to do. Who are we to tell others where they should go and what they should be? We are aware of what is available to us and want to use it to make a difference. We hope this text, and the following collection of works in this volume are a first step on that path.

The objective of this volume is to present a narrative—one of the scholarship of inclusion, in both its foundational semantics and interpretation as well as across the recent history of its discourse. This narrative is constructed as a dialogue over time, between the voices of our past—voices that advocated for an expansion of the normative to include broader definitions of gender, race, ethnicity, ability, neurodiversity, socio-economy and poverty. It is constructed as an imaginary—both in its form and in its message. Scripted as a conversation across three notions of time—the history, the contemporary and the imaginary—it presents this dialogue between historical advocates and ourselves as contemporary scholars and authors of this piece, with a projected cast into the future, a future we hope will transcend current notions of inclusion—and even the word inclusion itself—to present an imaginary, a moment where the need to include no longer exists, as all states of the other have been dissolved into an understanding of the human condition in its broadest sense and richest fabric.

This narrative is composed of two parts. The first presents the state of inclusivity through the contributing voices this volume presents. Through asking ourselves the five questions: Who? What? Where? Why? and How? we shed light on the demographics, formats, geographies, motivations and methodologies of the authors and their contributions found in this volume. Each of these questions is posed factually and communicated graphically.

Our goal hereby is to identify mechanisms of exclusion and present them for discussion to the broader UIA World Congress of Architects 2023 CPH. The second part is the imaginary-a fictitious dialogue across time from the earliest advocacies of the twentieth century to our contemporary moment and ahead into the imaginary we hope to construct.

Some of our readers might consider this approach absurd in its utopian thinking, but we would like to present it here as a catalyst, an imaginary point in a speculative future—not necessarily as a destination in and of itself. It should rather serve as a target that drives the trajectory of our discourse. In seeking this target we hope the discourse will uncover—if not finite absolute solutions to this infinitely complex problem of exclusion—then at the very least tactics and actions that can have meaningful impact in bringing us closer to that imaginary point in our future. If anything we hope to present a discourse, that at least brings us more progress than the contemporary stagnation and continuous consolidation of exclusive practices, echoes of issues the voices our past called for over a century ago. Again, in our choice to use fiction as a format, we were inspired by Woolf, who points out in her essay that '[…] when a subject is highly controversial [...] one cannot hope to tell the truth. One can only show how one came to hold whatever opinion one does hold. One can only give one's audience the chance of drawing their own conclusions as they observe the limitations, the prejudices, the idiosyncrasies of the speaker. Fiction here is likely to contain more truth than fact' (1929, 2004 ed.: 4).

Part 1: The Stage, the Method and the Voice

a. Who?
   Who does this volume include, and perhaps more importantly who does it exclude? And is that exclusion truly intentional or implicit? Can we create a discursive forum that escapes becoming a reproduction of the exclusionary constructs of our broader society—those based on language, culture, economy and access?
b. What?
   This book reflects the proceedings of the scientific panel of architecture for inclusivity, and yet, as architects predominately work visually, we wanted to go beyond traditional academic paper presentations. What we were asking for in the call was a body of scholarship across eight themes, through four formats, in order to make this congress available also for people who think and work outside the conventional scholastic text formats.

   This book consequently presents the different interpretation and tackling of the themes presented in the sub-panels. Contributions reach from reflections on different scales/typologies/processes/policies and spaces, etc.

   As we found the siloing of the different sub-topics problematic, we offered a panel of intersectionality, where authors, who tackle the issues we raise from various different perspectives, could contribute.

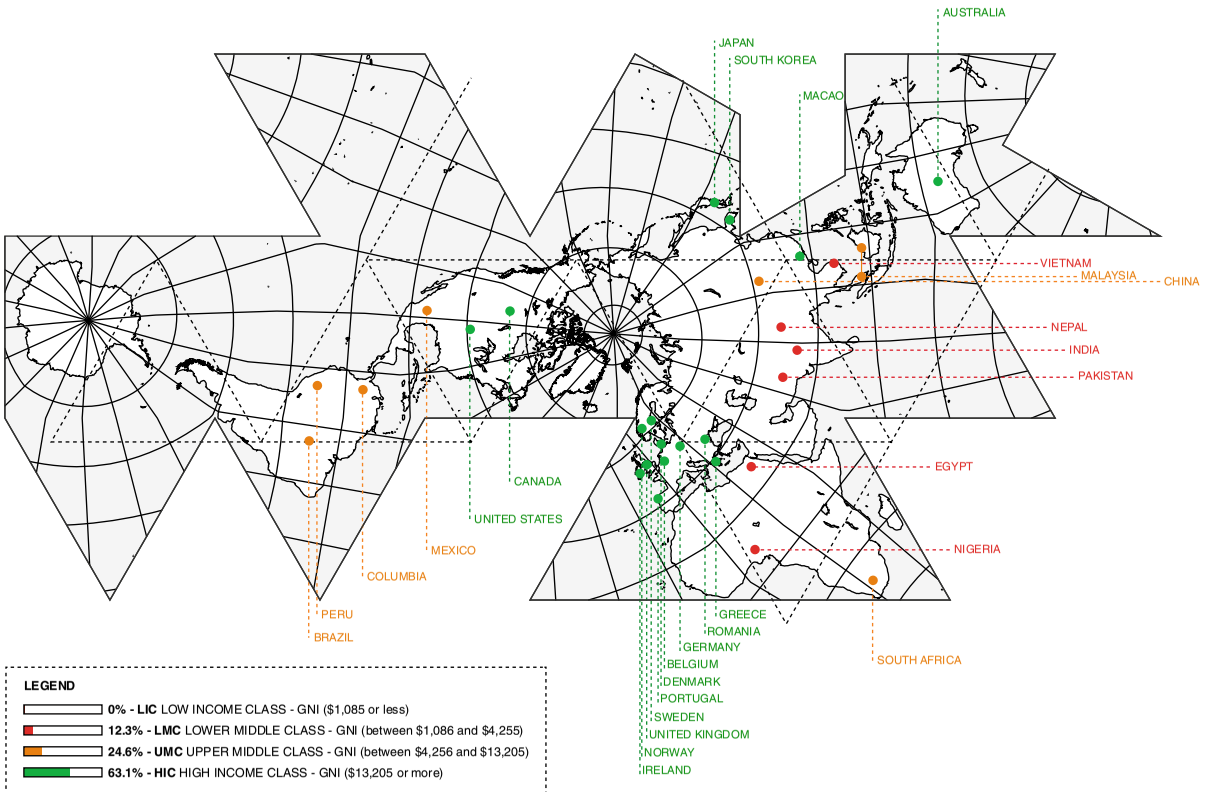

Fig. 1 This map illustrates country representation of authors by economic classification using the World Bank's Geographic categories in accordance to GNI (Gross National Income). Of note is the significant predominance of the High Income Class (of above $13,205 GNI) with over two-thirds of the papers and of equal note is the complete absence of the lowest economic class of countries with GNI $1085 or less. The distribution across countries in between these two extremes is almost perfectly declining in a linear relationship, with one-quarter of the remaining authors from upper-middle classification countries and only approximately one-eighth from lower-middle classification countries

Surprisingly, not many made use of this. Why is that, we are asking ourselves? Did we fail to formulate our intent clearly enough, or is it that the research still works within the paradigm of specialisation, across themes in isolation of one another? Rather than working with the in/exclusion dialectic, we would like to propose the concept of 'availability' as a working model.

c. Where?
Our work aimed to be broad in its reach, and diverse in its audience. While it is important to provide evidence and comment on what is there in front of us, we consider it equally important to show what we are missing and reflect on the dynamics behind that exclusion.

d. Why?
We realise that our effort to reach communities and environments that are less privileged than the one we come from was not as successful as we wanted it to be. *Design for Inclusivity* was the headline for the panel which was given to us and which formed the theme for this call. In combination with the conference motto of 'Leave no one behind' (LNOB)—a central remit of the UN Sustainable Development Goals—created some doubt and friction from the very beginning. Is inclusion a suitable term for what we want to advocate for? Who are we, to decide who is in-and/or excluded. Leaving no one behind implies the concept that there is one part that is going ahead and one part who is left behind—this is neither how we conceive of the current situation nor a valid approach for us to see the future.

A major dilemma of the very specific problem related to our work at this congress is that beyond the infrastructure to even receive information—relates to dynamic of knowledge injustice. We found that in regions where opportunity is scarce, digital access is inequitable and language is a barrier, these opportunities—although intended to be accessible to all—are brokered as currency, with false dynamics of 'invitation to submit' or 'nomination to represent'. Within these constructs of opportunity gatekeeping how are we truly being inclusive?

e. How?
Inevitably the barrier of economy emerges in even the most egalitarian of intents—and the 'how' becomes the 'how much?'. The pragmatic costs of participation in fora such as this can themselves be a mechanism of tacit exclusion—whether the published forum of this volume or the socio-academic forum of the UIA World Congress itself. Despite the well-intentioned theme to 'Leave no one behind', we find ourselves confronted with the realities of costs associated with entry into this forum.

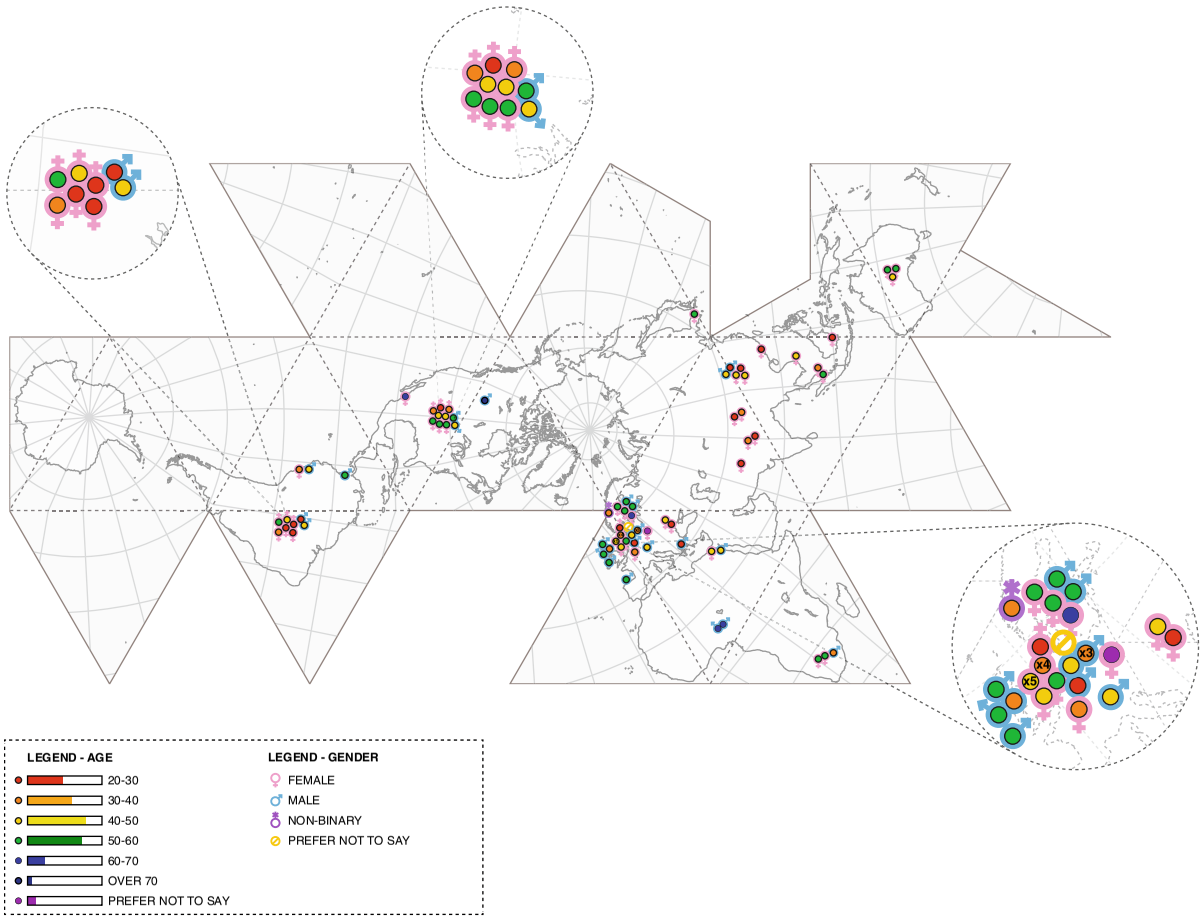

Fig. 2 This map illustrates the distribution of authors geographically but also through the intersectional lens of gender and age

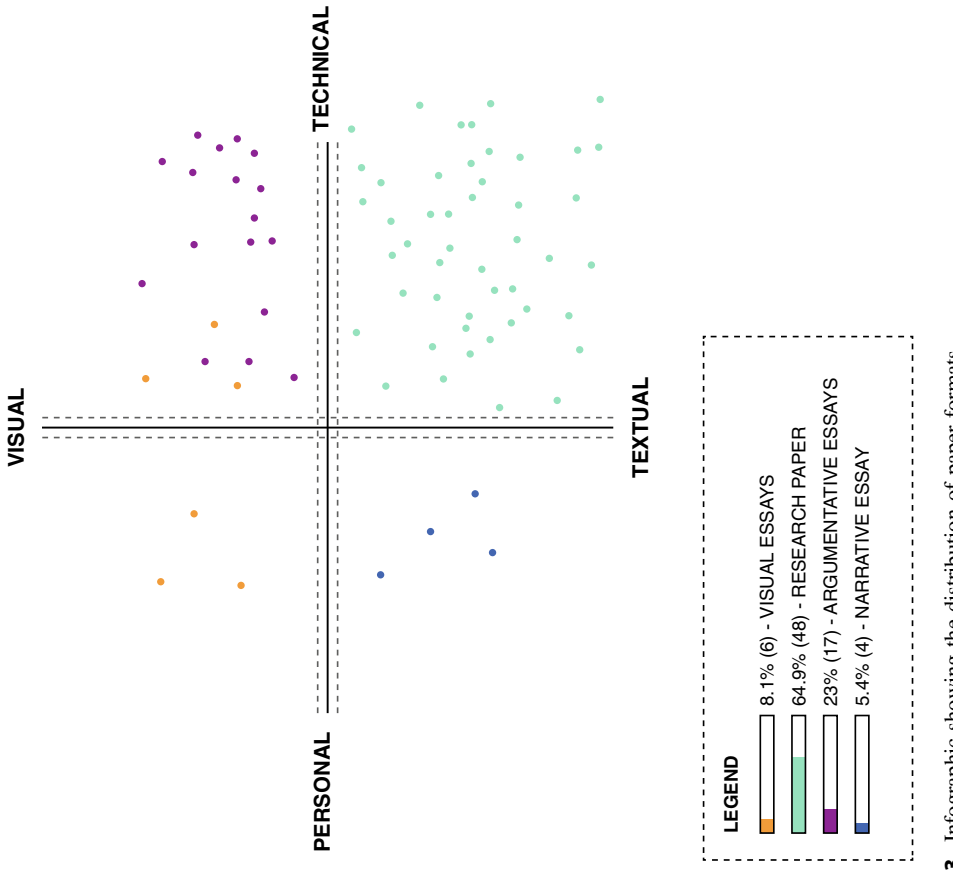

Fig. 3 Infographic showing the distribution of paper formats

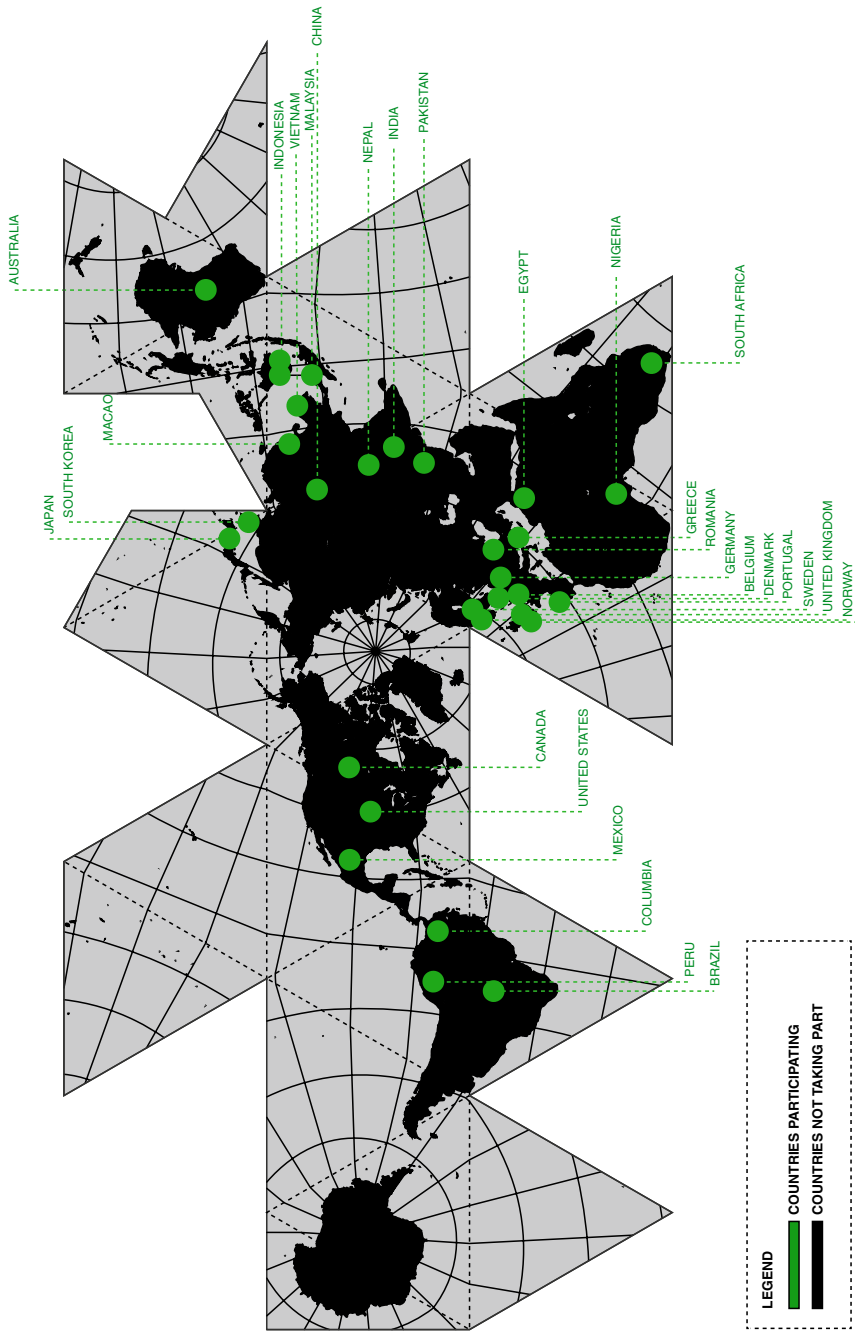

Fig. 4 This infographic illustrates which countries are not represented in this volume of work

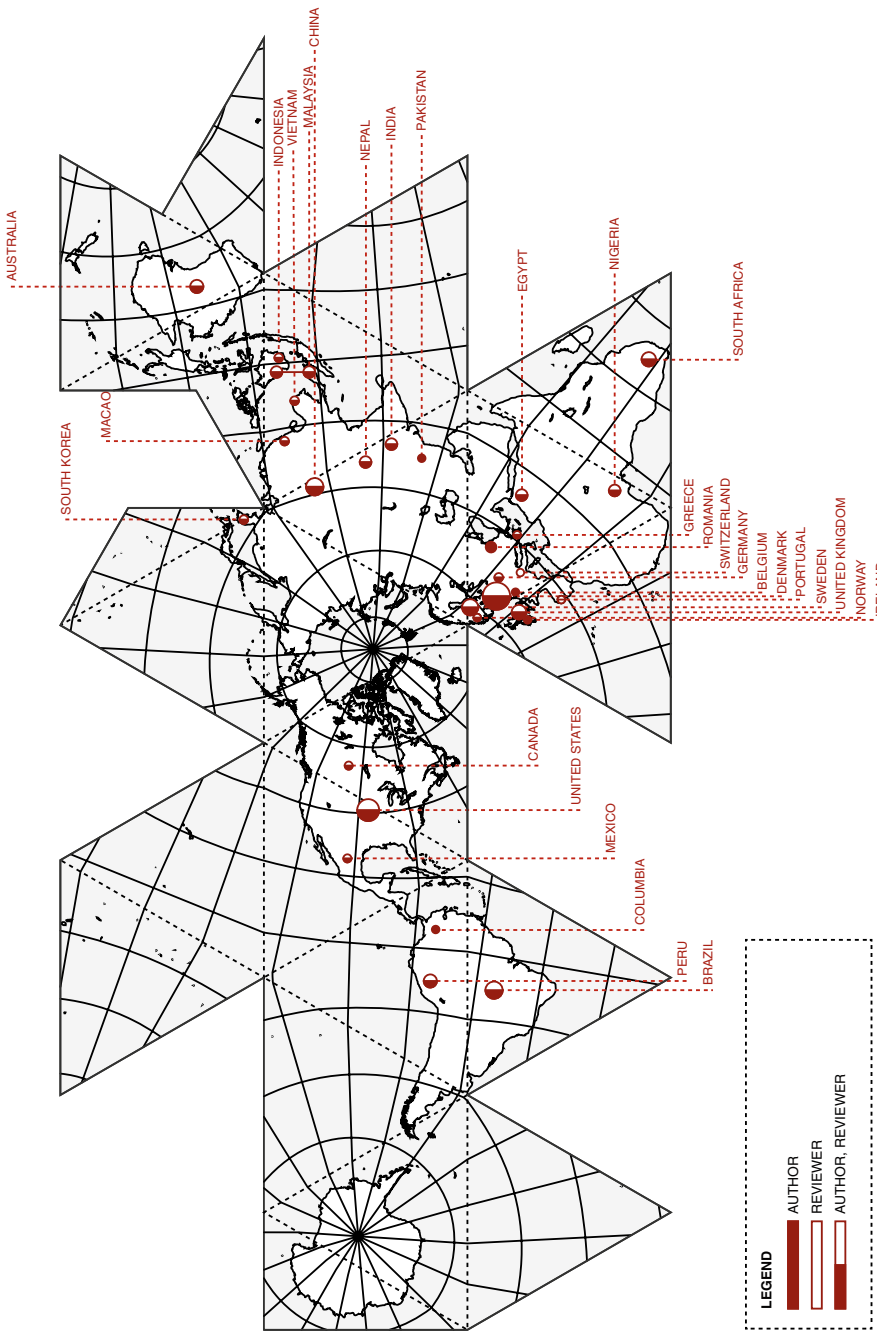

Fig. 5 This map illustrates the geographic distribution of authors, reviewers and those who engaged both as authors and reviewers

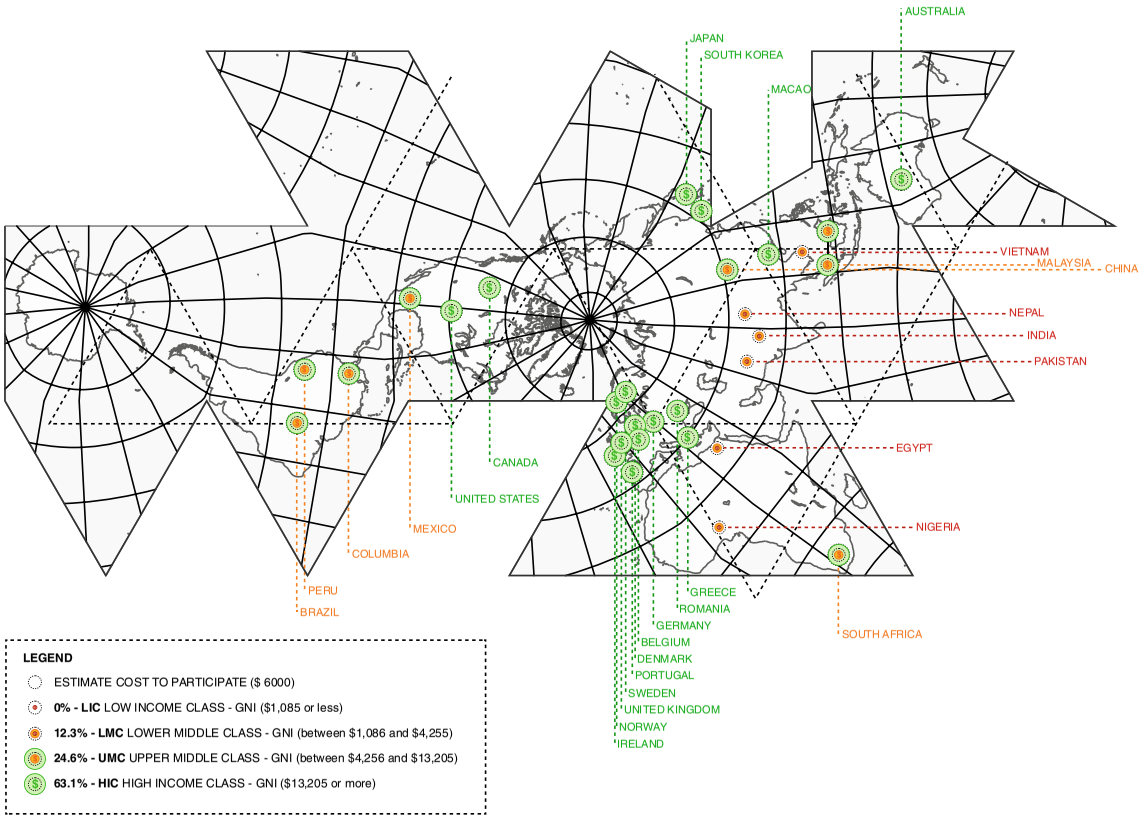

Fig. 6 This illustration represents the estimated cost of participation in the UIA World Congress—not accounting for costs of conducting the research itself, nor accounting for the opportunities, availability and scale of funding or lack thereof—in comparison to the GNI of the countries of each author participating in the Congress and included in this volume

The Imaginary

The Past: Virginia's room

A Room of One's Own, which serves as a point of departure for writing this introduction, was first published in 1929 and is based on two papers that Woolf delivered at the Arts Society and the Odtaa (**O**ne **D**amn **T**hing **A**fter **A**nother) Society at Girton in October 1928. In this essay, Woolf explores social injustices of her time and sheds light on women's lack of free expression and education. At the dawn of the 'new woman', she explores whether women are capable of producing literature and hereby stresses that they have an intellectual potential of their own right. She claims that the lack of female fiction is a result of missing opportunities, rather than a lack of talent. During the first six months after the essay was published, 22,000 copies were sold in England and the US and it subsequently became one of the women's movement most influential pieces of writing.

At the beginning of her essay, Woolf describes how the narrator was denied access to the library of Oxbridge College because of her gender and expands to what it means for a woman to be excluded from education. 'I thought of [...] the shut doors of the library; and I thought how unpleasant it is to be locked out; and I thought how it is worse perhaps to be locked in; and thinking of the safety and prosperity of one sex and of the poverty and insecurity of the other and of the effects of the tradition, [...] (Woolf 1929, 2004 ed.: 28), is how she subsequently ponders from the outside about the consequences of this sharp border condition, which is created by the institution. 'That that famous library has been cursed by a woman is a matter of complete indifference to a famous library. Venerable and calm, with all its treasures safe locked within its breast, it sleeps complacently and will, so far as I am concerned, so sleep for ever. Never will I wake those echoes, never will I ask for that hospitality again, I vowed as I descended the steps in anger' (Woolf 1929, 2004 ed.: 8). This is how Woolf describes how the institution, holding the power to admit some and reject others, has no empathy for those who are rejected and the fact that it rejects women has no effect on the institution's existence. 'I had no wish to enter had I the right, and this time the verger might have stopped me, demanding perhaps my baptismal certificate, or a letter of introduction from the Dean. But the outside of these magnificent buildings is often as beautiful as the inside.' (Woolf 1929, 2004 ed.: 9) This act of exclusion had a repelling effect on her. If in most parts of the world it is not necessarily gender, that is denying access to opportunities, what other mechanisms of exclusion are we facing today?

It becomes apparent to her protagonist, how different it is what those who are inside perceive and do, to those who are denied to enter and so she elaborates how such institutional practices actively create divides between men and women. She subsequently reflects on the social injustice and impossible conditions female writers had to face during the Victorian era when wanting to produce literature. In addition, she observes that there are only very few exciting female figures in literature and complains about the fact that women are usually perceived through a lens that focuses only on the relations men have with them. This not only holds true for writing of fiction,

according to Woolf, but for the entire production of history, which focuses on rulers, their wars and conquests, rather than on the living conditions of women. Can we expand her reasoning to the field of architecture today—production as well as history writing—we were asking ourselves? Moreover, can the condition of the female that Woolf describes in her essay, serve as a protagonist for all those among us, who are addressed in the volume of this book and who in one or the other way feel excluded?

Later in her essay, Woolf comes to the conclusion that 'a woman must have money and a room of her own if she is to write'. Her notion of the room is physical, as she describes it as a space to retreat without constant disturbance by others on the one hand. On the other, it is metaphorical, because she claims a mental space and mind-set of others that would allow literature written by women to evolve. She even elevates her claim to be the main message of her story, by using it in the title of her book and hereby clearly defines the economic independence and the spatial condition of a room of one's own to be a precondition for a woman's creative production. Her argument is materialist, because she argues that 'intellectual freedom depends upon materialist things', (Woolf 1929, 2004 ed.: 141). What about all the others who are excluded from education and similar privileges, because of their social status, poverty, race and ethnicity, though? Rather than calling out for a profound change, when pointing out that 'intellectual freedom depends upon materialist things,' (Woolf 1929, 2004 ed.: 141) Woolf to a large extent, confirms the unjust social conditions of her time, by simply calling for equal conditions for men and women, one might argue. As the history of many female writers—such as Harriet Jacobs, African-American slave and author—show, this is of course questionable. Isn't the room Woolf is demanding for women, yet another physical and mental barrier, that prevents us from imagining a world that offers equal opportunities for all? It is important to understand her text within the historical context it evolved from and through Woolf's own personal experience as a female author. Even in her own family, she became subject to discrimination because of her gender, as her father Sir Leslie Stephen, in line with the thinking of his time, believed that only boys should be sent to school.

Today, in an era where digital technology allows us to be anywhere anytime, do we still need to be in the same physical room? Probably not, but as the statistics in our graphics show, there seems to still be a intrinsic relation between poverty and achievement, a legacy of these analog forms of exclusion. Consequently, just as in the case of exclusion from the library, the absence of availability and opportunities still causes not only inequality, but can also lead to marginalisation, isolation and discrimination. If we look at the specific situation of this congress, what are the mechanisms of exclusion today and how could we potentially overcome and make it available to all of us?

The present (our room) and the current volume

What strikes us in our reflection of Woolf's notions of agency, space and scholarship, in the first moment is that we—two women—write this text from a room of our own, together in a secluded but transparent, safe space within a

library in an academic institution. Compared to Woolf, our situation has changed, and yet—as the texts in this volume will show—so much of her intent behind her discourse, and the injustices and exclusions she brings into sharp focus, unfortunately seem to remain unchanged. At the exact moment when the two of us are now allowed a room of our own—a transparent glass box floating above a liberal arts campus—working on the manuscript we are editing and introducing—this volume you are now reading—in Afghanistan, women have recently had taken away the right to university education and even an enjoyment as simple as going are to a public park with their child is denied to them.

The discrimination due to gender is not restricted to specific parts of the world. As the #MeToo movement has revealed, sexual assault and harassment has ruled everywhere in the world of architecture for far too long. Being well aware of the fact that history is not linear in its progressiveness, we now wonder how much access has actually been granted, and how many groups have gained the needed agency over their bodies in space and their place in the academic discourse and the practice of architecture? And what of the drastic climatic changes to our living environment in these 100 years since Woolf's text, and its disproportionate impact on the most vulnerable of our societies, who themselves are also the most excluded?

From Leonardo da Vinci's Vitruvian Man (1490) to Le Corbusier's Modulor (1948) our notion of the body was based on an idealised but at the same time, reductionist vision of the human. This notion was typically one of a white, cis-gendered, straight, able-bodied, walking, talking, seeing, hearing, neurotypical, Caucasian, European speaking, affluent, adult male figure. The reality of the diversity of our human condition, and the authorship represented within this volume is resoundingly not. So perhaps more importantly, we need to ask ourselves when engaging in the discourse of human-centred design, who is this presumptive human *not*? And perhaps even ask ourselves if it is a human at all or rather a network of different human as well as non-human actors, to speak in Bruno Latour's terms, who must be taken into consideration when interfering in the complex system of ecologies as a designer?

With this call to join the voices in this volume, we strived to create an invitation into a room for reflection and interrogation. The questioning of who that body was at the centre of our process—ultimately became the sub-panels of our call—as we asked ourselves—what is their gender identity? What is their ethnicity and race? What is their ability as defined by our contemporary notions of (dis)abililty across mobility and the sensory? What is their neuro-identity? Their age? What is their socio-economic condition? And are they even human or is it that the non-human must lead our design? And finally—is this body ever only one thing? And how do we bring in the inevitable intersectionality of every existence into our discourse? This line of questioning became our sub-panels of: Gender; Race and Ethnicity; Ability; Neurodiversity; Age; Poverty and Socio-economy; The Non-human and Intersectionality.

In this imaginary, we welcomed some contemporary actors/writers and gave them a voice which we combined with those who have joined us in our contemporary room by responding to our call—perhaps not as actors in space, but as discussants of the role that our spaces must play to bring these actors into our rooms. Across these definitions, scholars from all over the world, and in the variety of constructs we opened to them—brought their knowledge, pedagogies, case studies, questions and arguments to bear on the question 'how do we design for a future that is available for all?'. Their contributions converged around a number of themes that cut across all the work, themes that we hope the academic community will continue to explore and interrogate to get us to this available future we hope to project.

It seems that the very notions that we develop to eradicate exclusionary practices, themselves only entrench its constructs. Herein lies the gravity of semantics—the weight that the words we choose to speak of something may themselves only serve to reinforce their own negative connotations.

Throughout the discourse, both in this volume specifically—and in the discipline by and large—we use terminology like inclusion, accessibility and acceptance as aspirational pathways to our ideal future. But within each of these notions sits an underlying assumption of othering. Like Woolf's protagonist being considered 'other' and denied access to the library—to include, there must be an 'other' outside the norm to be invited in. To grant access, there must be an 'other' barred from entry that we must facilitate admission for. To accept, there must be an 'other' that we identify as different but choose to welcome into our normative construct of being and identity. The danger of these well-intentioned notions is that they sub-consciously create and in turn reinforce- a construct of othering only serving to confirm normative practices.

In this, our present room, we still engage in dialogue that excludes, and to move forward must deconstruct the semantics of this dialogue and use or produce language that does not other. 'Some people say what I did changed the world. But really, I simply refused to accept what people told me about who I could be. And I was willing to make a fuss about it,' (2020, p. 10) Judith Heumann, US American disability activist and internationally acclaimed spokesperson of the disability community pointed out her claim for advocacy. Certainly, she was not alone with this, 'nothing about us without us', by autism self-advocate Ari Newman, soon became a motto, an insistence in their struggle to be given a voice, afforded agency rather than relegating individuals with disabilities to the role of object and subject, as opposed to agent.

Advocacy lies on the margin, in the interstitial space between the normative and the other, and gradually as we progress and broaden our lens of the normative to include the interstitiality of that moment, we encounter the next. So just as the more we learn, the more we know what we do not know; the more we include, the more we realise how much we exclude. Our understanding of the depth of the othering in our society deepens as we dismantle each othering construct.

Perhaps the most impactful voice is that of the lived experience, the individual themselves. Throughout this volume we hear from such voices,

individuals who find themselves defined as the 'other' but also authors who report on the power of listening to the 'other', exploring emerging methodologies of co-production and co-creation to weave in notions of 'other' as author and 'other' as expert.

Among our authors are neurodivergent individuals, reporting on their specific and nuanced experiences in space, but also exploring those experiences through their powerful lens of the visual. This alignment with strengths, and granting of agency of method and process, uncovers knowledge and expertise otherwise seen as barrier and challenge. These contributions are what we present in our room as '(dis)ability as expertise' or the 'other as expert', as a form of provocation and protest to this notion of othering.

Other works present agency through either the processes they engage in to produce knowledge—participatory practices and community engagement methodologies; through the subject of agency as the topic of their investigation itself; or through the investigation and understanding of the policy frameworks through which this agency exists—or in some cases struggles to exist.

Our present room, compared to that of that past century, has now been populated not only with more diversity and a more authentic representation of the true breadth and texture of the human fabric—but also with voices historically silenced. These voices now thankfully are beginning to fall on ears that are more open to listen—but within our room we acknowledge that this diversity is self-fulfilling. Those who join us, like those who have joined us in this volume, desire to be here, to be heard but also to listen. We acknowledge that this is yet not the condition of those who stand outside our room, those who choose not to engage in this dialogue.

'I think in pictures. [...] Words are like a second language to me. I translate both spoken and written words into full-color movies, complete with sound, which run like a VCR tape in my head', is how Temple Grandin describes the way she perceives the world around her. (2009, Thinking in Pictures, p. 19) This motivated us to offer a variety of vehicles/formats through which the scholarship within this volume is shared, in order to reflect diverse ways of being, seeing and understanding our built world. By allowing for multiple constructs- the visual, the narrative, the argumentative and the technical, we hope to not only capture diverse ways of understanding, but also to bring to the broad architectural academy the notion that to place value on a single format of scholarship—the classical, test-based research paper- is to other—and to exclude perhaps other structures of understanding and means of communicating and critically engaging with the built world.

This shift is crucial, particularly as our knowledge self-propagates, and some may be tempted to only produce what is valued by the academy. We have created an infinite loop of promoting what has been deemed valuable—the classic, the normative, the voice that we are accustomed to hearing. Through this volume of works, with its diverse voices and broader formats we hope to instigate a shift, provoke a dialogue that will hopefully shift value to

the important voices of lived experiences, the important narratives and storytelling, the power of the image—all as forms of equally valuable knowledge production—an equality that is celebrated in our present room resonating with these diverse voices and languages.

The works in this volume span four of these vehicles.

The visual: a collection of architectural inquiry where the visual is both tool and language. Authors who chose to engage this format did so mindfully—where the process itself was best served through the graphic as a format. This liberated new information, helped highlight new methodologies and gave access to those for whom textual, verbal and English communication may be itself a barrier.

The narrative: allowed space for constructs of knowledge that are produced, disseminated, captured and communicated through story-telling. This releases the narrator from the normative constructs and confines of restrictive classical peer-reviewed technical writing formats, and allows for and values knowledge that is perhaps more personal, subjective and inherited—perhaps making space for more diverse cultural and personal expression. The fact that is the format least utilised within this volume in itself may be evidence of the need for increased space for these types of voices.

The argumentative: allows for debate and critical discourse to be central. Our broad topic of Design for Inclusivity lends itself to the languages of advocacy and often protest, and our authors utilised this format to present such dialogues and deconstructing.

The traditional, Research Paper format: by far the most popular format—almost two-thirds of the papers in this volume follow this format—it remains the gold standard of knowledge production in our field.

But what do these vehicles through which our scholars have chosen to communicate their work tell us? Have we created enough space in our present room to allow for scholarship outside of the normative structure? If we only value peer-reviewed traditional research production, and only measure impact by numerical citation, where is the space for lived experience, agency, the personal and the expertise it bears? If the very tools we use to produce research, even when it claims to be participatory—are themselves inaccessible how can we produce authentically inclusive knowledge? And in a practice so rooted in the visual, how do we value the process and product of design itself as a form of impact? If anything a form of impact with real-life present ramifications.

James Baldwin African-American writer proclaimed that '[...] it is certain, in any case, that ignorance, allied with power, is the most ferocious enemy justice can have,' (1998).

Discrimination is a disease of asymmetrical power, a symptom of privilege left unacknowledged and unchecked. To rectify this we must address these power dynamics, understand, inform and at times dismantle them. Our current room is not the democratic, just space that we delude ourselves to believe. Power structures still exist to propagate spatial injustices.

Can we reach a future where there are no power structures, where there is no privilege, where the identity blindspots and subconscious biases are

revealed? What would it look like and how would we get there? If the power structure that currently exists is to be balanced, it must first be dismantled, and to dismantle it perhaps you must invert it—put the margins in the position of privilege, learn from them and then negotiate a balanced multi-existence across all identities.

Authors across this volume bring this question to the field through studio pedagogies, explorations of policy dynamics and case studies of projects on the ground.

'Science may have found a cure for most evils; but it has found no remedy for the worst of them all—the apathy of human beings', is how Helen Keller, US American writer and disability activist, described the devastating effect of apathy. Although the voices in our room strive to challenge the constructs within which they operate, they do so with the tacit acceptance of certain status quo, a given understanding of what knowledge is, how it is produced and where it comes from. In this, at least we are not apathetic to the reality of the many exclusions in our field, even as we operate within a frame of privilege.

The voices curated in this volume strive to perhaps leverage that privilege to bring into focus these exclusions. Although not ideal, the geographies from which these voices emerge, and within which these cases are studied, are broader than typically presented in mainstream academia. With 29 countries represented, spanning all five of UIA's regions, our room has the potential to be closer to the state of the global forum required for authentic change.

Many papers in this volume dissect notions of identity within the geographies of exclusion, bringing to light both the power dynamics of our built environment in producing and perhaps propagating these exclusions, but also presenting strategies to first better understand these dynamics and perhaps even experiments in dismantling them. Operating on multiple scales, the work curated here addresses such issues from the generative space of the academic studio, to architectural practice to communities and government policy structures.

Through the conversation that has been brought by these contributors into our present room we find ourselves asking: if the majority of knowledge that is produced and valued is in a single language—with the *acknowledgement that it is in this language* that we are even posing this question—how can we claim to include all voices? If—as was the case in Virginia Woolf's room—only those with access to economic affluence and support can find themselves in our room, is the knowledge we are producing truly representative of the field? If the vehicles of knowledge production that we value are limited to a single format, structure and space, how can we claim to invite and consequently value all knowledge? If our metrics of excellence are based on these constructs, who are we celebrating and who are we in turn discriminating against and devaluing?

The Future (looking out of the window)

While the room Virginia Woolf was calling for in her essay served as the point of departure in writing the introduction to this important volume, the lived experience of Hanif Kureishi, a contemporary writer, is pointing into a

different, possible future. 'We have convinced ourselves that there is a standard of the well and effective human being. This is deception, an ideology, which is deliberately misleading. It means that we cannot always see the disabled, just as in other circumstances we fail to see others of colour, or queers. We should give up the standardised view of the world for a more complex view, which will include more people.' (Kureishi, Life is not Beautiful, 21.01.23) These lines stem from a blog, Kureishi, writes with the help of his family from his bed in a hospital in the periphery of Rome. The novelist and Oscar-nominated script writer was left unable to move his arms and legs after a crippled fall during a walk in Rome in late December last year. From his sick bed he is dictating daily dispatches in which he reflects about his new situation, life, love and other things and publishes them.

Paradoxically, confined to his bed, caught in a seemingly dysfunctional body, Kureishi's reflections about his past, the descriptions of his lived experience and the visions of the future which he kindly shares for free with everybody who has an interest, proved to be constructive for us to create a prospect, rather than an end of this text. While he describes himself as being a 'vegetable' and talking about his situation as a 'half life' in his earlier tweets, the way he conceives of his new situation and the world around him changes in the course of his writing. He slowly comes to realise the revelational effect of this bodily disorder, when stating that '[...] it is as if we want to believe that we live in a world of many healthy and well-functioning people. We do not. We have convinced ourselves that there is a standard of the well and effective human being. This is deception, an ideology, which is deliberately misleading. It means that we cannot always see the disabled, just as in other circumstances we fail to see others of colour, or queers.' (Kureishi, Life is not Beautiful, Blog, 21.01.23)—What Kureishi is calling for when arguing for a more differentiated view of the human being on the one hand and when he is claiming that we have to give up our standardised view on the other, is especially important for architects. Twentieth century architecture is based on standards, according to which architects design our physical environment. Standards determine how we perceive our bodies but they also act as frameworks according to which we create our environment. Normative practices as we know them in the field of architecture, law, morality and language are all bound to standards, rules and codes of conducts.

Moreover, there is another dimension to Kureishi's awakening, all of us can learn from.

In reference to the Hungarian psychoanalyst Sándor Ferenczi, who claims that trauma produces an incredibly fast growth in children because they are forced to accommodate themselves in this situation of horror, Kureishi reflects about the effect of trauma on human beings. Especially his own experience of racism in his youth, being a Pakistani descendent growing up in Great Britain. '[...] the unpleasantness of the school I was attending at the time [caused] that I began to read and write at a remarkable rate. I was far

more developed than my peers. Trauma saved me and made me into a writer. Something similar is happening here, I am finding a way to cope with the horror of my recent accident.' (Kureishi: Life is not Beautiful, Blog, 21.01.23) This is of course not to romanticise traumatic experience, but to acknowledge it as part of the diverse experiences in human life rather than understand it as a mechanism of marginalisation and exclusion.

When looking out of the window of our room, we see an imaginary future, in which we, as individuals, instead of constantly engaging in and applying reductionist, normative practices, we have critically evaluated, maybe redefined or even abolished them. We have revisited current codes and norms in architecture and urbanism and critically investigated if and how such norms relate to and instigate social change. Did they support the idea of creating the built environment so that it is available for all or do they become mechanisms that continue to nurture exclusion, lay at the basis of our reconsiderations.

We see a world that embraces diversity instead of identifying as normal and 'other'. As our sphere of inclusivity expands we find ourselves proximal to the condition that is closest to the margin, in almost a perpetual quest for authentic inclusion. And as we stretch further and learn more we find ourselves knowing less about the true diverse fabric of the human condition until we are educated by the voices at the margin and build the necessary knowledge to blur that boundary and include them. Any borders that define what is included or excluded had dissolved.

Outside of our window we hear language that has progressed beyond the othering of our past. We hear descriptions of the equitable affordances our built spatial infrastructures provide, and discourse around a post-inclusion, post-accessible built environment that is available to all. And in this talk of availability we see people engaging with agency over and through their own bodies in space, without label, without accommodation, without design as prosthetic, without the need for policy and exception—but in spaces that are simply available for everyone.

Outside of our window, we witness a systemic change. Any intervention into the ecology of our environment is not based anymore on the capitalist logic of maximising monetary profit. Neither does it follow any static, paradigmatic rules nor a concept where one party sets the course for others. We see those that were denied agency have now gained it. We see a world that offers availability, rather than operating according to terms of (ex)- and (in)clusion. The normal and the other developed into embracing the fact that we are all diverse unites us.

Kureishi reminds us in one of his tweets, that any creative act, any process of change comes with drawbacks and mistakes: 'When attempting to write there are some mistakes you have to make, mistakes which will yield good ideas, opening up a space for more thoughts. And there are other mistakes it might be worth avoiding, though sometimes it is difficult to tell the two apart' (Kureishi, The Writer and the Teacher 19.02.23).

We hope that in the process of collecting this volume of works and reflecting on the larger message their content, geographies and voices present, our mistakes are only those that 'yield good ideas' and that when

they are not, we 'can tell the two apart'. But ultimately our hope is that we have, if anything, opened up space for more thought—to emerge, engage and inform the future of our built environment.

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Contents

Part I
Gender

Radical Inclusivity: Architecture of Becoming

1

Kasia Nawratek

Abstract

This article examines the idea of Radical Inclusivity in the context of architecture through the perspective of maintenance and care. It traces the origins of Radical Inclusivity to the religious philosophy of Origen and the architectural experiments of Paolo Soleri inspired by the idea of the Omega Point by Pierre Teilhard de Chardin. The rejection of waste and growth through density and complexity of interactions facilitated by architecture combined with the understanding of buildings as dynamic and ever-changing entities is the core of Radical Inclusivity foregrounding time and contextuality as crucial layers of understanding of architecture. In this temporal perspective, maintenance and care are not separated from architecture, but are integral to its production from its conception in architectural practice, through the building process, then the maintenance of the finished building, and finally to its end-of-life care, disposal, and reuse of its remains. Using the lens of time, the article positions the maintenance and care in the context of Hannah Arendt's division between work and labor revealing hidden biases in the role of the architect and discusses its implications on the production of architecture from a feminist perspective. Using examples of maintenance in the art of Mierle Laderman Ukeles and architecture, this paper argues for a radically inclusive architecture, where the inclusivity principle is applied in the whole process of the production of architecture, including architectural education, design, and construction, and is extended to maintenance as well as working conditions of all actors involved.

Keywords

Radical inclusivity · Architecture · Maintenance · Care

1.1 Moving Projects with Temporal Dimension

Is truly inclusive design possible? Can we imagine architecture that embraces humans in all their unique, individual complexity and difference? What if we complicated things further and included non-humans to honour and recognise our entanglement with non-human Others? Or it

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is a utopian and overambitious vision that can never be achieved, because it's impossible to respond to the infinite number of permutations of individual needs and characteristics that would have to be not merely considered, but actively responded to in all architectural interventions? If it seems an impossible task, then perhaps we need to change our perspective and ask different questions about inclusivity and architecture.

"Everybody knows—and especially architects, of course—that a building is not a static object but a moving project, and that even once it has been built, it ages, it is transformed by its users, modified by all of what happens inside and outside, and that it will pass or be renovated, adulterated and transformed beyond recognition." (Latour and Yaneva 2017).

To perceive buildings as "moving projects", ever-changing dynamic entities connected to the world in myriad tangible and intangible ways, is to see them through a lens of the passing time. It is to follow their rhythms in tune with big planetary cycles and trace micro-cycles on a cellular level. The rhythms of humans and non-humans connected to a building can exist in proximity, but without ever coming into direct contact with each other. Their coexistence is possible because they occupy different spatial scales and follow different time cycles, sometimes separate and almost completely inconsequential to each other, and in some cases entangled to the point of symbiosis.

Adding the temporal dimension to our understanding of buildings becomes the lens capable of revealing their true shape reaching far beyond their external shell. By expanding our understanding beyond the three dimensions, we reveal a spatio-temporal structure requiring a different set of analytical tools capable of fully grasping its complexity. Seen through the temporal lens, the building expands and reveals its connections with other entities, alive and non-living, it pulsates in multiple rhythms, it changes, undergoes many transformations, and finally dies. To imagine the life of a building is to not only imagine its death but also the afterlife.

1.2 Radical Inclusivity

A temporal perspective on space is at the core of the idea of Radical Inclusivity (Nawratek and Nawratek 2015), attempting to reconfigure the established trajectories of thinking about inclusivity in architecture. Radical Inclusivity (RI) has its origins in the theology of Origen, a third-century Alexandrian religious philosopher who questioned the idea of hell. Origen believed that all creation would return to its creator at the end of time, which was a radical and blasphemous idea at the time as it eradicated the need for the existence of hell. When interpreted beyond religious context, Origen's thinking is at its core a radical rejection of waste. In this perspective, nothing is ever wasted and discarded; there is hope of redemption, even if it means waiting for it until the end of time. It remains a revolutionary and radically inclusive idea, in direct contradiction to the Western paradigm of the world constantly churning out waste: not only things but also living creatures and even people.

Another point of reference for Radical Inclusivity is Paolo Soleri's Arcology, a concept merging architecture and ecology. In 1970, Soleri[1] published a series of drawings and models of Arcologies, buildings in the scale of cities, each testing a different site, climate, or functional purpose. In the same year, Soleri set out to test his ideas and the construction of Arcosanti, a settlement in the desert in Arizona begun. Soleri was hugely influenced by writings by Pierre Teilhard de Chardin, a Jesuit priest, palaeontologist, theologian, and philosopher. His understanding of evolution as a purposeful process where consciousness is the highest form of organisation and the idea of the Omega Point were underpinning Soleri's architectural experiments. The Omega Point is particularly interesting as it shaped Soleri's approach to time in architecture. Teilhard proposed that everything in the universe spirals towards the Omega Point,

[1] In a text written from a feminist perspective, it is important to acknowledge that Soleri, who died in 2013, was accused of sexual abuse by his daughter, Daniela Soleri, in an essay published on the website Medium.com in 2017.

where it will be unified in the final state of full consciousness, echoing Origen's thoughts on final reunification with God.

Religious interpretations aside, this moment of reunion, a singular point in time of perfect fullness, a resolution of all loose narrative strands, of a story told in full and finally complete, offers something irresistible as it recalibrates human perspective on time, bringing acceptance, consolation, and even hope. Despite a clearly defined destination point, and because of the vast, incomprehensible distance between now and the Omega Point, this perspective reframes all human endeavours as parts of a journey, not isolated acts. In this approach, Omega Point is so far away, it becomes the never to be achieved state of perfection and stasis, where nothing could be improved upon, and our work is finally done. With the Omega Point in the distance, the past becomes a continuous presence that cannot be denied or forgotten. The Omega Point is impossibly far away and unreachable, its perfection and completeness allowing for imperfection and continuous experimentation. Its mere existence on the horizon is forgiving to errors and rewarding for hopeful trying. Circular, seasonal time cycles are revealed on a vast plane of time, and as the curse of repeated mistakes is lifted, hope emerges.

It would be tempting to approach Radical Inclusivity as an iteration of flat ontology. However, the temporality of the Omega Point introduces hierarchy to subjects connected in the web of relationships and situates them in a defined context, therefore introducing a non-flat, contextual reality (Wilde 2020).

Soleri applied these ideas to the urban form and saw architecture as a "(…) solid material imbued with a temporal impetus, an élan vital that could effect transactions between the built environment and its inhabitants" (Busbea 2013). Further following Teilhard, Soleri's cities were meant to be continuously growing through the increased complexity and density. The sheer scale of interactions and relationships created in this process, would result in a higher consciousness gained at the end. Growth here is defined as increased complexity and density, not an increase in size. This understanding of architecture as a process, as opposed to a solid entity, is an important reference point for Radical Inclusivity.

The no-waste approach when applied to architecture is already familiar as we think about the ideas of circular economy or adaptive reuse. They both have an inbuilt element of temporal thinking and accept that sooner or later, all buildings die. Therefore, it becomes imperative that in its lifetime, we should be constantly asking: how can a building enable and support life? And then, finally, how can its death contribute to the world?

1.3 Fear of Death in Architecture

At this point, the question of the understanding of time in relation to buildings becomes important for our further investigations. This understanding can be contradictory, as on the one hand we romanticise ruins, and there are many examples of architecture celebrating and embracing the passage of time, but on the other, we have a deeply ingrained fear of decay because it confronts us with the inevitability of death. We are doing our absolute best to rid buildings of any traces of entropy and change. We scrub any traces of our own existence and try to return things to the day they were fresh and new, washing away or concealing any signs of decay. Dust, mould, and grime need to be removed daily to uphold our delusions of power over time. However, we don't value this constant fight with entropy heralding the ultimate death of the universe; it is an unappreciated and undervalued work, even though it is impossible for us and our civilisation to survive without it. Big and small acts of care uphold the illusion of suspended time; death signalled by decay is deferred by another day, month, or year.

1.4 The Fragility of Buildings

Let us apply the temporal perspective to new architectural visions promising care-free world. The Line, the latest project announced by Saudi Arabia, a 500-m-tall linear city for 9 million people is planned to be built near the Red Sea (Ravenscroft 2022). Sleek visuals reveal a mirrored façade reflecting the desert around it. Another image comes to mind, uninvited, yet persistent. A window washer gently sways on a rope, cleaning the glass façade reflecting the sky and orange-tinted rock formations of Monument Valley. The rapid movement of clouds suggests a disparity between the lifespan of the human, the building he is servicing, and the landscape, deepening the sense of dreamy alienation. A second glance reveals the mirrored structure to be the Superstudio's "Continuous Monument" from 1969 (Quesada 2011) and the image comes from a short film titled "Routine Maintenance" (Fig. 1.1), by artists Hironaka and Suib (2014).

Once released, our imagination makes further leaps. What if there was a squad of window washers neatly spaced across the façade and moving in a choreographed effort, wearing coordinated uniforms? This would make for a more menacing image, devoid of its initial romanticism of loneliness up in the air and lacking the exclusivity of the experience. Or we could replace humans with a swarm of drones, meticulously and dutifully fighting the invincible dust in vain, long after the mirror structure becomes a hollowed monument for human hubris. The question remains: Once built, how will The Line keep its mirror walls clean?

Unexpectedly, the question of maintenance reveals buildings to be fragile, and in need of constant maintenance and care to merely remain unchanged. For the lone window washer, there is no growth nor substantial change at the end of this work, its only reward is the preservation of the status quo, perfectly frozen in time, restored to the state closest to when it was new and pristine.

1.5 Work and Labor, Development, and Maintenance

Artist Mierle Laderman Ukeles in her "Manifesto for Maintenance Art 1969!" (1969) made a distinction between "two basic systems: Development and Maintenance", where Development is "pure individual creation; the new; change; progress, advance, excitement, flight or fleeing.", whereas Maintenance's role is to "keep the dust off the pure individual creation; preserve the new; sustain the change; protect progress; defend and prolong the advance; renew the excitement; repeat the flight." Ukeles' Development and Maintenance mirror Hannah Arendt's distinction

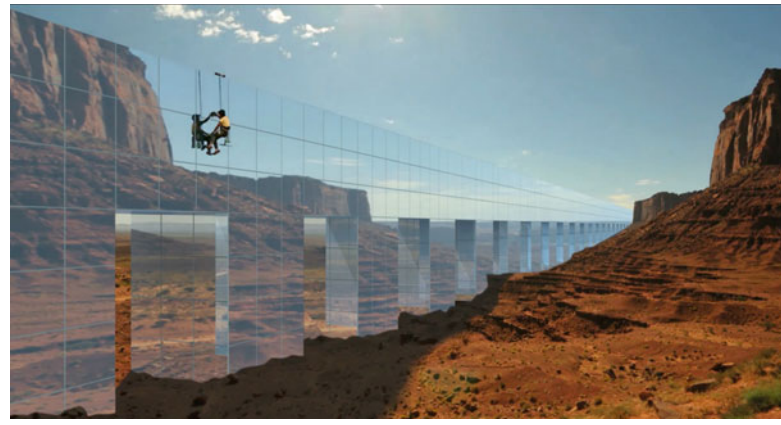

Fig. 1.1 Routine maintenance, 2014, Nadia Hironaka and Matthew Suib, video, screenshot

between work and labor[2] (Arendt 2013). Labor sustains life and is "(…) necessary for turning the raw into the cooked, dirt into cleanliness, or children into developed human beings secures our individual survival and the life of the species, but the products of labor are inherently ephemeral; reproductive labor eventually evaporates into the never-ending cycle of biological life." (Veltman 2010), whereas work fabricates things that exist beyond the process of their own production, transcends nature, and creates lasting artefacts sustaining the world for human beings to inhabit. Labor (reproductive and never-ending) sustains life and is a realm of women, whereas work (productive, individual, creative) builds civilisation, and is regarded an implicitly male pursuit. There is no doubt which one is more valued, and as frustrated Ukeles put it her Manifesto: "Maintenance is a drag; it takes all the fucking time."

If we apply those categories to architecture, it firmly lands in the realm of work, as its core values are individual creativity and the production of lasting artefacts.

With the work/labor distinction in mind, it becomes more understandable why women were perceived a threat to the idea of the architect when they started entering the profession at the end of the nineteenth century. Krasny (2019, p. 39) called it the care trouble, echoing Judith Butler's Gender Trouble (Butler 1990), as women's participation in the profession was perceived a threat to the independent and autonomous architect because of their association with care and reproductive work relegated to the domestic sphere. With women now firmly established in the profession, it would be reasonable to expect these discriminatory attitudes to be firmly in the past, but they are still deeply embedded in the way we define the role of the architect, and consequently how it is constructed in architectural education.

Despite being increasingly challenged, the idea of the architect in education is still predominantly constructed through assignments focusing on the individual creation of lasting artefacts—buildings. This approach perpetuates an exceptionalist mindset, still existing in many schools, where architecture is presented as a calling and students are expected to endure a series of rites of passage, testing their physical (all-nighters), and mental endurance (crits) in exchange for a promise of an artistically fulfilling career and even fame, playing into the starchitect culture still prevalent in the profession. A master-apprentice model on which architecture education is based has an embedded hierarchy obscuring the collective reality of architecture production.

This system not only reproduces an individualistic attitude among students but also makes them vulnerable to exploitative working conditions still widespread in the profession. It would be unacceptable in many other professions, and yet, architects are often expected to work for free. The long hours and unpaid overtime, unpaid internships, and competitions put enormous pressure on people working in the profession, particularly women, as the demands of work are not compatible with caring responsibilities still predominantly associated with women. In response to this precarious situation, a figure of the architect worker is entering the conversation in opposition to the individual genius of the past. Muyiwa Oki, the newly elected President of the Royal Institute of British Architects (RIBA), used the architect worker platform in his successful election campaign supported by an array of grass roots organisations and early career architects (Architecture Social 2022). This is also how The Architecture Lobby (one of Oki's supporters), an international organisation advocating for ethical labour practices, opens its manifesto: "We are precarious workers" (The Architecture Lobby 2022). Peggy Deamer, an architect and educator, the founding member of the Lobby, reframes the Arendtian distinction between work and labor, defining work as "(…) what we all do in our individual lives (i.e., we go to work every day), and labor as what is monetized by our economic system." (Levinson and Deamer 2020).

[2] I am using an American spelling of labor as used by Hannah Arendt when discussing her concept of labor. In all other instances, I am using British English spelling: labour.

A strategy of rejecting the work/labor distinction was adopted by Ukeles who exhibited maintenance (labor) itself. In her work, she documented domestic acts of care, revealing the most intimate and mundane aspects of childcare such as "Rinsing a B.M. Diaper", from Private Performances of Personal Maintenance as Art, 1970, or "Dressing to Go Out/Undressing to Go In", 1973. She breached the revered public sphere of an art gallery and in a series of black and white photographs documented the process of washing the steps of the Wadsworth Atheneum ("Washing/Tracks/Maintenance: Outside", 1973). In her "Touch Sanitation Performance" (1979–80), she further scaled up her efforts and in a truly gargantuan endeavour Ukeles thanked and shook hands with 8500 New York's sanitation workers. The performance was her daily work for almost a year as she spent 8–16 h a day visiting sanitation workers in different locations, interviewing them, observing them at work, and delivering speeches about its value (Steinhauer 2017).

This project also highlights another aspect of labour, as the emotional weight attached to all human interactions, and through Ukeles' prominent position in the process highlighting the expectation and burden women are expected to carry. A simple act of shaking hands and showing gratitude, in each case of the 8500 workers, must have come with a certain depth of a real, or performed, emotion, which is routinely expected from women as those who recognise, respond to, and regulate the emotions of others.

Another interesting insight into the maintenance in architecture comes from Rem Koolhaas in the interview in connection with the film by Ila Bêka and Louise Lemoîne, "Koolhaas Houselife" (2008). The film documents a house in Bordeaux Koolhaas designed for a disabled client through the experience of Guadalupe Acedo, a cleaner employed by the family. In the interview following the film, Koolhaas expressed his astonishment that she chose to clean a circular staircase, an unconventional architectural element, using the most conventional methods. As Hilary Sample (2016) points out: "His disappointment is not that the building gets dirty, or that the housekeeper is unduly burdened, but that his architecture has failed to inspire a particular kind of organization (…)".

Perhaps Koolhaas overestimated not only the agency of a cleaner but also how this work is situated within cultural expectations of who performs the labour of cleaning and how this role and tasks associated with it are traditionally defined, and therefore expected from workers. It is, however, possible to frame his disappointment as a reflection on maintenance as a creative act: "I can easily imagine if I were a cleaner—maybe this is something we should have thought of—is to devise some sort of protocol of what is convenient to be done by hand and what is convenient to be done by machine" (Koolhaas, 2008, quoted in Sample 2016, p. 99). Perhaps through his own privileged position as an architect, therefore, someone defined by productive work, Koolhaas changes the perception of cleaning and elevates it to a creative activity in need of a bespoke protocol.

1.6 Protocols of Care

Bespoke protocols, we all had to develop them during the pandemic. It changed our attitudes towards maintenance as it situated it in a wider context of processes and relationships between users, buildings, and systems (ventilation, heating, etc.) and somehow blurred the division between maintenance and cleaning, as they became intricately linked to each other as parts of maintenance strategies requiring an in-depth understanding of human and non-human behaviour in enclosed spaces.

The pandemic revealed the depth of expertise required for effective maintenance practices. It varies from the knowledge of appropriate chemicals to remove limescale, but it is also planning a timetable for face-to-face teaching at a primary school to reduce the spread of a virus. Maintenance is a fire evacuation plan for an assisted living facility and organisation of childcare during an academic conference. It requires a situated knowledge of a building and an understanding of architecture as a "moving project" with all its connections and

dependencies further complicated by the unpredictability of human, and non-human, behaviour.

Maintenance and care are therefore not separated from architecture, and I would argue that they should be practised with the same in-depth understanding and rigour as the design process. In such an interpretation, maintenance requires the same intellectual agility and creativity as design. Following that thought, we could imagine a bespoke architectural service focusing on the maintenance and everyday care of buildings, including alterations and reuse, and finally engaging with the controlled demolition and redistribution of materials.

Could we find a common denominator binding together work, labour, architecture, and its maintenance? As signalled earlier in this text, if we use the lens of time and apply to it architecture, its production, and then maintenance, it can not only reveal hidden forces still shaping how architecture is taught and produced, but perhaps also offer a way forward that can change the way it is practiced.

1.7 Radically Inclusive Architecture

The temporal perspective of Radical Inclusivity when applied to architecture introduces a dynamic element to our understanding of buildings. They are seen in the perpetual state of becoming and flux, deeply interwoven with their context and creating new connections in the response to their human and non-human users. They are never finished, and their external shells are not their true boundaries, which in the radically inclusive perspective extend far beyond a web of connections, dependencies, and relationships.

The radically inclusive framework does not allow for waste; all energy embedded in the process of its construction must be accounted for, and its use justified by creating closed circuits when possible.

Every building becomes a never-ending project; once the construction process is finished, the focus merely shifts from design and construction to maintenance/care, which is bespoke, situated, relational, creative, and care-ful. Maintenance still requires reproductive labour, but when seen from the perspective of the whole effort and expertise needed for building maintenance, it can engage, empower, and give agency to people performing the acts of care, be it the cleaning crew, builders, building managers, and finally users.

By adding a posthuman perspective, Radical Inclusivity plots interactions between humans and non-humans, and imagines scenarios of their coexistence (Fig. 1.2).

The temporal lens of Radical Inclusivity brings into sharp focus the conditions of the

Fig. 1.2 Posthumus. A sculpture following Donna Haraway's idea of "living and dying well with each other in a thick present". Student project. Bread, mould, resin. Simona Drabužinskaitė, Manchester School of Architecture, year 3, 2020/2021

production of architecture. It attributes value to work performed by architectural workers, and all people involved in the building process. It also highlights the inequalities embedded in the role of the architect, where following Hannah Arendt's division of work and labor, a hierarchical star system ignores the cooperative and relational aspects of the profession. In radically inclusive perspective architects are seen as workers and human beings with ties and responsibilities to others. It also recognises their responsibility to care for themselves and that unjust working conditions cannot produce just architecture.

"Climate justice as the basis of all architectural work. There can be no sustainable future without sustainable labor practices", as the Architecture Lobby demands in its manifesto (The Architecture Lobby 2022). This approach obviously extends to architectural education, where the idea of the architect is first constructed and validated through the positioning of students in their relationships with tutors and each other.

The broad perspective of the radically inclusive approach, not only directly in the design process but also extended to the conditions of the production of architecture, both in practice and architectural education, allows for embedding inclusive practices throughout the profession.

In the context of global architectural practices, where construction is often outsourced to migrant workers, a radically inclusive approach does not allow for the separation of the architectural design process and the working conditions of workers, making the exploitation of the differences in wealth between countries and also within them impossible, in a direct alignment with the UN Sustainable Development Goal 10: Reduce inequality within and among countries.

In architectural education, the inclusive principle applies directly to gender and other characteristics such as race, age, and ability, responding to the UN SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; and 5: Achieve gender equality and empower all women and girls.

The inclusive agenda reaches beyond the human-centric vision of the world, and using a posthuman perspective embeds humans, with all their differences and characteristics, into an even more complex web of interdependencies shared with non-human actors in a radical gesture of inclusion and care.

Radically Inclusive architecture is rich in life.

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2 Understanding School Administrators' and Teachers' Perceptions of Gender-Inclusive Washroom Design: A Canadian Case Study

Lindsay J. McCunn, Christine Woolley, and Darryl Condon

Abstract

Empirical associations between school design attributes and the quality of students' learning, comfort, and community experience are well-researched. Increasingly, a desire—and a requirement—to provide gender-inclusive washrooms in Canadian schools exists. Yet gaps in knowledge about how to best implement these spaces remain. The firm involved with this case study is a Canadian architecture and design practice that advocates for inclusive, accessible design, and strives to understand the social contexts emerging from built environments. This firm has designed gender-inclusive washrooms for a number of secondary schools and is seeking to understand their social impact on school culture based on the perspectives of teachers, staff, and administrators. Led by a professional environmental psychologist, this study employs interview methodology to examine employees' attitudes about the design of gender-inclusive washrooms at a particular school in British Columbia, Canada, as well as their perceptions of students' acceptance of these spaces. The aim to understand these spaces from the perspective of employees will allow architects and school districts to better contribute to the UN's SDGs related to the promotion of quality education, gender equality, and inequality reduction, and ensure that "no one is left behind".

Keywords

Gender-inclusive washrooms · Architecture · Environmental psychology

2.1 Introduction

Interdisciplinary research in the bodies of design and environmental psychology literature indicates that the school environment significantly affects the quality of students' learning experience, levels of comfort and wellbeing, and a sense of inclusivity (Bennett et al. 1980; Durán-Narucki 2008; Martin 2002; Uline et al. 2009). Schools can also influence how teachers, staff, and administrators perceive their work and their psychosocial experiences inside these environments (McCunn and Gifford 2015; McCunn 2019). The present "work-in-progress" study gathers subjective, experiential data from

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employees at a school in British Columbia where gender-inclusive washrooms have recently been implemented. This post-occupancy evaluation (POE) will assess the extent to which employees perceive levels of student acceptance of these washrooms using semi-structured interviews and systematic content analysis of response data. The work seeks to elucidate the effectiveness of the washrooms' spatial configurations and design characteristics (e.g., location, visibility to common areas, and level of privacy). Staff and administrators will also be asked about their impressions of the strengths and challenges of the washrooms' design process to complete the POE and improve the design of future inclusive schools.

This research engages a third-party researcher to explore how school settings can be improved in practice. Results will support advancement in the firm's designs of inclusive washrooms, and inform other firms and research endeavours (Figs. 2.1 and 2.2).

2.2 Literature Review

Architects and environmental psychologists alike are familiar with the importance of understanding how individuals are affected by physical environments. Social design philosophies ensure that built spaces foster social contact, feelings of security, personal growth, and aesthetic appeal (Sommer 1983). Interdisciplinary research shows that attributes of a variety of built settings affect levels of comfort, stress, productivity, wellbeing, and a sense of place (Altomonte et al. 2020; de Paiva and Jedon 2019; Devine-Wright and Clayton 2010; McCunn and Gifford 2017, 2021). Some psychosocial outcomes are easily observed by building owners, designers, and administrators while others require in-depth social scientific analyses to be understood comprehensively (de Paiva and Jedon 2019, Sommer and Sommer 1997).

The wellbeing of transgender and gender non-conforming individuals in gender-segregated

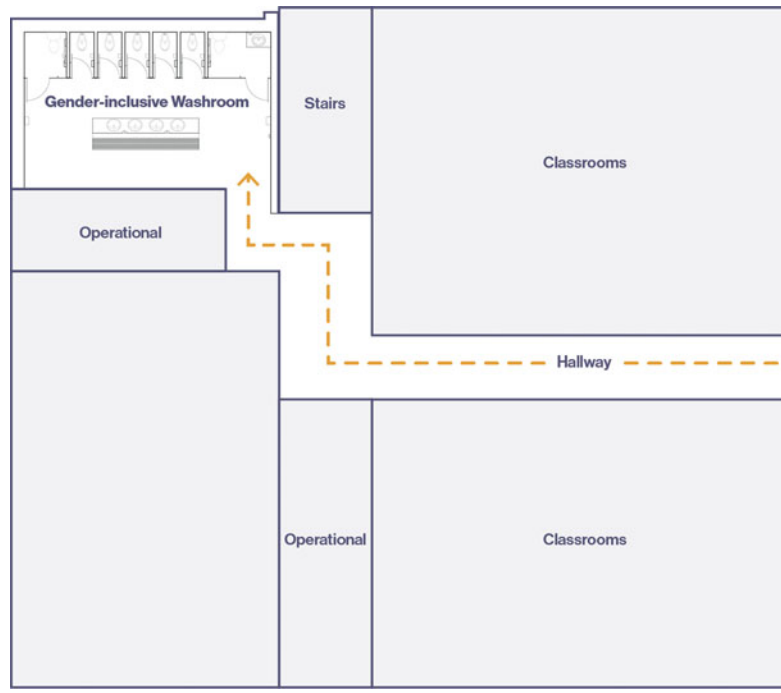

Fig. 2.1 Plan view of gender-inclusive washroom at case study school

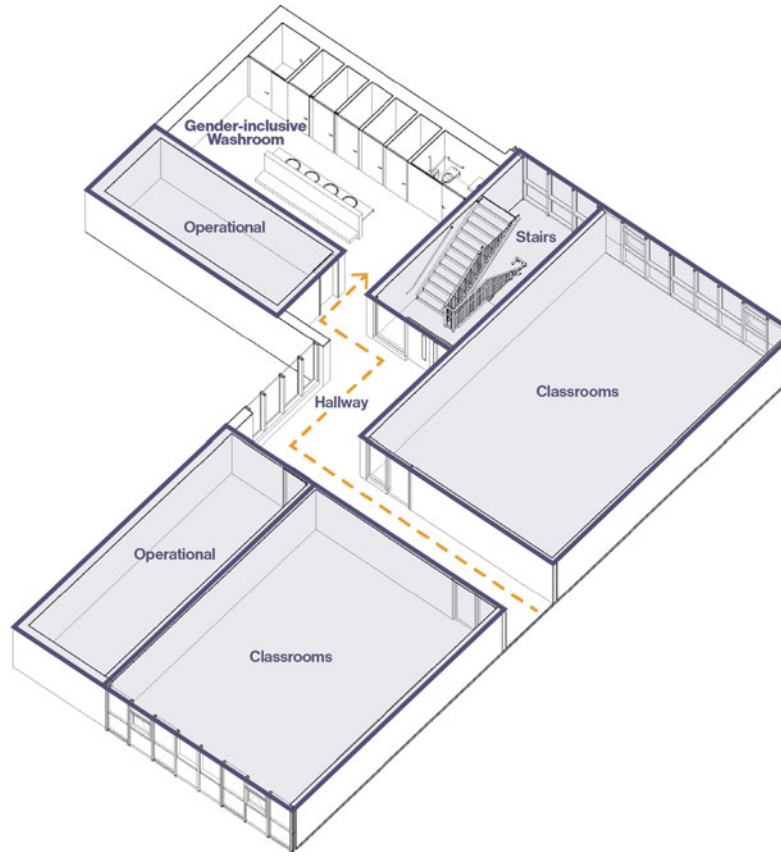

Fig. 2.2 Axonometric diagram of gender-inclusive washroom at case study school

spaces is a well-observed, ongoing issue. The findings of the second Canadian climate survey on homophobia, biphobia, and transphobia in schools indicate that 2SLGBTQ (two-spirit, lesbian, gay, bisexual, transgender, queer, or questioning) youth suffer harassment and discrimination (Peter et al. 2021). The survey found that 2SLGBTQ youth face a disproportionate amount of bullying concerning their sexual orientation and/or gender identity. This negatively affects wellbeing, safety, social connectedness, attendance, and academic achievement, as well as increases isolation and emotional distress (Peter et al. 2021).

Transgender and gender non-conforming individuals are often exposed to oppressive gender binary classification related to school documents, dress codes, and physical facilities (Cavanagh 2010; Porta et al. 2017). Not surprisingly, washrooms and changerooms are the locations most viewed as being unsafe by these youth (Francis et al. 2022; Kosciw et al. 2018; Peter et al. 2021; Taylor et al. 2011).

Gender-inclusive washrooms are designed to be safe and welcoming for everyone, regardless of gender identity or expression (Chaney and Sanchez 2017). Davies et al. (2017) argue that a positive school experience for transgender and gender non-conforming students can be achieved by incorporating gender-inclusive washrooms that are backed by advocacy and policy. Indeed, gender-inclusive washrooms contribute to students' sense of belonging at school, a reduction in bullying, and feelings of self-consciousness and anxiety (Francis et al. 2022; Greytak et al. 2009; McBride et al. 2020; Peter et al. 2021; Price-Feeney et al. 2020; Porta et al. 2017).

These spaces can serve as a model of how the physical environment can affect individual wellbeing for the better. However, they do not always

ensure equitable access. A recent study investigating secondary school all-gender washrooms found that the secluded location of the washroom (in the school's basement) resulted in the space being used for unsafe purposes (e.g., hanging out, vaping; Omercajic 2022). Arguably, gender-inclusive washrooms require different design strategies than gendered industry standards—but little data exists on best practices when implementing inclusive washrooms in K-12 settings (Cuningham Group Architecture 2020).

Cavanagh (2010) details trans and queer perspectives on the design of gender-inclusive washrooms. Many are concurrent with existing design strategies, such as enclosed individual rooms, ease of access without drawing attention, and accommodations for a range of body and family types, and abilities. Knowledge is beginning to shift through the emergence of interdisciplinary research, publications, and guidelines (e.g., Cunningham Group 2020; Gensler Research Institute 2018; HCMA Architecture + Design 2018; Sanders and Stryker 2016; Stalled! (n.d.). Canadian provinces, municipalities, and school boards are also creating recommendations for inclusive washrooms. Nevertheless, refining these strategies to ensure spaces meet occupant needs and evolving social values is prudent.

2.3 Methodology

Employees at the school can voluntarily participate in online interviews. Recruitment is occurring via emails sent to publicly available school district email addresses. This procedure has been approved by the researcher's institutional ethics board. We aim to recruit between 7 and 15 participants; three interviews have been compared at this time. Ten interview items have been composed to elicit descriptions of the school's washrooms with respect to their location, amount (and importance) of visibility from common areas, and whether students are perceived to understand the spaces as safe and socially inclusive. Descriptions of positive and negative behavioural and attitudinal outcomes arising from the washrooms will be gathered and analysed.

Semi-structured interviews are a powerful qualitative research tool because they provide standardization in how questions are asked across participants while allowing for free-flowing responses (Sommer and Sommer 1997). Data will be systematically content-analysed to capture emerging themes and their percentages—this is a reliable technique for translating interview material into quantitative and meaningful environment-behaviour principles and practices (Sommer and Sommer 1997).

2.4 Results

Results will be presented at UIA2023.

2.5 Discussion and Conclusion

Research outcomes can be applied by the continued improvement in the firm's design of inclusive washrooms, the development of new guidelines, and the advancement of architectural practices when shared at professional conferences and through in-house decision-making for future projects.

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3 Importance of Architecture and Gender Perspective for Healthy and Energy-Efficient Households to Achieve Sustainability: A Case of Kathmandu

Bindu Shrestha

Abstract

Architecture with a gender lens has a crucial role in achieving sustainability in an urban built environment in healthy living and energy efficiency considerations. Households are one of the most energy-demanding sectors and consume almost 80% of total energy. Women are considered primary users due to their prominent involvement in household activities in Asian contexts like Nepal. Nepalese household energy consumption is at a crossroads, and national policy matters for its future development. However, it focuses less on architecture, healthy planning, and gender considerations. Historical buildings and settlements have set examples of sustainability, resembling healthy living with less energy use. Scholars have started to emphasize the improvement and interconnection of the built environment in terms of a green building design. Gender participation also contributes to economic and social development. With these considerations, this study emphasizes identifying environmental behaviors and gender roles' understanding in three different built environments of various socio-economic contexts of Kathmandu. It has examined 623 household questionnaires and six indoor air quality tests. The study indicates that the lower income groups use a more significant share (13%) of their monthly income for household energy needs. However, they live in poor indoor air quality environments and lack proper ventilation. 37% of inner-city's kitchens lack proper ventilation, and 71% of urban kitchens have only one window. Even though females of all generations are aware of energy-saving practices reflecting higher gender participation in household energy and are poor air quality kitchens without proper ventilation due to lacking proper health-sensitive energy-efficient building regulations, proper building regulations can achieve the energy-saving potential of architectural design in terms of building elements in orientation, form, and materials with inclusiveness in design.

Keywords

Household energy · Gender · Indoor air quality · Architecture · Sustainability

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3.1 Introduction

Energy has been crucial since human evolution and remains a vein to achieving Sustainable Development Goals (SDGs) (Habtezion 2016). Household energy consumption accounts for a 35% share of total energy worldwide (IEA, 2019; Shrestha et al. 2021) and is expected to increase by 20–40% in 2040 (Santamouris 2019). While the study shows that energy-efficient households are primary vehicles to achieve the individual and sustainable nation's welfare, however, the achievement is still low. WHO's (2006) study identifies that inaccessibility to cleaner technologies, healthy building planning concepts, and women's low participation are significant barriers to development (Shrestha et al. 2021). However, it has yet to receive much attention in sustainability studies.

The environmental literature shows that women are likely to save energy by 22% more compared to men (Huang and Chao 2017; Shrestha et al. 2020a, b). Women are pivotal in the transition toward sustainable household energy practices as they are primary energy users and can influence society (Milne 2003). Simultaneously, the researchers have emphasized that household energy consumption could be reduced by 10–30% solely by changing its inhabitants' behavior without compromising their comfort (Owens and Wilhite 1988). The energy-saving potentials from proper architectural design decisions can be increased up to 63–76% depending on climate (Naboni et al. 2015). Energy efficiency investments can increase internal air temperatures leading to better living conditions (Poortinga et al. 2018).

However, Nepal still needs to have a strong sustainable energy strategy (ADB 2013). The residential sector is accounted for 80% of the largest energy consumption, and cooking is the highest energy use activity with 60% of the total energy share (Nakarmi 2018). The energy efficiency vision has been started using efficient lighting and has proved to have a potential saving of 4,325 GWH (REEP 2013). Nevertheless, more is needed for the energy-saving for sustainability concept. Public awareness has led mainly to potential saving and energy-efficient practices (Shrestha et al. 2020a, b). Realizing the importance of energy awareness, recently, Nepal announced the 'Energy Decade' in 2018 to expand renewable energy (Sapkota et al. 2014). Nepal Energy Efficiency Program (NEEP) has emphasized energy-saving in different residential sectors under the Alternative Energy Promotion Center (AEPC). However, it has limitations of inclusive guidelines lacking consideration of building design, planning guidelines, and gender lens. Improving building system design using new technologies have a pertinent role in reducing energy consumption. One of the largest energy demands in the building is indoor climate control for a healthy living environment that consists of heating, cooling, and ventilation (Naboni et al. 2015). In this regard, building design, planning, and use of materials can play a crucial role in Kathmandu households with behavioral awareness.

This study is focused on a three-layered matrix: (a) A healthy built environment in terms of energy-efficient appliance use (heating/cooling appliance, solar energy, and income and energy share), (b) environmental behaviors in terms of indoor comfort (kitchen design, indoor air quality, and thermal comfort), and (c) energy use behavior in intergenerational gender participation.

3.2 Materials and Methods

Epistemology has been understood through the constructivism and interpretivist philosophical tradition to perceive the lifeworld. The research logic is based on inductive logic to gain ground issues in the three city layers—the random stratified sampling survey with a total sample size of 623 respondents. The built neighborhood environment and intergenerational gender data were collected from the questionnaire survey, interviews, and observation; analyzed in the descriptive, multinomial logistic regression model and verified from the significant test, as shown in Fig. 3.1.

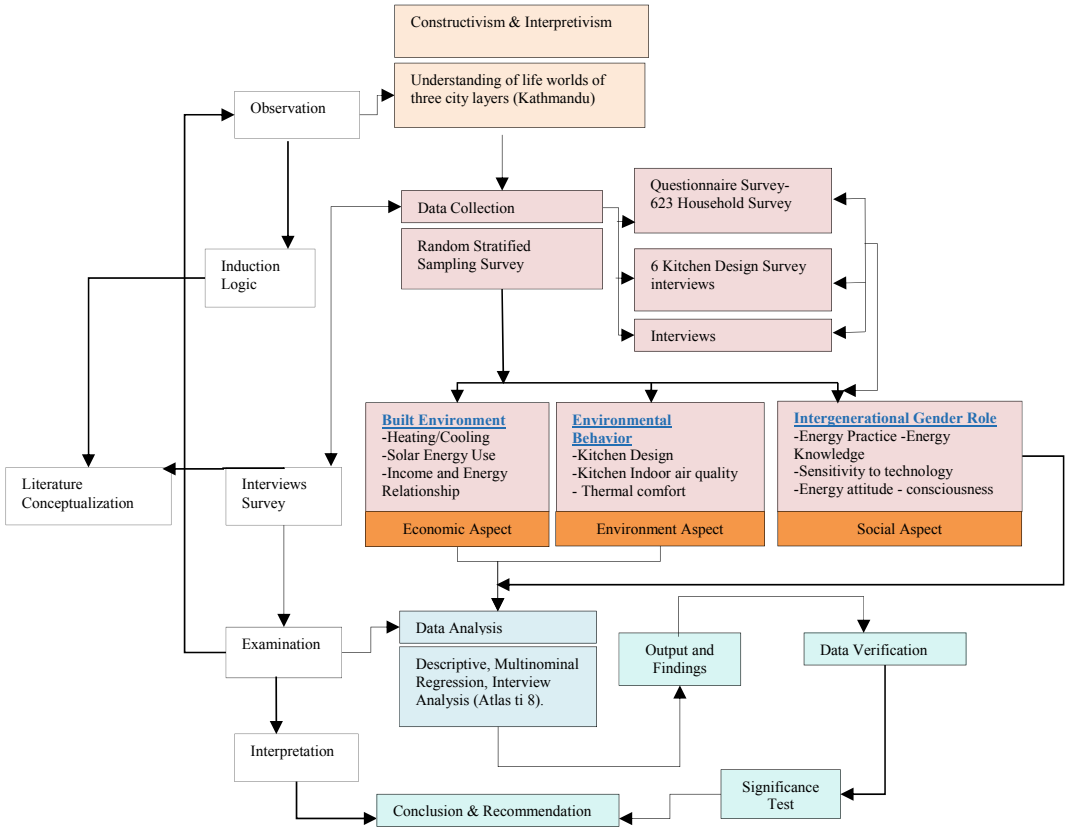


Fig. 3.1 Research conceptual methods and methodology

The environmental indicators were established from the test of indoor air quality (IAQ) and thermal performance using the HOBO sensor. The indoor air quality test was done using Onset's HOBO MX 1102 CO_2 sensor logger to check CO_2 concentration, humidity, and indoor air temperature placed in the cooking areas at 1.5 m from the ground. It has a recording range: of 0–5000 ppm with accuracy: ± 50 ppm ± 5% reading at 25 °C, less than 90% relative humidity in a non-condensing environment.

A three-dimensional matrix has been established to analyze environmental behavior—appliance use, design, indoor air quality, and comfort; intergenerational gender role—energy practice, attitude, knowledge, sensitivity, and consciousness; and the spatial built environment—three layers of the city as shown in Fig. 3.2.

3.2.1 Selection of Study Areas

Kathmandu city is the capital of Nepal—the world's 96th largest country by area, a landlocked country surrounded by large nations of China and India, holding 31 million population in an area of 147,516 Km^2. The city has a high-density population of 20,288 people per square kilometer and 1.5 million dwellers (WPR 2019), as shown in Fig. 3.3. The Kathmandu Valley serves as the economic and cultural center of the country (Dhungel 2017). The male and female proportion in the country is 48% and 52%, respectively. It is an ethnically diverse city that holds primarily Newar as the original ethnic group—30%, Brahmin/Chhetri—28%, Rai/Limbu/Gurung accounts—21%, and other ethnicities are 14% of the population (GoN 2019).

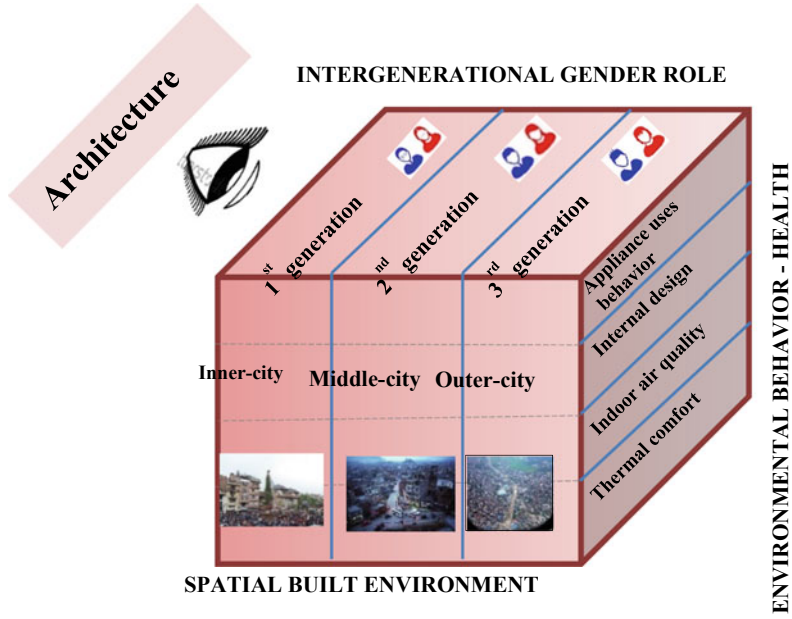


Fig. 3.2 Three-dimensional analysis matrix

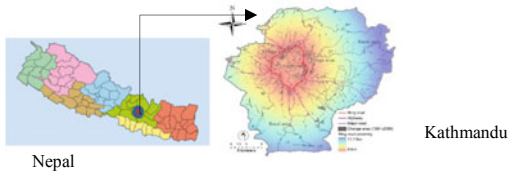


Fig. 3.3 Study area—Kathmandu. *Source* Thapa and Murayama (2010)

The selection of three study city layers is based on the urbanization and expansion of the city in three strata—inner-city, middle-city, and outer-city with different socio-economies. The core city planning was initially based on traditional values and religious beliefs. The middle-city is peripheral development around the city reflecting mixed settlement and culture, and the outer-city resembles new settlements, as shown in Fig. 3.4.

3.3 Results and Discussion

The study results are divided into three sections: a. Built environment, b. Environmental behavior (Health consideration), and c. Intergenerational gender role.

3.3.1 Built Environment

This section deals with a built environment with considerations of heating/cooling appliance use, solar energy use, and discusses its relationship with income and impacts reflecting the economic aspect of sustainability.

3.3.1.1 Built Environment and Energy Use for Heating/Cooling

The heating system data in different expenditure groups demonstrated that the highest use of a heating system was found in the high-income group of outer-city dwellers at 68%. The lowest use of heating systems users was found in a low-income group of inner-city by 15%, as shown in Fig. 3.5. The contrast trend was noticeable in the low use of heating in the high-income group of inner-city by only 22% due to the compact settlement and clothing adjustment culture.

Similarly, space cooling use was found extensively in all income groups of three city layers (Fig. 3.5). The highest percentage of electric fans was used (66%) by middle-income respondents in outer-city. The high-income group of the inner- and outer-city made moderately less use of the cooling system by 16% and

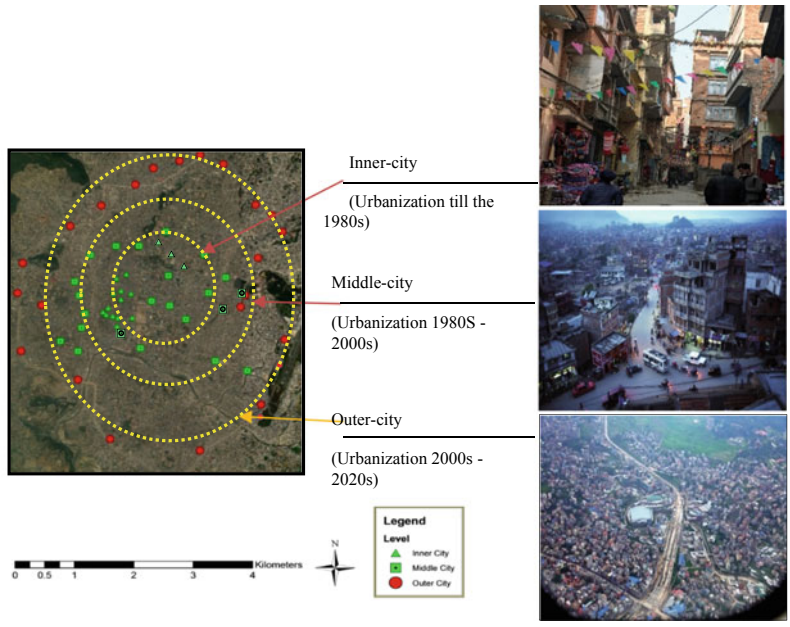


Fig. 3.4 Selection of sixty neighborhoods in three city layers

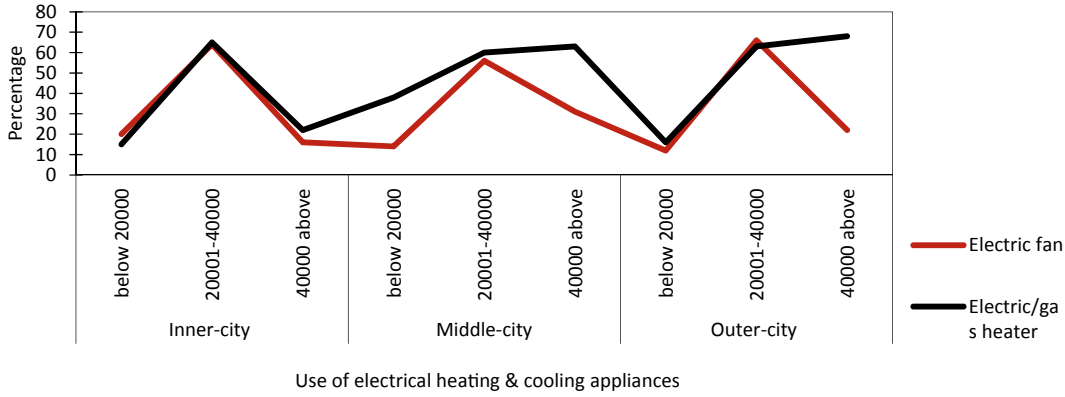


Fig. 3.5 The relation between heating and cooling appliances with income

22% because well-ventilated buildings of the peri-urban built environment positively impact saving energy in the summertime.

The result showed that income and heating appliances have a positive moderate correlation ($r = 0.48$, $p < 0.01$), the higher the income, the more use of appliances. The test of differences was statistically significant between income and appliance usage ($x^2 = 174.27$, $p < 0.001$, $r = 0.56$).

3.3.1.2 Built Environment and Solar Energy Use

The use of solar energy as a photovoltaic (PV) panel started in Kathmandu two decades ago for lighting and bathing purposes during the electricity crisis. The higher use of solar panels was found in the middle-income group of middle- and outer-city by 3.7% and 3.5% (Fig. 3.6). The least users of solar panels were the low-income group (0.5%) due to higher installation

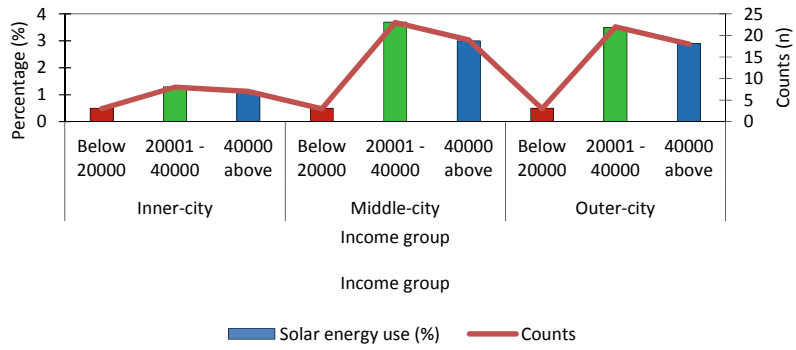


Fig. 3.6 Solar energy uses in a different economy

costs lacking sunspaces in their households which reflected incredibly less acceptance in inner-city families.

3.3.1.3 Income and Energy Share in Urban Households

As shown in Fig. 3.7, the result indicated that the energy consumption capacity also elevated when the household income increased. It showed that income and energy expenses had a moderate positive correlation ($r = 0.43$, $P < 0.01$).

The low-income group spent on energy consumption by 13%, the middle-income by 6%, and the high-income group 3% of their total share of income. The result indicated that the society segments with lower income used a larger share of their monthly income for household energy needs.

3.4 Discussion

Responding to the results of 3.1, low heating/cooling in the inner-city resembles its built environment in response to climate, lifestyle, and local materials used. The building and street network orientation allowed maximum sunlight, encouraging dwellers to gather and perform their daily activities in streets and open spaces. Bajracharya (2014) identified that traditional buildings save 10–20% more energy for heating or cooling than modern buildings of Kathmandu due to the use of indigenous materials, thick walls of sun-dried brick, and biodegradable qualities, and thermal properties that support to have energy-efficient households. However, rapid urbanization and increased socio-economic activities had a tremendous impact on energy

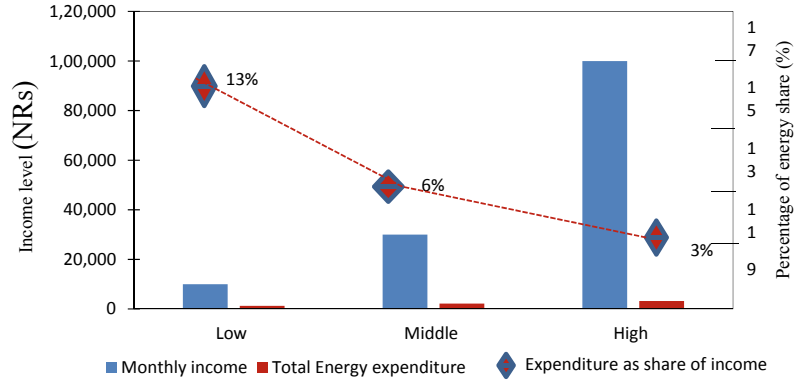


Fig. 3.7 Average income and monthly household energy cost share

Fig. 3.8 Public space and inhabitants of informal business

consumption patterns. One of them is a social system and the method of dividing an ancestor's property has developed a division in the urban fabric into horizontal and vertical fragments resulting in vertical structures and a distorted city's urban skyline (Fig. 3.8). The built environment significantly impacts human well-being and a small change in household energy decisions can have an enormous impact in the longer term to achieve sustainability. The subsidy policy to the low-income group and new development areas can increase solar energy use to achieve a clean city and reduce the gap between income groups.

3.4.1 Environmental Behavior

This section addressed the urban indoor environment regarding the impact of using kitchen hoods and kitchen design and discussed thermal comfort and the COVID-19 context.

3.4.1.1 Kitchen Indoor Environment: Kitchen Hoods and Ventilation

The kitchen environment is part of the built environment for health consideration that links to ventilation and kitchen hoods as crucial roles for Indoor Air Quality (IAQ). The study showed that the use of exhaust fans and chimneys was higher in modern buildings (22–23%) compared to traditional (0.16–0.3%) and mixed buildings (traditional structures with concrete finishing) (1–2%) (Fig. 3.9). It showed that the electric kitchen hoods were higher in modern buildings than traditional ones. Similarly, the use of an exhaust fan/chimney in the kitchen was higher in the owned household by 20–21% compared to rental households' kitchens. The results revealed that urban kitchens without windows were found by 37%, in inner-city, and having a single window 71%.

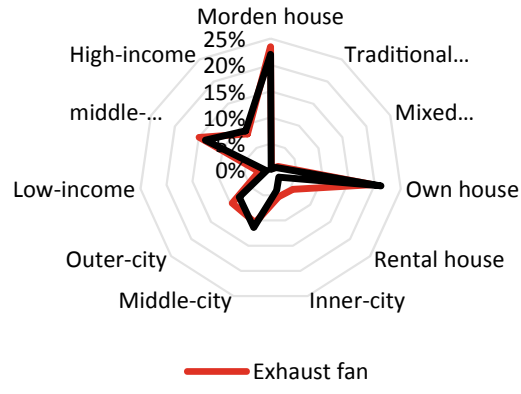


Fig. 3.9 Use of exhaust fans and chimneys in various building types

3.4.1.2 Kitchen Design (Indoor Air Quality and Thermal Comfort)

WHO standards and American Society of Conditioning Engineers (ASHRAE) have provided ventilation standards to IAQ for CO_2 concentration levels. They suggested open windows for fresh airflow for healthy air quality. CO_2 concentration level has potential health issues when it exceeds 1000 ppm (Fisk et al. 2013) and impacts human health. Most of the rental kitchen spaces did not have windows and chimneys in Fig. 3.10. In this study, the six kitchens were examined regarding CO_2 concentration level and thermal comfort in three city layers of Kathmandu.

The highest CO_2 concentration was noted on D13 at 2150 ppm, as shown in Fig. 3.11. It was surprisingly high for a single family with a cooking culture of 2–3 items daily due to lacking ventilation, exhaust fan, or chimney resulting in poor air quality in the room. In the D8 household, the highest concentration level of CO_2 was found in the morning and evening levels up to 1824 ppm (Fig. 3.11). The distinct increase in CO_2 level during the cooking time was linked to the lacking ventilation and kitchen hoods. In the rest of the houses, CO_2 concentrations were lower than 1000 ppm on a normal day, as recommended by the ASHRAE standard.

IAQ in terms of CO_2 concentration level was found to be higher during a social event, raised to 3634 ppm in D12 households due to firewood's use to make traditional meat barbeque. D2, D3, D6, and D8 households used to have social gatherings of 10–20 numbers within a year. The CO_2 concentration level of D2 increased to 1881 ppm, 2250 ppm in D3, 1296 ppm in D6, and 2521 ppm in D8 (Fig. 3.12).

The observations showed that the household of low-income groups living in rental spaces used fewer electrical appliances and fewer social activities. Those spaces had relatively higher CO_2 levels compared to household-owned spaces. The contributing factors to an increased level of CO_2 in the Kathmandu urban kitchen were increased occupancy, cooking culture, fuel use types, ventilation behavior, stagnant pollutants, and limited floor area. Shen et al. (2020) and Taneja et al. (2008) underlined that cooking activities contributed to emitting CO_2, including other pollutants. Additionally, the trend of increased indoor CO_2 levels was higher in winter than in summer. However, information on IAQ in the kitchens could have been more extensive about Kathmandu for elaborative study. Females

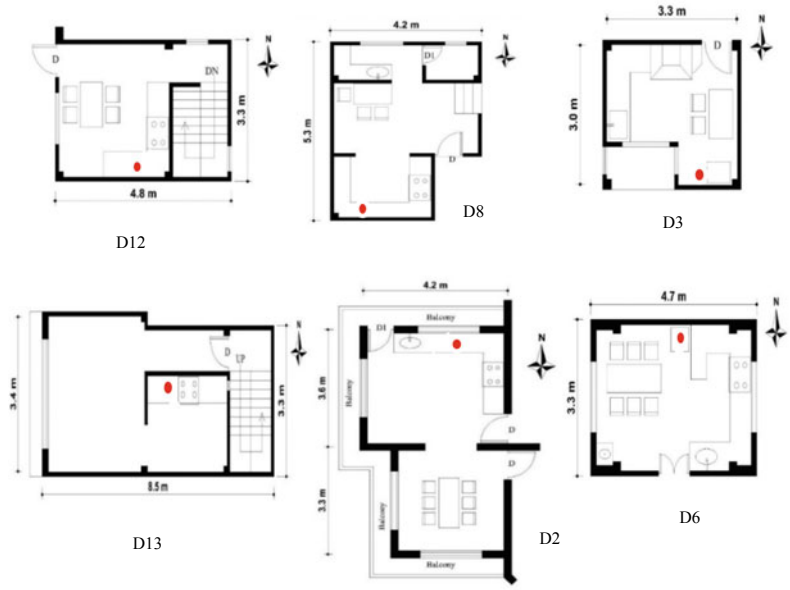


Fig. 3.10 Plan of the examined kitchen of urban Kathmandu

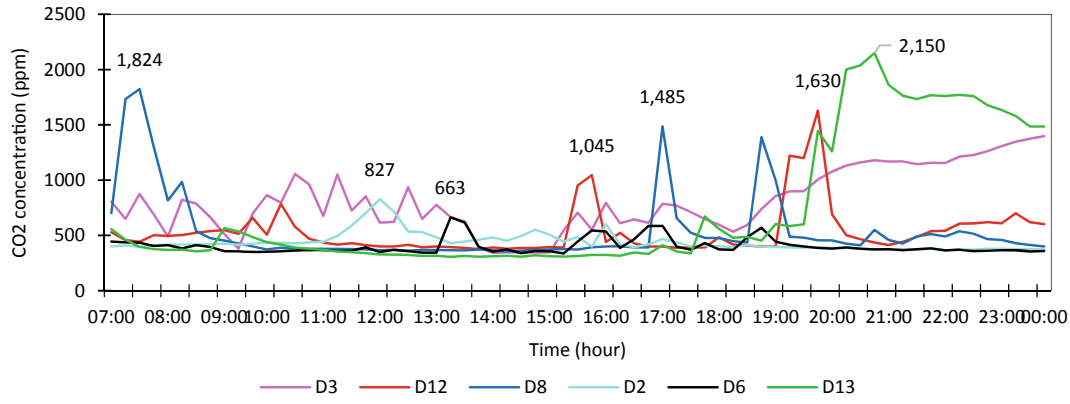
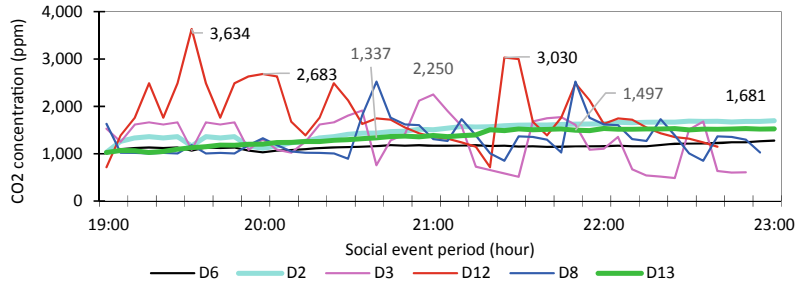


Fig. 3.11 CO_2 concentration level in an urban kitchen

Fig. 3.12 CO_2 concentration level in the urban kitchen during social events



have long cooking hours and are exposed to emissions without proper ventilation, but they are still unaware of IAQ in Kathmandu.

3.4.1.3 Thermal Comfort of the Kitchen

The thermal performance of individual kitchens was tested and predicted the future indoor temperature of the kitchen from the linear regression model. The combined linear regression results of all kitchens showed that the indoor and outdoor air temperature relationship was strongly positive ($R^2 = 0.69$) in an increasing trend (Fig. 3.13). When the outdoor temperature was 8 °C, the indoor temperature exhibited 12 °C with 4 °C increments as shown in Fig. 3.13. Kathmandu's outdoor temperature was raised up to 32–34 °C maximum, and it is predicted that indoor air temperature up to 36–38 °C, which is higher than the ASHRAE standard. Nevertheless, when the indoor air temperature increased, inhabitants opened the windows to get natural airflow. In the winter, the windows in the kitchen were usually closed, raising the indoor temperature.

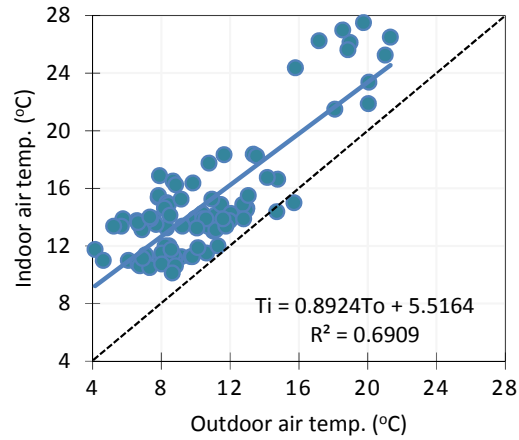


Fig. 3.13 Combined regression of thermal environment of Kathmandu kitchen

The results showed that 69% of the total variation in the indoor air temperature is explained by outdoor temperature degree

Table 3.1 Predicted indoor air temperature of the kitchen

Outdoor temp (To)	Predicted indoor temp (Ti)
11	15
12	16
13	17
14	18
15	19
16	20
17	21
18	22
19	23
20	24
21	25
22	26
32	36

increment, reflecting the best fit model. The predicted combined indoor temperature increment is presented as shown in Table 3.1. The range of differences in the indoor kitchen temperature was also affected by the building types, design, building materials, and location. These factors are essential to consider in building design and suggested to maintain through building laws and regulations.

3.5 Discussion

Responding to the results of 3.2., the indoor air quality conditions of urban Kathmandu kitchens were in line with Davidson et al. (1986), Lee et al. (2012), and Batog and Badura (2013), with high CO_2 concentration during the cooking task. Pandey et al. (1990) and Pokharel and Rijal (2020) emphasized that poor ventilation ultimately increased CO_2 concentrations resulting in poor IAQ, and also recognized that building characteristics, such as infiltration and ventilation rate, play an essential role in the variation of indoor CO_2 concentration. It has been identified that time spent in higher pollutant kitchen matters, and temperature, humidity, and VOCs have a major risk factor for acute respiratory

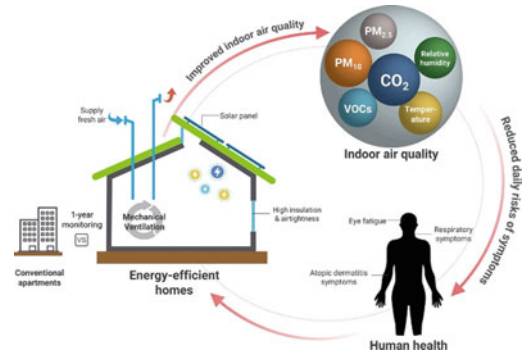


Fig. 3.14 Improvement of IAQ to reduce health risk symptoms

infections, eye fatigue, and dermatitis problems (Fig. 3.14). In this regard, Lee et al. (2012) and Rahman and Islam (2016) investigated that a kitchen hood system can reduce CO_2 concentration (@ 1.5 m/s hood system vs. close vent) by 10 times by the use of an efficient hood system maintaining thermal comfort quite well inside the kitchen space.

Inhabitants living in small dwellings without ventilations are severley suffering from health complications. In particular, those conditions might have affected more during the COVID-19 pandemic (Peters and Halleran 2020). Women's cooking hours increased during the COVID-19 pandemic, and kitchen IAQ was often overlooked. Besides, cooking oil, smoking, and human activities contribute to IAQ due to fuel emissions, people's smoking, and cleaning homes (Du and Wang 2020).

It suggests that urban housing, particularly kitchens, needs to be improved in the context of COVID-19 to reduce infectious diseases for better indoor air quality with proper humidity. ASHRAE standard suggests 20–24 °C, RH < 65%, and $CO_2 < 1000$ ppm. IAQ can be improved by proper cross ventilation, natural light (glazing, skylights, orientation), and reducing CO_2 concentration levels to improve the bioclimatic performance of buildings. It contributes indirectly to the fight against the pandemic by improving health conditions over a large timescale of more than 25 years (Peters and Halleran 2020; Pinheiro and Luís 2020; Somani et al. 2020).

3.5.1 Intergenerational Energy Behavior—Gender Role

This section emphasizes that energy-related behaviors in three generations were investigated from a gender perspective. The generation was defined based on age groups (1st generation—above 50 years, 2nd generation—31 to 49 years, and 3rd generation—18 to 30 years) in three city layers with five variables: energy practice, knowledge, sensitivity to technology, attitude, and consciousness.

(a) ***Energy Practice—switching off lights***

The energy use behavior varied in three generations according to three different locations. The data showed that 31% of females of 1st generation had a higher tendency to switch off lights in the outer-city. Males of inner-and middle-city (32% each) of 1st generation had a higher tendency to this practice than females of the same generation. The 2nd generation data showed that 43%, 48%, and 44% of females tended to switch off lights while the room was unoccupied in all city layers, as shown in Table 3.2. Similarly, in the 3rd generation, 27%, 48%, and 37% of females tended to switch off lights in all city layers.

(b) ***Energy Knowledge—energy-efficient appliance purchase***

The data showed that 20% of inner-city and 23% of middle-city males from 1st generation demonstrated energy knowledge about energy-efficient appliances while purchasing electrical appliances by checking energy efficiency. The 2nd generation data showed that 29% and 25% of females had demonstrated energy efficiency knowledge. Similarly, the data of the 3rd generation revealed that 27%, 48%, and 37% of females revealed higher energy knowledge in all city layers. It indicated that males of 1st and 2nd generations had substantial knowledge of energy-efficient appliances compared to females of the same generation. The females of the 3rd generation had been increasing interest and knowledge of energy-efficient appliances.

(c) ***Sensitivity to Technology***

The sensitivity of technology was examined by asking about eagerness to shift technology for electrical cooking from LPG when the energy cost was the same or lower than existing. On average, 4% of male respondents of the 1st generation had demonstrated their interest in

Table 3.2 Summary of gender differences in subjective energy decisions in three generations

Variables	Activities	1st generation	2nd generation	3rd generation
Energy practice	Switching off lights when no one was in a room	↑ Male	↑ Female	↑ Female
Energy knowledge	Using/purchasing efficient appliances—checking labels	↑ Male	↑ Male	↑ Female
Sensitivity to technology	Shifting technology—from electrical cooking to LPG	↑ Male	Male = female	↑ Female
Energy attitude	Recycling waste Exchange old appliance	↑ Male	↑ Male ↑ Female	↑ Female Male = female
Energy Consciousness	Electricity bill checking regularly	↑ Male	↑ Female ↑ Male	↑ Female

↑ *Note* Vertical arrow upwards—a higher decision

shifting technology in three city neighborhoods. Simultaneously, only 3% of male and female respondents of the 2nd generation exhibited an interest in it in all layers. Females of the 3rd generation exhibited slightly higher technology sensitivity. The result revealed that the percentage of sensitivity toward clean energy was meager. It indicated that education and social media had enhanced females' interest in technical knowledge.

(d) ***Energy Attitude***

Males of the inner- and middle-city of the 1st generation (73% and 67%) had a higher positive attitude toward exchanging, reusing, and donating old appliances than females. In contrast, 67% of females in outer-city from 1st generation demonstrated an energy attitude toward exchanging and donating appliances. In the 2nd generation, 54% and 55% of females had a positive attitude in the middle- and outer-city, respectively. Simultaneously, in the 3rd generation, all females (55%, 60%, and 54%) had higher involvement in exchanging old appliances in all city layers. The results exhibited that a higher percentage of females in all generations demonstrated an efficiency attitude on reuse/exchange/giving appliances to others.

(e) ***Energy Consciousness***

The energy consciousness was examined by asking about the activities of checking the electricity bills. The data showed that 24% of the 1st generation's male respondents demonstrated energy consciousness in the inner- and middle-cities. In contrast, 18% of females of the 1st generation exhibited energy consciousness in the outer-city. In the 2nd generation, 35% of males in the inner-city, and 32% of females in the middle-city, 28% of both males and females exhibited energy consciousness in the outer-city. In the 3rd generation, 18%, 36%, and 29% of female respondents demonstrated energy consciousness through checking bills, respectively, in all city layers, as shown in Table 3.2.

The results showed that both 1st and 2nd generations' males demonstrated energy consciousness in the inner-city and females of 3rd generation demonstrated equal energy consciousness in three city layers. The results demonstrated that the 1st generation's males had higher energy-positive behavior in all variables. In the 2nd generation, females had higher consciousness, energy practice, and attitude. However, both males and females of the 2nd generation were equally involved in technology shifting, energy knowledge, and attitude. In the 3rd generation, females exhibited higher energy behaviors (Table 3.2).

3.6 Discussion

Responding to results of 3.3, the assertions of gender differences in energy-saving behavior were complex in intergenerational analysis and positioned significant values as explored by Barr et al. (2005), Sütterlin et al. (2011), Yohanis (2012), Chancel (2014), and Bardazzi and Pazienza (2017). The 1st generation had less exposure to a new socio-economic context that had shaped their habits throughout one's life trajectories. Those old generations who had suffered at a young age with limited resources may have kept low consumption habits over time. The 2nd generation was nurtured during the economic rise and might have extended their energy consumption habits over time and had both frequently suffered due to an energy crisis. Thus, they tended to save energy in attitude, practice, and consciousness. The intergenerational study demonstrated that the new generation tends to move to clean and healthy households with energy consciousness and sensitivity to technology.

As shown in Fig. 3.15, the spatial built environment of energy use systems in buildings demonstrated that heating/cooling appliances and solar energy highly influenced the city's economic aspect. The architecture design has a more significant role in reducing energy use and needs to consider further urban regulations and guidelines. Environmental behavior systems were

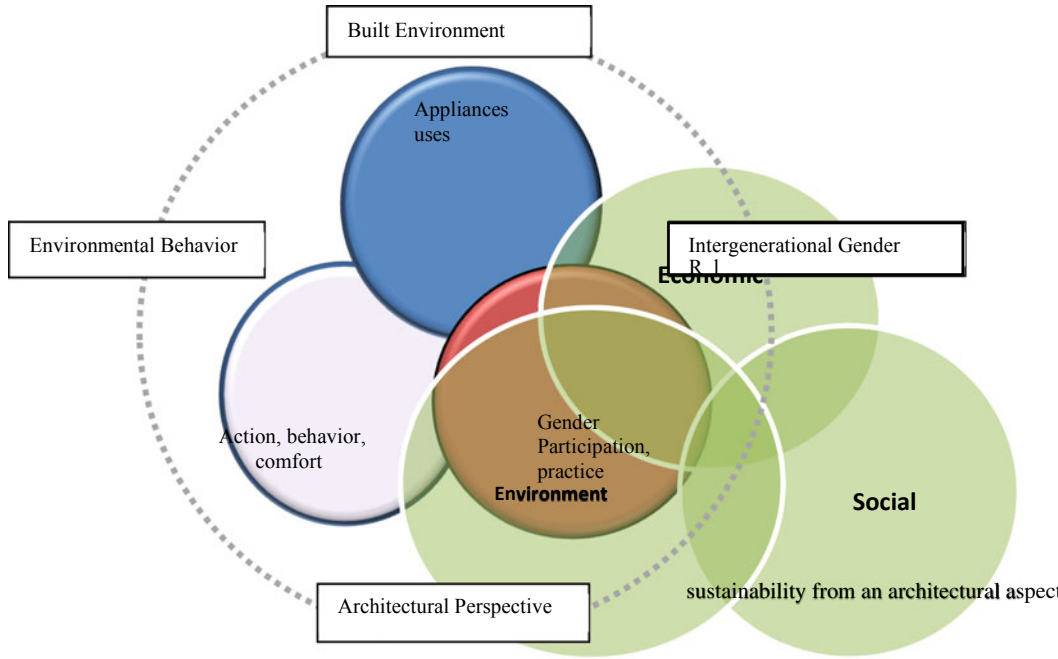


Fig. 3.15 Achieving sustainability from an architectural aspect

perceived as crucial in energy-saving through proper kitchen design and indoor air quality to have healthy living comfort. It is primarily related to inhabitants' behavior and building bylaws to maintain a healthy city. Energy use in different generations was related to the social aspect and emphasized the importance of inclusiveness in energy technology knowledge and awareness. However, the women of Kathmandu have been highly active in energy practice but need to gain more knowledge of technology. Thus, the built environment, gender roles, and environmental behaviors are interlinked and need to be considered from an architectural lens to achieve SDG goals 5, 7, and 11.

3.7 Conclusion and Recommendations

Both the architecture and gender perspectives are pivotal in household energy use to achieve sustainability goals. It concludes the higher importance of building design regulations, energy-efficient bylaws, and public awareness for the low-income groups for a sustainable community. The correlation between energy consumption and income denotes that lower income groups use a larger share of their monthly income for household energy needs. The lower income females suffer more from unhealthy kitchens due to unawareness and unaffordability. However, new-generation females appeared actively to gain energy knowledge with joint energy decisions. Men can also learn from women about energy-saving attitudes; similarly, higher/middle-income groups can learn from the low-income group about energy-saving practices. This study suggests that an energy subsidy policy should be implemented, encouraging them to enhance the healthy urban kitchen, particularly for lower income groups in inner-city. It is recommended that CO_2 warning sensor devices should be installed in kitchens to warn dwellers because residents cannot easily detect indoor air pollution as a warning alert. It should be a concern of city development authorities and building bylaws not to allow enclosed kitchens and rooms without

proper ventilation and kitchen hoods. Kathmandu buildings need to focus on energy efficiency with consideration of building bylaws, neighborhood densification regulations, green building materials, window-to-floor area ratio requirements, and daylight and ventilation to improve health implications. The energy-saving potentials of better architectural design can be achieved by strategizing the building elements in orientation, form, and materials with inclusive participation in decisions. Thus, the architectural perspective should be placed as the fourth dimension of sustainability while planning settlements and buildings to consider energy efficiency in both active and passive energy to achieve sustainability. Healthy design is characterized by the architecture design practicing traditions of sustainable material design, thoughtful use of water and other resources, local labor, and intergenerational gender engagement in contemporary buildings. Investing in housing planning, design, and construction with these goals in mind will foster healthy environments, economic development, and skills education.

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Design for Non-binary Youth

4

Tracy Lord

Abstract

We often design environments to meet gender-specific requirements, whether due to religious, cultural or lifestyle needs, but how do you navigate buildings when you are mis-gendered, non-binary or unsure of your gender identity? What barriers do we intrinsically create in architecture by applying gender to places and how do we shift this to focus on inclusivity. In working with the Youth Participation and Engagement Team at Orygen in a consultative design process for the Orygen Building in Australia, the facility architects came to understand that one of the biggest issues of concern for young people was the inclusion of design for the LGBTQIA + community, particularly in relation to gender and sexual orientation. Standard design solutions for amenities can become continually confrontational for these groups, but is it as easy as making them all gender neutral? And in what other ways do we subconsciously exclude them? The Orygen project is used as a case study in the review of gender-inclusive spaces, as it sought to provide environments for youth who seek assistance for Mental Health issues. In studying this project, we understand that we cannot design spaces for non-binary or mis-gendered people solely based on historical information and research. The multitude of current issues can only be understood by direct engagement and including these people in the design process. The paper reviews the issues of gender inclusivity and gender neutrality and the importance of inclusion with the design and consultation process.

Keywords

Transgender design · Gender inclusive design · Gender architecture · Queer space · Inclusive architecture

4.1 Introduction

The issue of sexual identity has for many years been used as a platform to discuss equity and inclusion in our society. Now, this discussion is being expanded to include gender identity and to provide inclusivity for transgender members of the community. As gender identity is often linked to outward appearance, it can bring more immediate attention and is usually less well understood.

The Gay and Lesbian Alliance Against Defamation (GLAAD) defines transgender as a term used to describe people whose gender

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identity differs from the sex they were assigned at birth (GLAAD: Transgender FAQ 2022). The term transgender can be used as an umbrella term to cover transgender, gender fluid or gender diverse, intersex and non-binary people. Within this report, I have also used the terms transgender and non-binary independently to differentiate between the two groups. I have used transgender to describe people who do not identify with their birth-assigned gender but may still identify as male or female, while using the term non-binary to describe people who do not identify distinctly as one gender. This report largely focuses on the Australian example which may differ in some respects from other countries.

The report uses a case study of the design for a mental health centre for young people to show how consultation leads to a broader understanding of project issues when reviewed with more diverse groups, with particular reference to transgender inclusivity. Initially, it reviews why an awareness of gender identity is important and then focuses on different areas where this is seen to be an issue. Finally, the paper reviews the issue of gender neutrality and the importance of inclusion within the design and the consultation process.

Understanding gender identity can transform the way we design public spaces, but it can only be understood through direct engagement and consultation with differently gendered people.

4.2 Methodology

4.2.1 Case Study

In 2016, Billard Leece Architects (BLP) began working with Orygen, a non-profit organisation focused on youth mental health, to deliver a building and environment housing all areas of the organisation focusing on developing a new model of care for young people seeking help. The centre included office and administrative spaces but focused on outpatient facilities including one-on-one consultation and group therapy spaces for youth and adolescents under the age of 18 years, with mental health issues. Orygen as an organisation is focused on global research, policy, education and clinical care to ensure evidence-based treatments and approaches to provide optimal mental health for young people (Fig. 4.1).

In approaching the design of the centre, BLP wanted to provide an environment built in response to the people who would be using it. For Orygen, the answer started in a consultation strategy which set aside preconceived ideas and precedent studies and instead asked young people, their families and staff what they actually wanted in a health service. The process began by establishing working user groups which consisted of over 140 service users who were

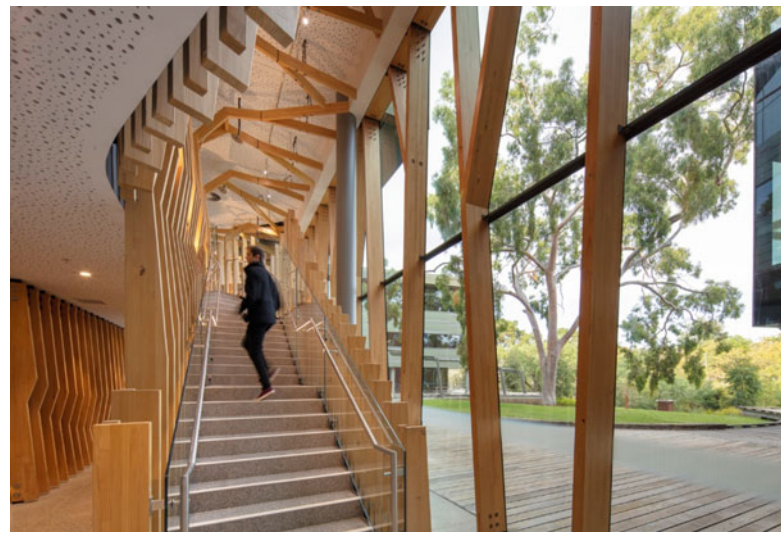

Fig. 4.1 Interconnecting stair Orygen centre, BLP architects

engaged through varying means including surveys, small group discussions and interviews over the life of the project. A core group of the users provided more detailed input into the design and construction of the spaces, to ensure consistency and accountability for decisions made.

So, what did the discussions tell us? What we found was a shift towards issues that would not have been discussed 20 or even 10 years ago in Australia. A discussion that focused not just on the services provided within the facility but which also sought to discover the values and beliefs of the organisation and how those ideals might determine some of the design decisions. We found that what is really important to young people is inclusivity and in particular the way in which we can provide inclusion for those in the LGBTQIA+ community. While the Orygen centre was not focused on providing health services for transgender people, the focus group identified this again and again as a key area of concern. They told us that often struggles with sexual orientation and gender identity can underlie their mental health issues and that it was important to ensure the centre design didn't create spaces that would exacerbate those struggles. It should be stated in this context that gender diversity in itself does not cause mental health problems. However, trans and gender diverse people are more likely to experience stressful occurrences that can increase their risk of depression, anxiety, self-harm and suicide (Headspace Australia 2022). Tonya Hinde, the project's Interior Design Director, said, "One of the most discussed issues with young people and clinicians was 'inclusivity', particularly for those in the LGBTQIA community. Through our consultation process we learned that gender and sexual orientation discrimination is a real issue for young people and not just for those living the experience" (Bell 2021). What they didn't want were spaces that made them make confrontational choices about who they were and how they identified. That the spaces needed to be inclusive for mis-gendered, non-binary, trans or gender-variant people, or for people who just weren't ready to make that decision yet (Fig. 4.2).

4.2.2 Understanding Transgender

Talk to teenagers or people in their early 20s today and they talk about being both sexually and gender fluid. For the most part, they understand and recognise sexual discrimination against women but also see the restrictions and limitations put on both sexes in the assigning of traditional gender roles—in how to behave, how to act, what to wear and what to do. And they're not yet ready to have society define who they are by labelling themselves to a binary gender concept.

Fig. 4.2 Ground floor plan, Orygen centre, BLP architects

In Australia, the 2016 Census was the first time a gender option differing from male and female was recognised for inclusion in this country. The response of 1,260 'other-gendered' people was not considered to be accurate as a previous pilot test showed a much higher response (Australian Bureau of Statistics 2018). The question was seen as problematic for a number of reasons. Firstly, if you identify yourself as 'other' on the questionnaire you were then required to complete another online form, the information could not be captured within the body of the census document. Secondly, there remains an unwillingness to identify as 'different' in an official document for fear of discrimination or disrespect and a level of distrust that this information could be used beyond the census data collection. Finally, the term 'other' is a term of exclusion, of identifying you as 'different' somehow not 'normal' and difficult enough to require a whole other form to fill out. By 2021, the Census question had been amended to remove the term 'other' and to replace it with 'non-binary sex', however, the question only required respondents to respond 'male', 'female' or 'non-binary' limiting the identification of transgender numbers in Australia (Knott 2022). The change from the Australian Bureau of Statistics (ABS) was a beginning to inclusive language but it also identifies a bigger issue—that data collection that requires identification of gender can present a roadblock in accessing social infrastructure such as health and education. That filling in a form can present difficulties for a section of our community.

> I avoid going to the doctor. In general, I try to have as little interaction with the medical health system as possible – non-binary study participant (Bennett 2020).

Awareness of inclusivity in data fields is becoming more prevalent, particularly as organisations chase 'Pink Dollars' and seek to be perceived as LGBTQ friendly, but this awareness can often be superficial and typically caters to an easier market—sexuality, rather than gender identity. Online purchases often require identification of gender, typically to allow for data profiling and targeted marketing, but why is this necessary? By asking this question, companies can alienate transgender people and their allies.

The data field entry issue becomes most problematic in relation to accessing health care. While information relating to birth-assigned gender can be necessary to consider potential medical issues, generalising on this information can alienate non-binary patients. And if they are uncomfortable filling in a form, the discomfort once they are through the door only increases. How many people won't access physical or mental health care because of the knowledge that the discussion may stall on clarifying their gender, rather than focusing on the actual health issue. The issues that have been highlighted so far represent the struggles before we even enter the built environment. So how do we as designers make our public buildings, our health buildings and our education buildings truly inclusive? Is it just about the toilets?

4.3 Results

4.3.1 Case Study—Bathroom Design

Our discussions for the Orygen project did focus a lot on bathrooms. As stated by Ivan Coyote in their 2015 TedX Vancouver talk "There are a few things that all of us need. We all need air to breathe. We need clean water to drink. We need food to eat. We need shelter and love. And we all need a safe place to pee" (TedX Talks 2015).

Bathroom facilities are one of the most obvious places where gender choice is required. At Orygen, the intention was to address young people's mental health issues and to make the building as user friendly and inclusive as possible. It was important to our discussion group participants that using the bathroom not be confrontational, that it was just something they could do in a space that didn't ask them to declare who they were. It was important for BLP that Orygen was designed as a safe space, a space that didn't force a binary narrative to use it. A space that didn't create stress and anxiety in a task as

seemingly simple as using the bathroom. But how do you design for this? What gives the best response?

A common response is to allow the person to make their own choice—to 'use the bathroom that best fits your gender identity' while keeping the binary male/female bathrooms to choose from. In 2019, when a sign with words to this effect was used outside bathrooms in the Department of Prime Minister and Cabinet (PM&C) in Australia's capital, the then Prime Minister called the sign 'ridiculous', describing it as 'over the top' 'political correctness.' (ABC News Australia 2019). I would argue that this initiative doesn't go far enough—that while it allows trans people to decide which gender they choose, it fails to address non-binary people who may identify as both or neither gender. It is, however, a 'quick fix', tokenistic with no structural change required to the bathrooms—a nod to inclusiveness, a band-aid stuck on to address the issue (Fig. 4.3).

In many organisations, the response is given even less thought, with unisex accessible toilets identified as the option for transgender use. However, there is a perception in the community that these toilets should only be used by people with a disability and often specifically a person in a wheelchair. While this assumption is also problematic, the continued implication on a transgender person using the accessible toilet is that their gender identification is in some way a disabling condition. And there is always a 'well meaning citizen' happy to point out when you're using the wrong toilet—comments usually made in ignorance.

The design response at Orygen was to create all gender facilities, bathrooms with shared handwash facilities, but individual stalls and to capitalise on Orygen's youth focus by using signage that gave a playful response to identity. Toilets were identified for use by male/female/droid/mermaid/super-hero or alien identities. The use of this signage caused a problem for a completely different reason—under Australia's Disability Discrimination Act, bathrooms with ambulant or accessible facilities are required to include statutory signage including Braille and tactile characters as well as international symbols identifying those toilets, to comply with the Building Code of Australia. By catering for one marginal group, we risked causing issues for another group. The signs were eventually passed as an alternative, compliant solution but raises the issue of how current building legislature creates a roadblock to inclusive signage for these facilities (Fig. 4.4).

The solution chosen for the centre was an all-gender bathroom with closed stalls and separate wash basins. The spaces were provided in a more open, easily accessible location, however, fully compliant disabled access toilets were still provided separately. This solution was seen to also address other issues around single sex facilities,

Fig. 4.3 Signage at Department of Prime Minister & Cabinet

Fig. 4.4 Bathroom signage, Orygen centre, BLP architects

such as access for parents with children, different sex carers of people with additional needs or people with sensory development issues, such as autism (Fig. 4.5).

Subsequent to the completion of the main Orygen centre, additional drop-in centres and facilities in other locations have been built. Orygen have now developed a Capital Projects Template for Inclusive Spaces to be used in the design of all future centres. These requirements include the provision of closed stalls and separate, public communal washing and drying facilities. Signage for the bathrooms is required to only include a symbol of a toilet with no gender-identifying inclusion (Fig. 4.6).

In addition to outlining their requirements for inclusive design, the Orygen template explains their reasons for providing these inclusive spaces and also addresses the perceived safety issues of all-gender toilets, which continues to be used as the main restriction for providing all-gender facilities. So why are all-gender toilets seen as so problematic?

In conservative US states such as North Carolina, laws have been enacted which require

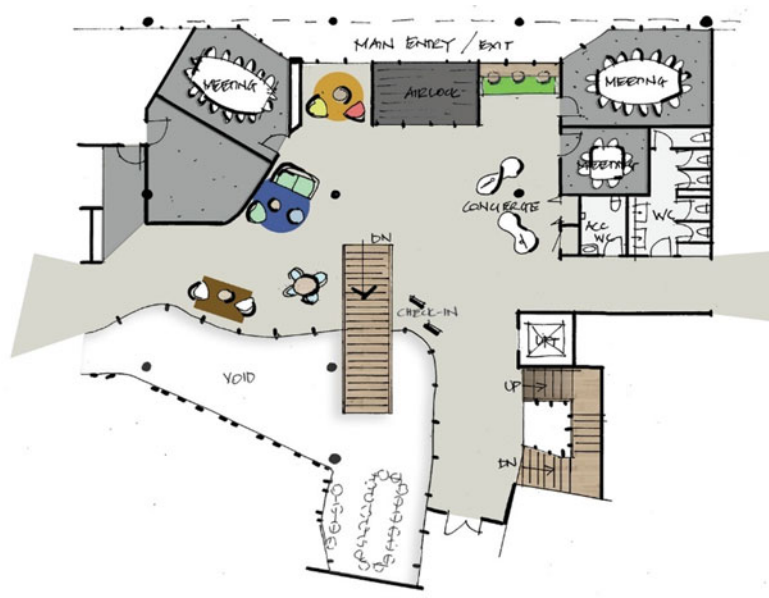

Fig. 4.5 Sketch plan, Entry foyer, Orygen centre, BLP architects

Fig. 4.6 Signage example, Orygen capital projects template

people to use the toilet that match their birth-assigned gender. The argument typically is that there is a concern for women's safety—that men may now access women's bathrooms with the intention of violence. Issues in the UK have also related to men using facilities without changing their behaviour—leaving stall doors open and other problematic toilet etiquettes. In most cases, the perceived solution has been to go back to single-gendered facilities, rather than to modify men's behaviour. In terms of the risk of violence, a study by UCLA's Williams Institute found that 70% of trans participants had experienced some form of verbal harassment or physical assault when accessing gender-segregated public toilets (Manton 2021).

4.3.2 International Examples—Stalled!

In the United States, a cross-disciplinary research team, including architect Joel Sanders, transgender historian Susan Stryker and legal scholar Terry Kogan was created and named Stalled! The intention of this group was to look particularly at design solutions which could be used to provide alternatives to sex-segregated bathrooms. The work of Stalled! reviews the three standard solutions for all-gender bathrooms: using accessible or disabled toilets as the non-gender facility; low cost retro-fit design, which may include just replacing signs and leaving urinals and finally, a multi-user solution that includes a combined wash area with separate non-gendered toilet stalls. Wheelchair accessible facilities are also included in this model. Stalled! also recommends the use of signage with no gender identification—all very similar to the approach currently used by Orygen.

The work of Stalled! examines the historical context of single sex bathrooms to assist in debunking the myth of 'unsafe' bathroom spaces. In his essay on Architectural History, Joel Sanders notes the relatively late introduction of single sex bathrooms in the late nineteenth century, based on the assumption that "women were emotionally and physically vulnerable and needed to take refuge when they ventured out of the home and into public space" (Sanders 2020). He further notes that the bathrooms have traditionally been placed for exclusionary politics, not just for gender, but for race and more recently sexuality.

4.3.3 Other Areas

Moving beyond bathrooms and focusing on the design of buildings for health, the next space identified in consultation as challenging was the segregated waiting room. In the health setting, this segregation is again purported to provide safety and privacy for women, in particular so that they can discuss women's health issues separately, although one does question is this privacy for the women, or so men don't have to hear about women's issues which make them uncomfortable. Often trans and non-binary people are uncomfortable in all-male spaces, so they are grouped with women. This is seen as a safer option but can be quite confronting for those whose birth-assigned gender was female but don't identify as such.

> For non-binary people like me, it feels bad to always be grouped together with women, especially because I often get misgendered as one. (Fossheim 2020)

Change room facilities are another space where gender segregation requires a confrontational choice. While in most hospital settings, change rooms for patient access to services such as Imaging and Theatre are mostly unisex, in educational settings and sports facilities, provision of all-gender spaces is usually overlooked. In Australia, change rooms for women in sports facilities have traditionally either been not included or provided with such size restriction as to exclude their use. Changes are being made to include non-gendered facilities, but the focus is being placed on providing 'female-friendly' spaces (Moore and Borg 2021). However, these improvements are badged, they are beginning to address gender diversity, but it is still a long way from including non-gendered change rooms in areas within a professional setting, such as surgical access to Operating Theatres, for example.

4.4 Discussion

So, is providing all-gender spaces for everyone to use enough? The answer is yes—and no. We live in a world where binary identity remains a cause for discrimination, where the myths of 'lady-like behaviour' and 'being a man' continue to perpetuate a view of how people should behave and what they can do. Before we can achieve gender neutrality, we have to have gender equality, where rights and values are not determined by a binary gender narrative. As designers, we need to provide design that doesn't just provide gender neutral spaces, but actively seeks to address gender inequity for female, trans and non-binary people. We need to understand how gender currently influences organisations, decision-making and priorities and to reframe client briefs to include discussion beyond the male world view. "Despite the best intentions of architects, governments and institutions, to be neutral is simply an act of discrimination against women and gender-diverse people" (Moore and Kalms 2021). Neutral spaces designed to be used by all tend to be overtaken by cis-men, whose behaviours can restrict access for everyone else. We need to keep going, to push for gender equality and to push for a society where gender is no longer important or relevant. Joel Sanders refers to the idea of trans theory—a move away from cisgender-centric design (Sanders 2017).

Bathroom design has been a large part of the discussion, as it should be, but what other spaces are problematic? What else is going on that the cishet portion of the population may not be aware of? To give an example of gender bias that we don't often think about, consider voice-assist such as Siri and Alexa—female voices assigned to technology for home and service-orientated roles. For more authoritative roles such as banking and insurance apps male voices are used. A creative agency partnering with Copenhagen Pride developed the world's first genderless voice (Yalcinkaya 2019)—seeking to eradicate this bias in technology. It's called Q and it seeks to remove gender association with certain tasks—to push towards gender neutrality and question what relevance gender has to the performance of those tasks.

Fashion, not surprisingly, is another area where gender is being called into question, with clothing pieces being designed as non-binary based on the style, rather than the sex. In 2015, London Department Store Selfridges opened concept retail spaces without gender branding which sought to provoke conversation about gender targeting in fashion and retail (Howarth 2015). Non-binary fashion brands and clothing lines are becoming more prevalent, but young consumers don't just want their clothes to be non-binary, they're also expecting it to be environmental sustainable. They expect more from their inclusivity.

In looking more broadly at transgender architecture, theorists such as Lucas Cassidy Crawford (Crawford 2010) suggest that transgender architecture historically exists and has only recently been repressed by conventional architecture. Crawford uses the example of Vitruvius' definition of the three orders of Roman columns: Doric as masculine, Ionic as feminine and Corinthian as a blending of the two,

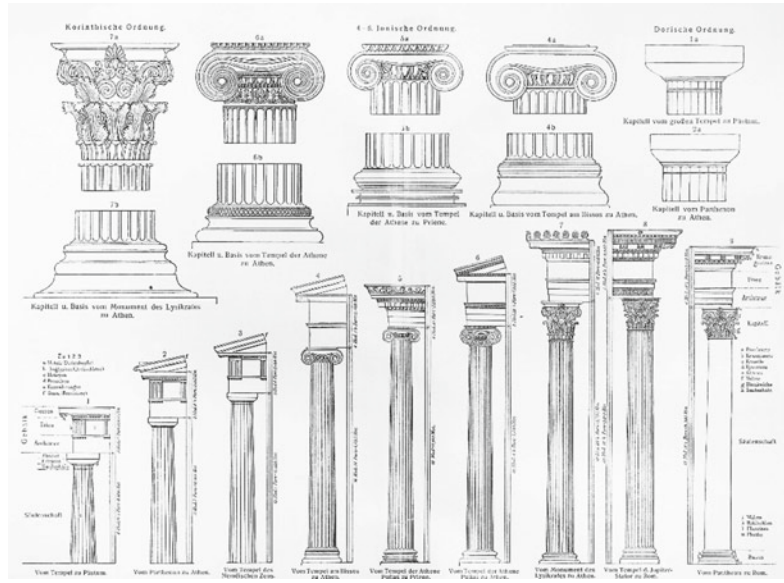

Fig. 4.7 Ancient order of columns

taking aspects of both the male and female to create a hybrid (Fig. 4.7).

Are we taking this too far? Are we creating problems that don't exist and taking political correctness beyond what is necessary? Are we being swallowed by our own 'wokeness'?

If we look at this issue in purely capitalist terms and marketability, there is a clear argument for why we need to consider gender neutrality in our design. When designing workplace environments for commercial clients, we need to take into consideration the difficulty in the attraction and retention of their staff, particularly following the post-Covid 'Great Resignation'. With Generation Z accounting for 24% of the workforce in 2020, the design of spaces where Gen Z want to work has to align with their belief systems. Research released from the Gen Z Spotlight Report undertaken by Washington State University Carson College of Business (CCB) showed a clear difference in expectation from these younger employees. Chip Hunter, Dean of CCB noted "This generation cares deeply about issues like cultural inclusivity, sustainability and a healthy work-life balance and 70% of Gen Z employees in the study want to work for a company whose values align with their own" (Perna 2021). This is a generation who are open-minded and invested in diversity and inclusivity. One study found that 70% of Gen Zers strongly believe that public spaces should provide gender neutral bathrooms, compared to 57% of Millennials (McLaren 2019). To attract these workers, we need to design for inclusion. In designing retail spaces, similar considerations need to be taken into account. Young consumers want inclusivity but it has to be authentic and at a structural level—not just a sign on the bathroom door.

To take the issue of gender-neutral bathrooms one step further—research shows that the inclusion of these facilities can be an unexpected solution to long queues for women's toilets. A study by the University of California showed that for companies of around 300 employees the waiting time for toilet facilities is around 9 times longer for men than women. When all facilities are gender neutral, the average waiting time drops to one minute, a 20 s increase for men, but a significant one minute 20 s decrease for women (Bernal 2020).

When it comes to designing for social infrastructure, the issue becomes ensuring access to health and education for the broader population. As previously stated, gender-diverse people are less likely to access health services and can

Fig. 4.8 Foyer space, Orygen centre, BLP architects

experience mental distress by this exclusion. There is no point in designing a facility for health or mental health care where the design itself perpetuates the problem.

What BLP's work at Orygen showed is that we can't rely on past research, building codes or current facility guidelines to show us how to design with inclusivity. Our design process must include authentic discussion with users with lived experience of gender diversity and a continual checking in throughout the design and construction process to ensure the relevance of the issues are understood and included. More work on the impacts of gender neutrality and fluidity in design is needed and more conversations about this issue are required (Fig. 4.8).

4.5 Conclusion

In designing for non-binary people, we need to be aware of areas where gender can be used in an exclusive way, not just in architecture, but in all areas of design and discussion. We need to understand that issues of gender now go beyond female vs male and to properly service our clients in designing their spaces we need to be cognisant of inclusivity in our designs. In designing social infrastructure, we need to question the accessibility of the space, not just at the building entry, but also in data collection and segregation and question the need for this.

In looking at bathroom design, it has to be understood that true, authentic inclusion will require changes beyond the superficial and that making these changes can have positive impacts on workforce and organisational identity. In refurbishing spaces, we may need to look at the location of these services as well as what they include to ensure they are safe for all users. In the design of new spaces, we need to expand our ideas of inclusivity and accessibility for a wider range of users.

We need to be aware of the problems in creating gender neutral spaces not because of the behaviour of trans or non-binary people but because of the behaviour of other people within those spaces. Gender neutral design often returns to the default setting of cis-male needs. Ensuring spaces aren't feminine does not mean that they are gender neutral, for example. As designers, we have a responsibility to be less discriminating and more inclusive.

This paper has sought to be a start to research and learning in this area. It provides few, if any solutions, but looks to identify needs and develop questions to be used in creating an authentic response to inclusive non-binary gender design. It seeks to start to bring awareness to the need for these conversations and to include different

voices in the design process. And finally, it dares to hope that we can begin to move forward in a world where gender no longer matters.

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5 Critical Framework for the Development of Women's Shelters in Karachi: A Contextual Study

Ilsa Ahmed

Abstract

Domestic violence or abuse is inflicted upon 20–25% of women globally. It generally occurs where they should be the safest, under their own roofs. To escape their predicament, the women, in search of safety and security, escape to facilities designed to shelter and protect them. Unfortunately, there are an increasing number of women's shelters worldwide that are crowded, involve communal living, offer little or no privacy, and include restrictions related to living conditions. The built environment of shelter homes should have a positive impact on the health, recovery, and wellbeing of the survivors, not the other way around. The aim of this research is to understand the architectural requirements of women's shelters based on the needs of women who are victims of psychological and/or physical abuse. Addressing "Goal 5: Gender Equality" of the UN Sustainable Development Goals (SDG) 2030 Agenda, this research will explore novel strategies and innovations that can be applied in order to design a space that inspires feelings of security, inclusivity, and comfort, which these women are in desperate need of. This study seeks to understand how architecture can help these women heal and start anew. This research will also focus on how architecture can help build a self-sustaining community and how these women can enter the workforce. To understand the current living standards of these women, the architecture of two of Karachi's women's shelters was studied and analyzed. Interviews were conducted with the inhabitants and on-site social workers at the shelters in Karachi. Understanding the relevant literature such as case studies and psychological research papers was an important part of the research.

Keywords

Women · Shelters · Architecture · Design strategies · Inclusive design · Karachi · Domestic violence survivors · Urban densification · Safe public space

5.1 Introduction

The relationship between traumatized women and the spaces they inhabit is the main focus of this study, to gain insights into the architectural design possibilities that support and/or are related to the empowerment of victims of domestic abuse and social injustices.

Women who fall prey to domestic abuse and social injustices, once removed from their

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predicament, must get the opportunity to heal and grow. It is essential to gain an in-depth understanding of their predicament and infrastructural shortcomings to address shelter design. While there has been much research on trauma-informed care and architecture (Harris and Fallot 2001; Bonder 2009; Oral et al. 2016), none has specifically focused on victims of domestic abuse and their spatial needs.

This research includes

- In-depth study of the architectural and infrastructural needs of the victims of domestic violence as presented in the available literature.
- Case studies of women's shelters in Karachi.
- Exploration of self-sustaining ways in which women's shelters can be developed throughout the city of Karachi.
- Exploration of novel design strategies through architectural research.

5.2 Literature Review

The prevalence of domestic abuse in Pakistan is a result of the generational cycle of the perpetuation of abuse and the rights of men to physically abuse their wives (Fikree et al. 2005). According to Tutty (1999), shelter for domestic violence survivors is divided into the following categories:

Emergency Shelters.
Transitional Housing.
Housing.

Some shelters provide specific services for women who have physical or mental disabilities (Joshi 2017). These organizations may make these women permanent residents within the facility much like the Bilquis Edhi Center in Northern Karachi which is part psychiatric ward and part emergency shelter for women (Pakistan: Karachi's Forgotten "Mad Women" 2020). This structure gives rise to problems such as overcrowding and sanitation.

As emphasized by Lyon et al. (2008), domestic violence shelters all over the world address very specific issues. The services offered by these shelters are as follows:

- individual advocacy
- medical treatment for immediate and long-term consequences of violence
- crisis intervention
- safety planning.

These services offered by domestic violence shelters can have a significant impact on the residents during the early stages of their rehabilitation (Shostack 2001; Van Natta 2010). The director of Boulder County Safehouse, a center for crisis intervention for women, explained that the need for control includes control over the temperature of the water, the temperature of the room, and natural light. Refuzero and Verderber's (1990a, b) study of Los Angeles shelters and New Orleans applies a reiteration of this control in the women's immediate surroundings explaining it as a means of coping with the absence of control. The study states that the shelters moderate unwanted elements whether they are visual or auditory and in doing so create a calm setting that is not chaotic. Furthermore, the shelters have adequate surveillance and admirable views surrounding the facilities. Through crisis intervention, a shelter is capable of providing a limited duration of stay in a safe haven, however, a woman may find it difficult to reconnect with "her space" as a crucial part of the healing process. This could be because abused women have gone far too long without their space; here space is the personalized outlook on the women's immediate surroundings (Follenweider 1993, pp. 363–364). In situations like this, reclamation has an equal role as rehabilitation. Through their research, Taylor and Silverman (1992) seek to generalize the dialogue on housing for women by questioning the concept of shelter. The central theme of this work is the aim of changing the traditional ideas and conceptions of shelter by including ideas that are subjective and diverse. They claim that through their paper they seek to define shelter in ways

that exceed the limitations of mere accommodation and start dealing with problems and issues of place involving the individual within society.

Moser and Peake (1994) note the importance of considering the specific needs of households headed by women within cultural contexts, particularly with regards to resource availability and access. Chant and Ward (1987) highlight the existence of programs for low-income housing and construction specifically for families headed by women. Smith and Stevens (1988) also emphasize that access to self-help housing projects should not be determined by patriarchal association. Arthurs (1996) states that a second-stage shelter for women and children should be located in a residential area and have enclosed play areas for child protection. As explained by Basolo and Morlan (1993), housing activism is a way for women to eliminate the conformation to societal norms and adopt novel ideas and concepts of space. It is crucial to make women part of the design process.

Marcus et al. (1994) and Harrison (2010) highlight the connection between domestic violence, mental health, and architecture. A study by Shepley et al. (2013) suggests recommendations for designing behavioral health facilities that address both psychological and functional needs. The recommendations have been divided into two categories, one emphasizing the factors related to environmental psychology (Psychological Needs), and the other emphasizing the functional factors (Functional Needs). They were summarized as follows:

The main areas of concern like safety and security, comfort, privacy, and control were studied. One of the conclusions drawn from the studies suggests that with a population showing signs of decline in cognitive abilities, spatial clarity and organization need to be taken into consideration.

Most women in Third World cities, including Pakistan, are found employed in the informal employment sector such as running small-scale businesses and producing petty commodities from home (Kusow 1993; Chatterjee 2021). According to a UN Women report, Home Based Workers in Pakistan contribute 65% to the economy UN Women Pakistan (2016).

5.3 Methods

This study employed a multiple case study design. The purpose of using a multiple case study design was to examine the state of women's shelters in the context of Karachi from multiple perspectives and to identify common themes and patterns across the two shelters. The research findings were instrumental in formulating novel design strategies for women's shelters in Karachi.

Selection of Cases

A total of two cases were selected for this study:

1. Bilquis Edhi Center
2. Panah Shelter Home.

The cases for this study were selected from Karachi to purposively make these shelters the focus of this study. The shelters were selected based on two main factors: scale and nature of administration.

Data Collection

Data were collected from each case through multiple methods, including observations, interviews, and document analysis. Observations were conducted on-site at each case and lasted a day at each of the shelters. Semi-structured interviews were conducted with key informants, such as staff and residents at each shelter and were audio/video-recorded.

Participants

The sample for local data consisted of 4 women from Panah Shelter Home and 6 from Bilquis Edhi Center. The 10 women who were to be interviewed were chosen by the shelters' management. The managers were interviewed at both of the shelters. In addition to the manager, a psychiatrist at Bilquis Edhi Center was also interviewed.

Procedure

The survivors at both of the shelters were interviewed individually. Their interviews were done in a more informal manner using an unstructured survey to allow for more open-ended responses or follow-up questions based on the initial responses. See Appendix A. At Panah Shelter Home, the interviews were voice recorded, and at Bilquis Edhi Center, the interviews were recorded in videos. At Bilquis Edhi Center, the shelter manager and on-site psychiatrist were interviewed together. An unstructured survey was administered by the interviewer. See Appendix B. A documentary was produced in order to present the collected data in an organized and simplified way. The findings were then discussed in detail alongside contextual considerations to develop design strategies within the city of Karachi. This process included the following steps.

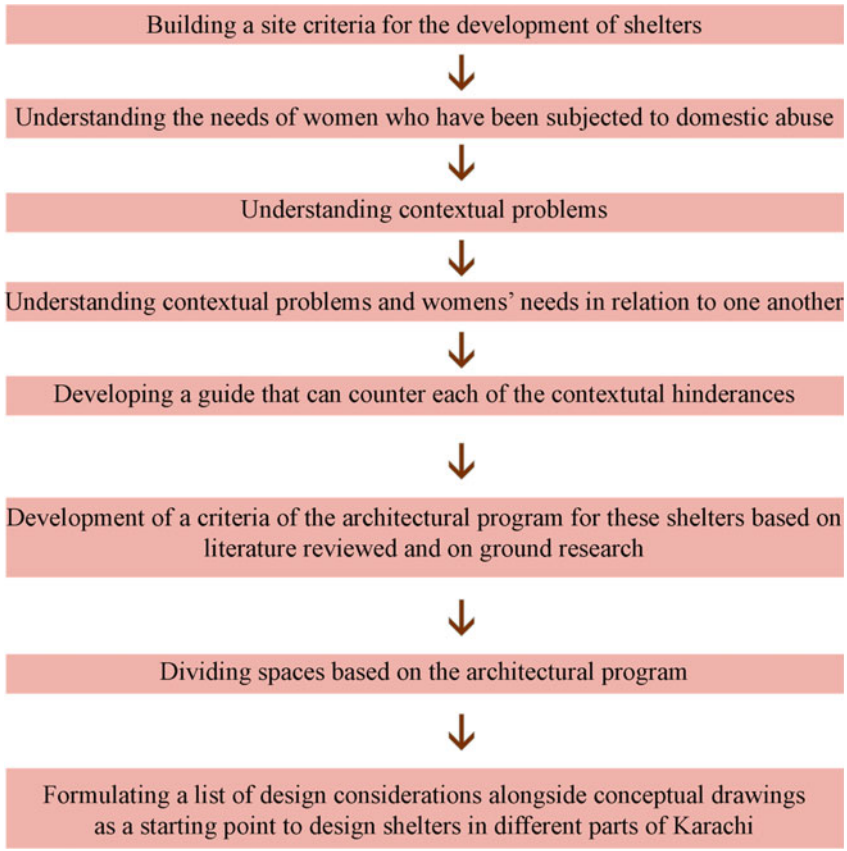


Table 5.1 Table showing factors related to environmental psychology (Psychological Needs), and the other emphasizing the functional factors (Functional Needs)

Functional needs	Psychological needs
Personal space and density control	Effective communication
Sensory considerations	Connection to the outside
Spatial clarity and organization	Treatment and care
Stress reduction, comfort, and hominess	Safety and maintenance

Ethical Considerations

Informed consent was obtained from the women before the study. The confidentiality and privacy of the women's data were protected.

5.4 Results

The results of interviews and observations at the two shelters have been represented in the form of tables that use standard criteria based on systematic similarities in the two shelters that were visited. The collection of this data acknowledges the recurring themes and also identifies how different each shelter's responses to the contextual problems are.

Panah Shelter Home

Located in the Gulberg Town of Karachi, this domestic violence shelter accommodates women who are trying to escape domestic violence and forced marriage along with women who are victims of sexual abuse, assault, and exploitation, are under the threat of honor killing, and are trying to find temporary protection from any kind of social injustice (Table 5.2).

Bilquis Edhi Center

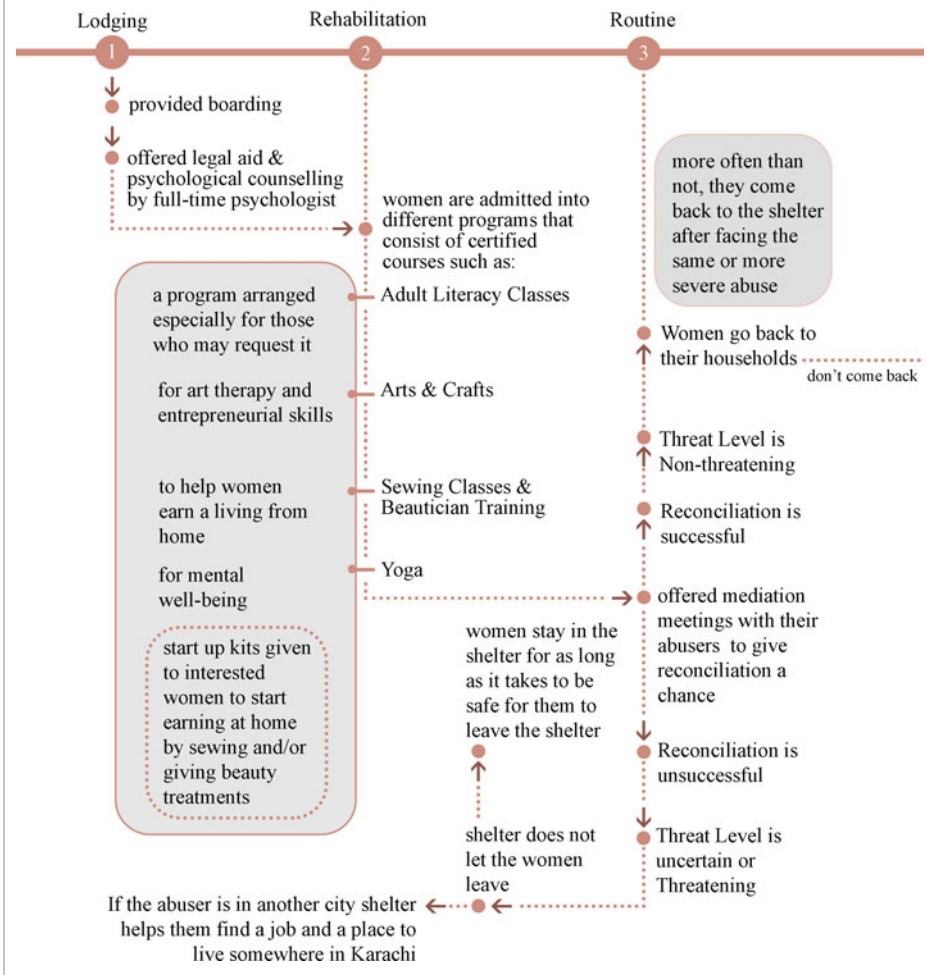
Bilquis Edhi Center is the largest psychiatric hospital in South Asia. This facility is split into two parts; one is an emergency welcome center for women and the other is a psychiatric ward. This facility is in the low-income neighborhood of North Karachi. The Bilquis Edhi Center falls under the umbrella of the Bilquis Edhi Foundation which is a part of the Edhi Welfare Organization. This organization is run solely on domestic and international funds and donations. Founded under a national welfare agenda, it is also strictly independent of any kind of governmental support. This facility is home to hundreds of little girls and women. Many little girls are left at the infamous Edhi Jhoola (a cradle where people anonymously leave infants) right outside this shelter's gate thereby making the shelter an orphanage as well. This shelter has a highly inclusive policy and welcomes all women who need shelter, have run away from home, have been abandoned by family, and suffer from mental illness and also infants who have been left at the Jhoola.[1]

Discussion

The results of the study indicate a gap in shelter design in Karachi, as the design does not address the individual needs of women who have experienced domestic violence. Research found that the site selection for the shelters is not based on research or surveys, making it important to find an airtight solution for site selection in a city like Karachi where the crime rate is high (Hashmi 2022) and population growth is rapid. The study also highlights the prevalence of domestic violence in Karachi, and the need for more shelters based on the number of women facing abuse in each district. The infrastructural decision of Panah Shelter Home to only house 50 women and children at a time is also considered in the calculation of the number of shelters needed (Figs. 5.1 and 5.2).

[1] For further insight, a short video has been prepared by the author which is available here: https://youtu.be/I_5VtW5B3hw.

Table 5.2 Table showing Panah Shelter Home results from on-ground observations and interviews

Panah shelter home	Integration into the Shelter all women are welcomed into the shelter excepting homeless women and women with congenital illnesses 
	Administration
	Public-private partnership project
	Population
	Accommodates approximately 50 people including women and their children
	Services Provided to Women
	The shelter has its own physicians, psychologists, and pro bono lawyers as well as a lawyer on retainer. The shelter also has liaison with the police
	Architectural program
	Administration Block
	● waiting room ● meeting room; for survivors to meet their visitor

(continued)

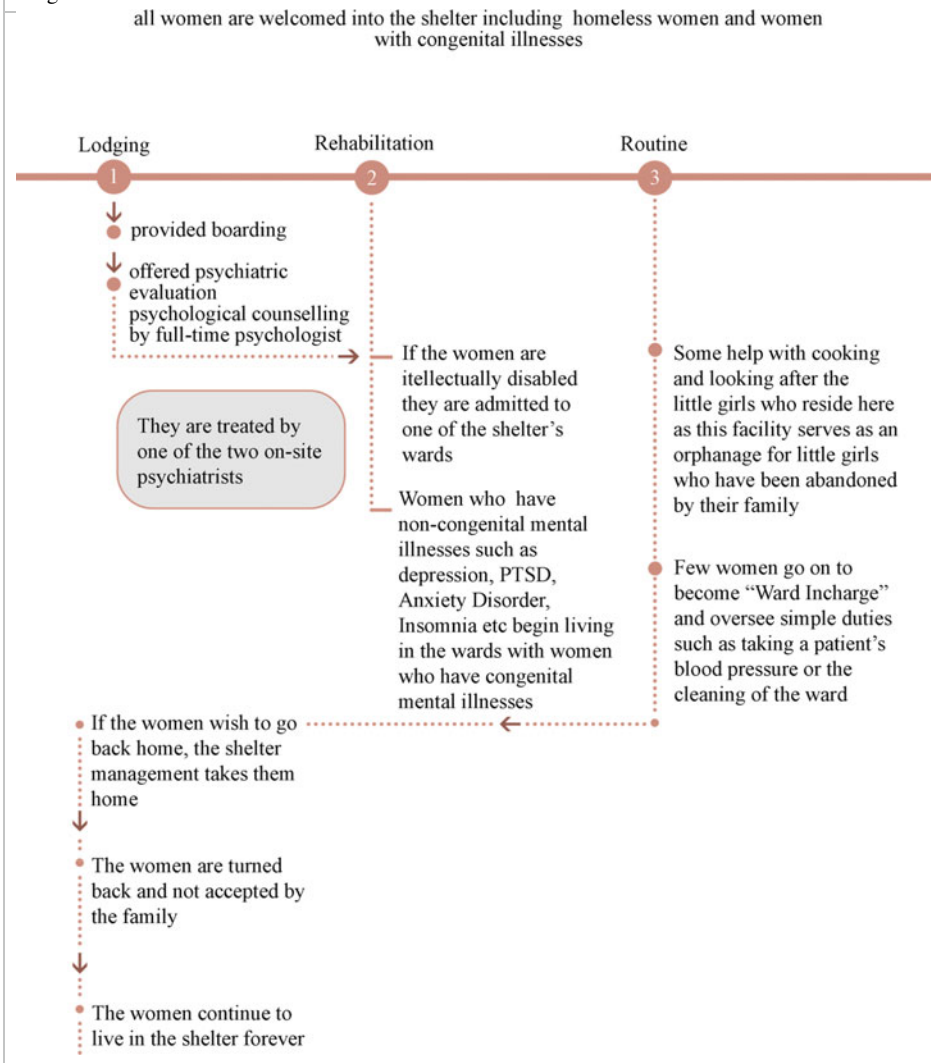
Table 5.2 (continued)

	● reception ● administration room, where the finance manager and administrator are ● manager room, where the manager, lawyer, and caseworker are ● conference room; for staff meetings and mediation meetings with the abusers ● records room, where all the files are stored in hardcopy ● two atriums; for staff members
	Shelter Block
	● Sleeping quarters; some shared by 4 women and some shared by mother and children ● Recreation Room ● Gym ● TV Room ● Gardens ● Sewing Class ● Informal Education Classroom for women and children ● Beautician Training Classroom ● Arts & Crafts Classroom ● Computer Room; for computer literacy classes ● Dining Room ● Kitchen
	Amenities
	● Parking area ● Storeroom ● Pantries ● Namaz area (Prayer room) ● Washing area; for laundary
	Child centric spaces
	Classrooms only
	Management
	The shelter is managed by Zar Bano Kohyar, who specializes in gender study and is also a sociologist
	Vocational Training
	Certified courses such as Adult Literacy Classes Computer Literacy Sewing Classes & Beautician Training Yoga Arts & Crafts
	Site
	Residential area[2]
	Site selection
	Not based upon any survey or research
	Open spaces
	45% of the total area
	Shelter Dependency[3]
	Prevalent

[2] In Karachi, a residential area could also be a mixed-use area. In Panah Shelter's case, the site is surrounded by homes as well as schools and a few shops.

[3] Shelter dependency is when women and children become permanent residents of a shelter and don't wish to leave as they have become accustomed to the safety that the shelters offer.

Table 5.3 Table showing Bilquis Edhi Center results from on-ground observations and interviews

Bilquis Edhi Center	Integration into the shelter 
	Administration
	Non-Governmental organization
	Population
	Accommodates approximately 1500 people including women and children
	Services provided to women
	The shelter has its own physicians and psychologists who work pro bono. The shelter also has liaison with the police
	Architectural program
	Administration block
	● Reception ● Administration room; Psychiatrist's office & Manager's room ● Large emergency room connected to the offices and accompanied by restrooms for the patients

(continued)

Table 5.3 (continued)

	● Records office, where all the files are stored in hardcopy ● Staff break room ● Lobby
	Shelter block
	● Sleeping quarters; with no specific limit to how many women can sleep inside at one time ● Gym ● TV room ● Large courtyard in the center ● Nursery ● Separate children's rooms ● Dining room ● 9 Wards; women with congenital mental disorders and women with non-congenital mental disorders live together[4] ● Kitchen
	Amenities
	● Parking area ● Storeroom ● Pantries ● Namaz area (Prayer room) ● Washing area; for laundary
	Child centric spaces
	Classroom and Separate children's rooms
	Management
	The shelter is managed by Dr. Naseem Atiq, who is a psychologist, with the assistance of 16 nurses and some of the shelter residents
	Vocational training
	None
	Site
	Residential area
	Site selection
	Not based upon any survey or research
	Open spaces
	60% of the total area
	Shelter dependency
	Prevalent

An urban planning study proposed a master plan for Karachi in 2020 to address urban densification and proposed developing new centers on the city's periphery to decentralize growth Karachi Master Plan (2020). See Fig. 5.2.

It can be deduced that the development of women's shelters needs to be done using the current evidence from Karachi's urban densification studies as a guide to ensure a more sustainable solution to overcrowding and sanitation issues in the current shelters. Through the provision of these shelters, the government can rehabilitate this specific community of abused women within different parts of the city.

Mapping out unsafe areas of the city will aid in designing shelters based on the danger levels

[4] Many women end up getting into fights and physically harm each other. Each ward has a ward in charge who has to keep everyone in check. The ward in charge is one of the residents with a relatively better mental state or is heading toward recovery from past trauma and abuse.

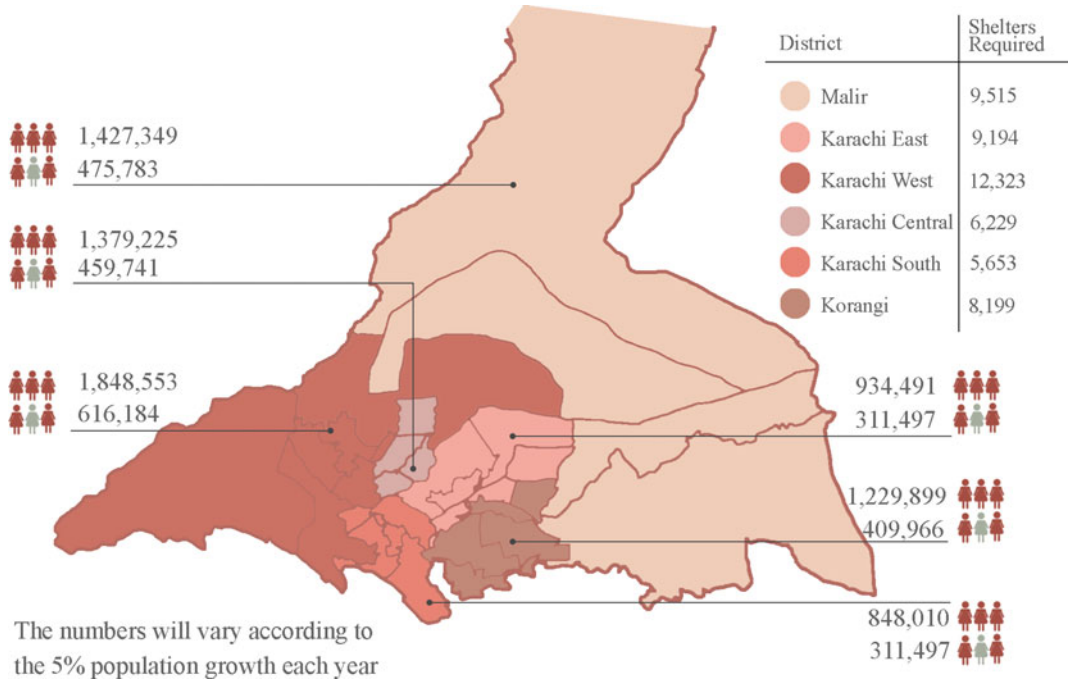


Fig. 5.1 Map of Karachi showing the number of shelters required in each district

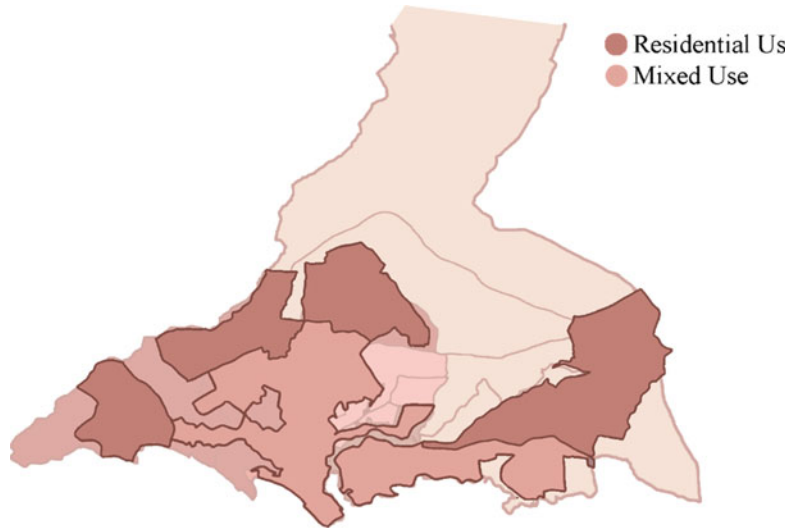


Fig. 5.2 Interpretation of the decentralization of mixed-use areas map in the Karachi Master Plan 2020 (Karachi Master Plan 2020)

of the specific region. Safety and security are the top priority for women's shelters in Karachi. A map was created using news reports and statistics from the Citizens-Police Liaison Committee to determine the crime rate in each region, with a focus on high-population areas such as Karachi Central, Figs. 5.3 and 5.4.

The shelter manager at the Panah Shelter Home explains that the police escort women and children to court and are contacted in case of serious emergencies. A map of police stations in the area has been created to ensure shelters are located within a 5-min drive of a police station. See Fig. 5.5.

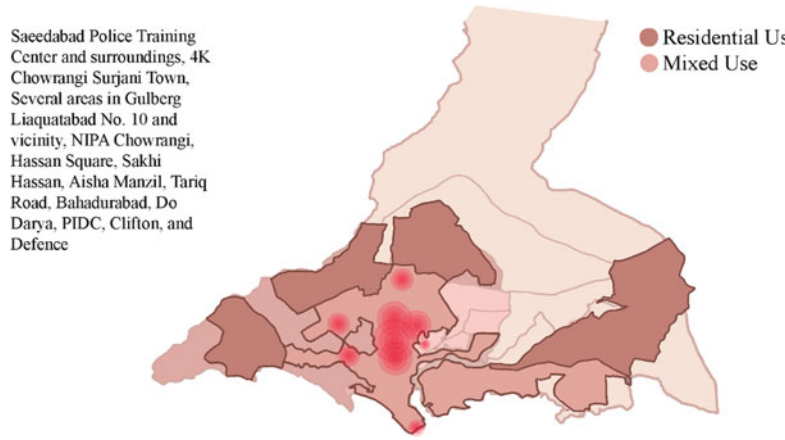


Fig. 5.3 Map of mixed-use and residential areas showing unsafe areas in red dots

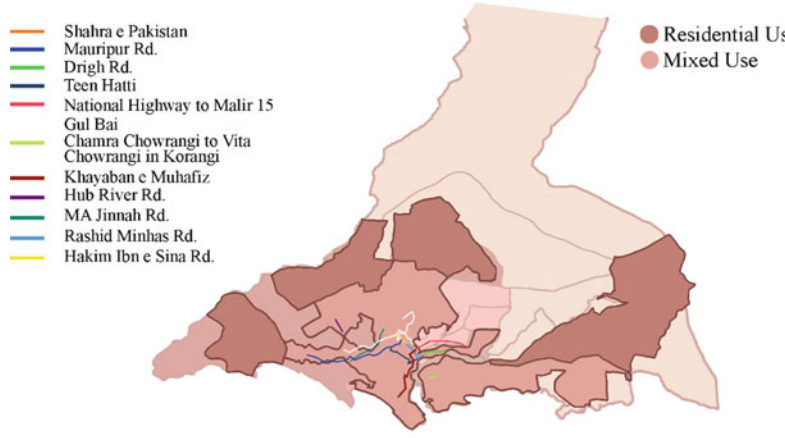


Fig. 5.4 Map of mixed-use and residential areas showing unsafe roads with multi-colored lines

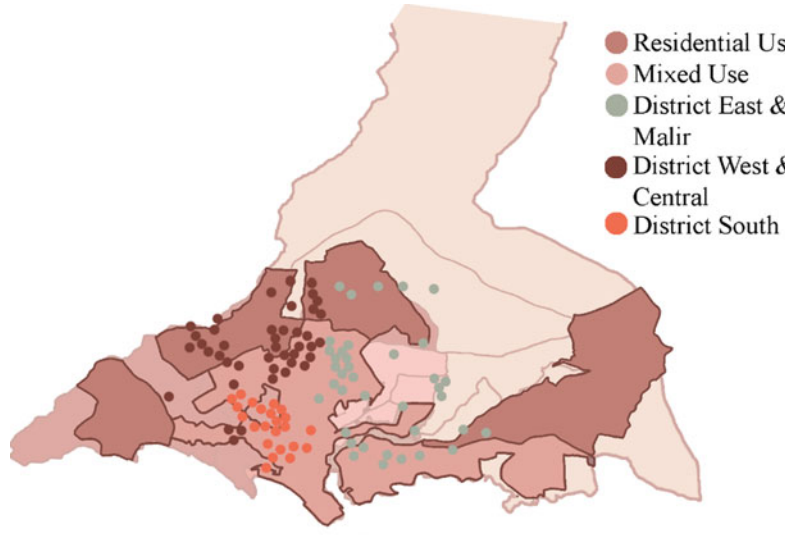


Fig. 5.5 Map showing locations of police stations throughout different districts

However, police stations in Karachi are predominantly run by male officers police therefore, the stations cannot be in close proximity to the shelters due to the public's lack of trust in the police force in Pakistan. A Human Rights Watch report (2016) elaborates how public surveys and research conducted by government accountability and correctional institutions indicate that the police are one of the most corrupt government institutions in the country responsible for harassing, abducting, and looting the citizens. They are also the most feared institution, and the public does not cease to complain about the lack of accountability in this system.

Research shows that ideal locations for shelters for women and children should be surrounded by housing and have enclosed play areas for protection against abduction. Karachi's shelters are embedded in residential areas. This presents itself an opportunity for the incorporation of playscapes that are embedded within the shelter building. This makes them much more accessible, safe, and secure to children and women. Given the security issue, parking needs to be provided within a closed boundary. Figure 5.6 shows how a typical residential area in Karachi tends to sprawl.

Given Karachi's growing need for vertical development in the form of mid-rise buildings, a basement for parking is the most viable and also the safest. The idea of G + 4 and G + 6 development also comes from the Karachi Master Plan 2020. Following is a checklist for the site criteria, to be used as a guide for site selection for women's shelters in Karachi. If even one of the factors from the following list is missing, the site will be deemed non-eligible. The site

- Must be at an urban center along the peripheries of the city. However, in Karachi Central, the shelters need to be located away from the aforementioned dangerous areas, roads, and streets.
- Should be within a 5–10 km radius of a police station.

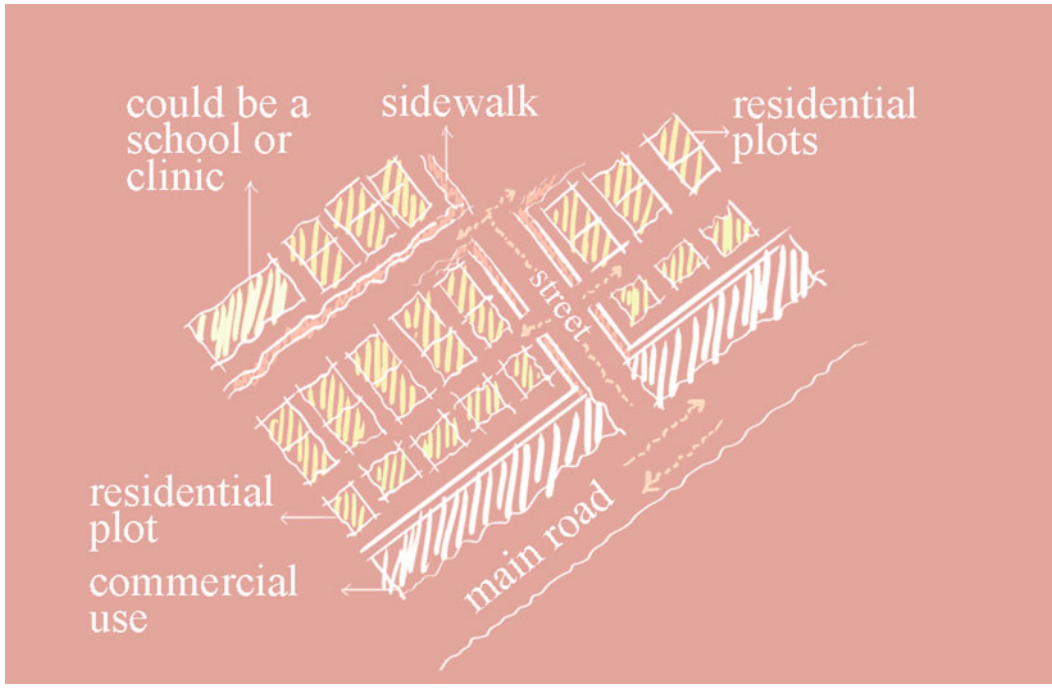


Fig. 5.6 A typical residential area in Karachi (excepting gated communities which are zoned to keep residential areas completely separate from commercial ones, usually inhabited by people from the higher income bracket)

- Should not be on or adjacent to a main road or alleyway.
- Must be in a residential area surrounded only by housing with no commercial activity in its immediate vicinity.
- Needs to be in a zone where the City District Government allows excavation for basements.
- Can only have one point of access.
- Must be two adjoined 1000 yd^2 plots to sufficiently inhabit 50 women and children.
- Should be protected from trespassers, abusers, or intruders with the aid of physical barriers such as walls or fences as well as foliage.
- Is only eligible if it passes the crime rate assessment based on the UN's International Classification of Crime for Statistical Purposes (ICCS) framework. The shelter can only be built if the site's crime rate is the lowest in the city's index.

The research suggests that the design of shelters for women in Karachi should prioritize safety and security, and address the issue of shelter dependency. It should also focus on economic independence, cultural co-existence, and the relationship between mothers and children, as well as connection to the outside world. The design process should involve input from the women who will use the shelter. Key program criteria for design are shown in Fig. 5.7.

Dr. Seemi Manzur, a professor at the Center of Excellence for Women's Studies, suggests incorporating a flexible working space for students and academics conducting research to

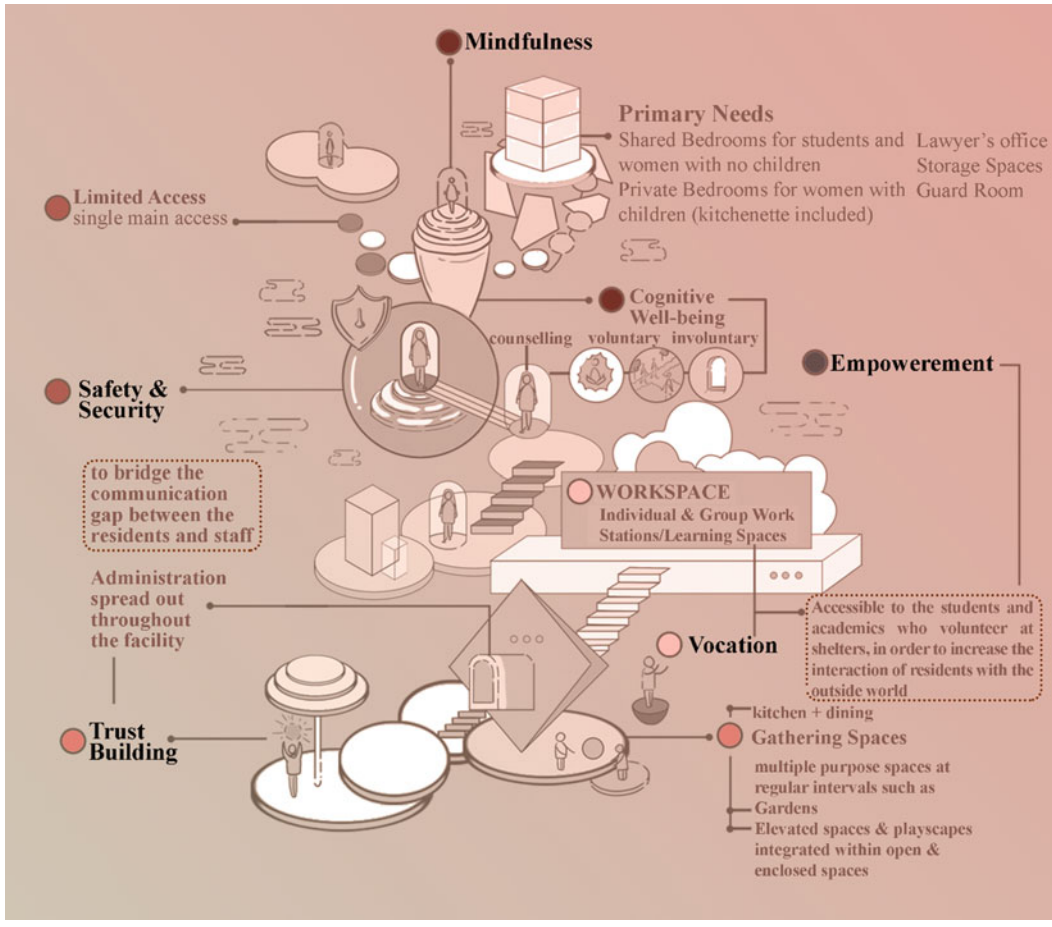
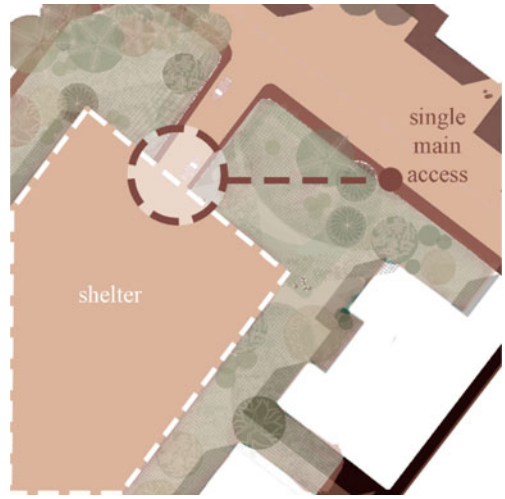


Fig. 5.7 Program explained through the needs of the residents

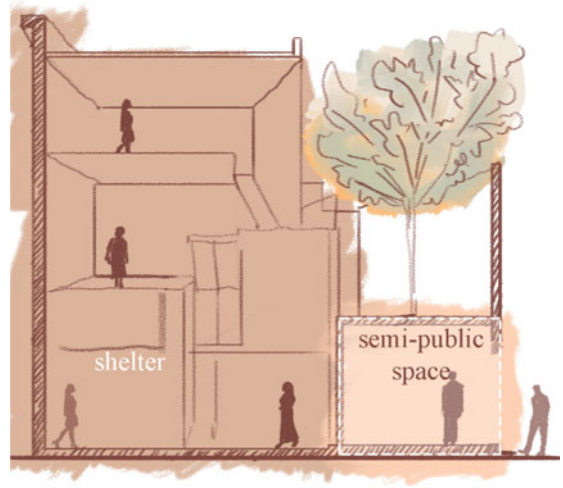
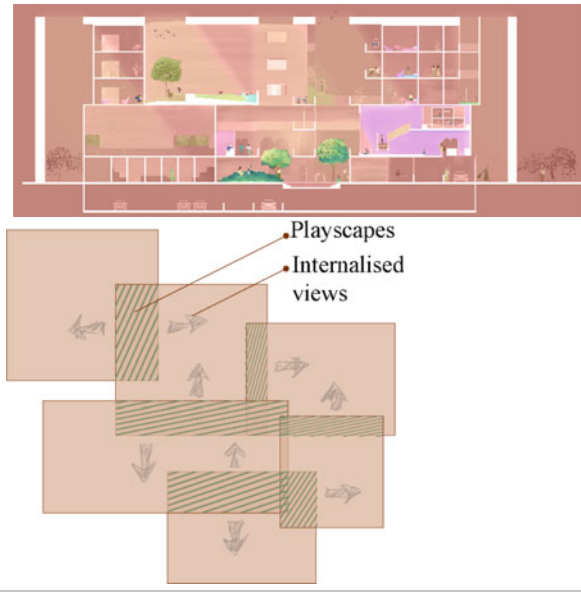
Fig. 5.8 One of the arrangements out of the 15

increase knowledge work and women's interaction with the outside world. The idea of semi-private spaces for neighborhood women suggests that women who are looking to find an escape from their everyday lives could also come to spend some time in a safe haven. This design strategy has its roots in the general lack of safe public spaces for women in Karachi. The women of Karachi do not enjoy the privilege of recreation the same as the men of this city (Bukhari 2019). Areas for mediation and external affairs should be placed away from living quarters to protect residents from potential trauma. The issue of homelessness and shelter dependency should also be addressed through flexible programs and second-stage housing. A good example of such design intervention is the SOS Village project in Djibouti, which incorporates natural light, wind direction, and vegetation in the design of 15 houses arranged differently to maximize their functionality. The designers studied housing and culture in contexts similar to Djibouti and designed a "Medina" with very specific design intent. Their intent was to design a Medina for Children with many open spaces and lots of vegetation (Archdaily 2014). Figure 5.8 shows a breakdown of one of the schemes designed for the SOS Village, Djibouti.

In order to determine the ideal environment for a special building type such as women's shelters in the city of Karachi, the perception of privacy and security as well as access to safe predictable services need to be addressed first. The following table illustrates design strategies to ensure the aforementioned safety protocols within the context of Karachi as well as design considerations that can help make the spatial quality pleasant.

Design considerations	Conceptualization
The vehicular and pedestrian access needs to be from one point of entrance instead of multiple to ensure safety and security. The shelter must be surrounded by housing	
Foliage needs to be used as a way to create a visual as well as physical barrier between the shelter and its surroundings	

(continued)

Design considerations	Conceptualization
The on-ground research indicates that spaces for mediation meetings with abusers and/or family need to be cut off from the rest of the shelter minimizing the residents' exposure to animosity	
Abundant daylight needs to find its way into the shelter but very large openings that allow outsiders to have visual access pose a threat. Courtyards of the Panah Shelter Home and Edhi Center are hardly ever accessed by the residents. A more viable solution is to design small pockets of open spaces embedded within the rest of the design and use light tunnels to let natural light in. Introverted design is of significance in this case These pockets of spaces can also be playscapes	
Flexibility within communal spaces will not only be stimulating but also encourage a variety of uses with each space. This has the potential to give autonomy to the women and children, consistent with research done in the past, autonomy of the built environment plays an important role Visual Access will also enhance autonomy and clarify wayfinding	

(continued)

Design considerations	Conceptualization
Previous research has suggested that shelters should have attractive views, but in the context of Karachi, it may be more appropriate to create internal spaces with pleasing views rather than large openings that increase external visibility. The living areas should be designed to feel like a community rather than a dormitory. This will aid in forming a self-sustaining community of female-headed households. The living section must include recreational spaces such as a swimming pool, gardens, vegetable patch, and plenty of open spaces for the children to play. This will make the women and children feel more at home, increase interaction between the residents, and accommodate staff members	
Home Based Workers as they have been mentioned in UN reports have been successfully identified by Panah Shelter Home. However, it still has a long way to go when it comes to shaping a built environment that can help these women with honing their skills and learning new ones in order to enter the workforce. Through flexible workspaces within the shelter, women can learn skills of their choosing	

5.5 Conclusion

The present study, through field research, discovered that the design of shelters for women in Karachi is frequently approached in an isolated manner, with minimal input from the intended users themselves. Analysis of two case studies revealed that the challenges faced by women in Karachi are unique and influenced by societal and cultural factors. This research aims to demonstrate how the built environment can be tailored to meet the needs of women affected by domestic violence, as well as those seeking safe public spaces in Karachi. Through the development of program criteria and an appropriate division of spaces, this research endeavors to integrate social development considerations into architectural design. Furthermore, the research findings underscore the prevalence of shelter dependency and the growing population of homeless women in the region, emphasizing the imperative for the successful reintegration of these women back into society. The limited existing research on this topic highlights the potential for further knowledge work in this field. The results of this research can be used to inform the development of new or improved shelters for women in Karachi, with a focus on ensuring that the design meets the specific needs of the intended population.

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Appendix 1

Survey Questions for the Survivors

1. What is your name?
2. How old are you?
3. Are you married?
4. Do you have any children?
5. How far have you gone in your studies?
6. Did you have a job before you came to the shelter?
7. How long have you been living in this shelter?
8. Have you ever lived in any other shelters?
9. Why are you living in this shelter?
10. Do you feel safe in this shelter?
11. Have you ever tried to go back home?
12. How is your relationship with the other women who live here?
13. What kind of vocational training are you receiving here?
14. Are you satisfied with the vocational training that you are receiving here?
15. Do you ever participate in any outdoor activities?
16. Do you prefer a private or a shared bedroom?
17. Do you have plans for your future?
18. Is there anything that you would like to change about the built environment of this shelter?

Appendix 2

Survey Questions for Management

1. How many women and children live at this shelter?
2. How long have you been working at this shelter?
3. What are your duties here?
4. How are the women and children integrated into the shelter?

5. What are the services that you provide to your residents?
6. What are the day-to-day operations at this shelter?
7. Do you offer vocational training? If so, on what basis have the vocational training programs been chosen?

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Part II
Race, Ethnicity and Minorities

Afrorurality New Proposals for the Construction of Ethnic Identity

6

Daniel Huertas Nadal

Abstract

This photo essay takes a tour through the ways of living of Afro-descendant communities in rural areas of the Caribbean in Colombia. In these communities, to look is to find a state of complicity that allows us to discover the sense of everyday life. While architecture exhibits an analytical gaze, photography observes from intuition. The defense of a renewed, transcultural, and plural ethnicity faces the difficulty of overcoming an imaginary of the ethnicity linked to traditional cultures. Generally, a colonial scenario where the ethnic projection is inferior to a modern white subject who only interacts with the ethnic from some visions of the rural. Nevertheless, the image of blackness has persisted as marginal, rural, regional, specific, and with an appearance that reclaims to be ancestral. The architecture currently proposed, discussed, and imposed from the urban does not know how to address the rural, and does not know how to meet the needs of ethnic differences. Development plans articulate political proposals in which economic values prevail. The Afro-descendant communities collect in their ways of inhabiting their diasporic condition, struggle against inequality, and projection as cultural development. Identity is not an economic construction. The new generations demand new spaces of identity; that is why it is necessary to go beyond the exoticism of the inclusive. Learning to overlap our worlds with each other's worlds is essential. From here, an updated version of the world can be imagined.

Keywords

Ethno-development · Inclusive territories · Afro-rural housing · Social inclusion · Social construction of habitat

6.1 Introduction

This photographic essay responds to four years of work with the Afro-descendant Ma-Majarí community of El Nispero in Montes de María, in the Colombian Caribbean, in an area known ancestrally as “Llanos de Angola”. In general, the African diaspora in Colombia allows us to discover a cultural experience that, from pain and suffering, allowed the communities to reinvent a life in exile, achieving freedom from slavery in different scenarios. In Montes de María, the

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Afro-descendant communities, mainly from Angola and Congo, built different *"palenques"*, settlements populated and defended by enslaved Africans who escaped from the slave regime during the colonial era, from which they defended their freedom as maroon communities. The Ma-Majarí community has its origin in the so-called Palenque of Angola.

In the construction processes of different development policies, black communities have historically been made invisible, especially Afro-descendant communities in Colombia. Continuing to leave Afro-rural communities on the sidelines of an alleged Global Development is committing a double mistake: one that discriminates against the value of the rural and another that underestimates the value of the differential ethnic approach. Policies tend to seek social homogeneity to produce solutions that work for everyone. At the same time, cultures continue to defend the value of diversity to produce solutions capable of adapting to other contexts.

I wonder if ethno-development has a place in Sustainable Development and if the idea of Inclusive Design can incorporate the discourses of a diaspora that has ignored Africa for centuries. Sharing the discoveries of what it means to be Afro in the rurality of the ancestral settlements of the Colombian Caribbean requires alternative research tools and processes.

Photography allows a complicit dialogue in the redefinition of identity and the collective construction of a shared imaginary to recognize each other and look toward the future. These images put the very idea of development in crisis. This photographic essay shows the fascinating complexity of building ethnic identity, its intangible heritage, and a way of life linked to the territory.

The exhibition collects the color of the people: their customs, voices, and dances, the color of their houses, and their dreams. Thanks to its people, these images of identity, culture, and ethno-development have been possible. This exhibition captures the color of life in the Ma-Majarí Community Council of El Níspero.

6.2 Considerations

Ma-Majarí community of El Nispero in the Colombian Caribbean represents one hundred years of building the cultural reality and identity rights of Afro-descendant communities. Nowadays, ethnic status means, at the same time, liberation and condemnation, a new commitment to cultural ethnicity: the articulation of options for progress and empowerment for new generations. Ethno-development can be seen as a social inclusion strategy based on values such as cultural diversity, equality, and equity. In this sense, the Sustainable Development Goals scenario in Colombia has been raised as an opportunity to transform the ethnic rural world.

Therefore, new Afro-descendant generations commit to responding to their dreams, illusions, and perspectives, making any project a proposal that responds to the most profound human interests. Being Afro in the twenty-first century means discussing whether the fundamental rights of Afro-descendant communities involve preserving traditional practices and ways of life or facing the challenge of reformulating effective mechanisms for constructing a new social habitat. This project proposes a trip through traditional Afro-Caribbean housing: its origins, schemes, social relations, and construction systems. Characterizing the black community's ways of life and traditions would permit us to propose an update of that housing uses and management, from which to build a living ancestrality that looks to the future. Constructing a cultural identity route claims to stay in the territory with dignity and visualize a new Afro way of life.

The research is developed from a Participatory Action Research approach, understanding that the result of the research is, above all, a process. The images in this photographic essay show the discovery process, slow and complicit, that has accompanied the work with the community to redefine their Life Plan. It should be clarified that Life Plans for Afro-descendant communities in Colombia define legal documents that express the community's ways of

living, the ties that define their ancestry, and the strategies with which they want to protect their future in the territory.

Although there is no clearly stated ethnic route in the Sustainable Development Goals, some of its points make it possible to underline the importance of "leaving no one behind": The idea of global development and the criteria of economic growth could be questioned. Inequality, vulnerability, and the risks of social exclusion are unfathomable in Afro-descendant environments. Internal displacement processes due to the violence of armed actors and the pressures of economic drivers that have taken over the discourse of social development have multiplied. Focusing on inclusive cities has blurred the necessary resilience of rurality. The alliances do not reach the territory, the local ones, the national ones, and much less the global ones.

This photo essay intends to share an exhibition with large format images at the UIA2023 Congress, making visible a reality that needs to dismantle the repeated colonial discourse of Afro-descendant projections. It is crucial in this decade in which the United Nations' proposals for Sustainable Development Goals and the International Decade for People of African Descent coincide.

6.3 Visual Essay: Afroruralities

Afrorural (Afro-rural)

The Afro movement in Montes de María has its roots in the Palenque de Angola, established over a hundred years ago. However, there is little awareness of these communities' cultural reality and identity rights. The founding conditions of their territory have often been blurred or extinguished by military and paramilitary violence during the armed conflict in Colombia (Fig. 6.1).

Recursos sellados (Sealed resources)

In Colombia, violence for the control of resources extends throughout the territory, control of land, timber, mining, or water. Infrastructures are essential for a dignified stay in the territory, especially those related to water. These collective

Fig. 6.1 Aerial view of El Níspero. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.2 Old community water wells. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

wells, now sealed, are a metaphor for the current situation, for exclusion and silence (Fig. 6.2).

Mi casita (My little house)

La Victoria neighborhood was formed in 2021. It represents a victory against violence and threats from agribusiness and the institutional absence of the state. After a long and contentious process, the community council could buy two hectares of land. Three months after distributing the land to the neediest families, they had already built their houses: we cannot risk waiting again for help to build (Fig. 6.3).

La calle de mi casa (The street of my house)

It is played in the street, while someone heats porridge and makes coffee on a stove. The street is the extension of the house as far as the grandmother can see and hear. The streets are full of eyes that protect because when children are born, they offer themselves to a shared world (Fig. 6.4).

Refresquito pal caló (Little cool for the heat)

The "raspao" is scraped ice mixed with colored sweet anilines. It is sold on the street. The economy is as fragile and as strong as families; each house trades with what it can. They sell rice, paper, clothes, or medicines in the houses, on the street meat, some vegetables, or fish (Fig. 6.5).

Recuerdo de Galisia (Souvenir from Galisia)

The named Galicia exposes the traces of Spanish migration after the civil war. Then, as a memory of Colombian magical realism, the blind granny calls her granddaughter to welcome us and asks her daughter to tell us about how she dreamed of her prosperity (Fig. 6.6).

La carpintería está cerrada (The carpentry is closed)

The house is more than a hundred years old; it is one of the examples of traditional house construction with wood, inheriting some construction techniques from carpenters from Jamaica

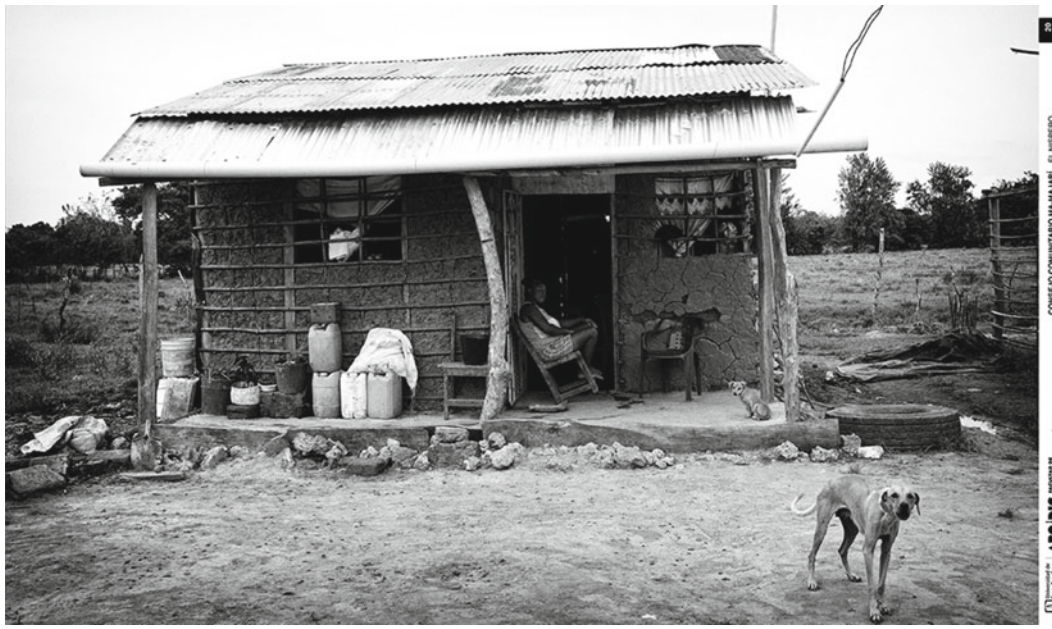

Fig. 6.3 New home in La Victoria neighborhood. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2021. @Daniel Huertas

Fig. 6.4 Child playing with a top. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.5 "Raspao" sale in the square. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.6 First brick factory homes in the Caribbean area. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.7 Colonial wooden house. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

and the Antilles hired by foreign companies when they arrived in Colombia at the beginning of the century (Fig. 6.7).

La vida es para sonreir (Life is for smiling)

During the meetings, the young people openly declared their desire to leave the territory. Therefore, this could represent a fragile bridge in the construction of the habitat. The social fabric cannot assume the commitment to respond to dreams, illusions, and perspectives of new generations that make any project respond to the most profound human interests (Fig. 6.8).

Los ancestros (The ancestors)

The Afro-Caribbean ancestral dwelling has different origins that place the constructions with mud walls and palm woven roofs as typological references that relate these structures with traditional African constructions such as those built in the North of Angola, Congo, or Tanzania (Fig. 6.9).

La casa de Perfectico (Perfectico's house)

With more than 100 years, the house is one of the four houses that founded El Níspero. Juan Tovar and María Angulo built it, and although it has permanently been inhabited, it has never been remodeled. The house remains as it was originally built, only changing the paint on its façade every year (Fig. 6.10).

Siempre rosada (Always pink)

This type of wooden house with a metallic roof is directly related to the insular wooden architecture of the Caribbean area, more influenced by the work of master builders of Antillean origin than by traditional African influences. Zinc roofing was introduced to the camps of foreign companies and was widely spread because of its ease of construction (Fig. 6.11).

El rinconcito para vivir (The small corner to live)

The work with the bahareque system in the Caribbean region has received rejection and a lack of institutional support. Institutional initiatives do not invest in developing traditional construction systems, overcoming some characteristics, such as the lack of sanitation inherent to the technique or some expressions of the

Fig. 6.8 Children playing in the street. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2018. @Daniel Huertas

Fig. 6.9 Afro-descendant ancestral house. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.10 House in "caña parada" (vertical cane), the first house in El Nispero. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.11 Traditional wood board house. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.12 Traditional construction system in "bahareque". Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2018. @Daniel Huertas

imaginary that contribute to reinforcing an image of poverty (Fig. 6.12).

Brujas y gansos (Witches and geese)

They say witches stop in these trees at nightfall, whistling at those who pass unwary to cross the stream. If someone discovers them at sunset, they transform into geese and flee along the riverbank. Everyone stops to talk at this intersection, even the witches (Fig. 6.13).

Toda la vida (All the life)

> I can only work going up the mountain to lower firewood. I no longer have a donkey, so I put it down on my shoulders. It is hard for me to get down enough firewood to sell, but it is still enough to live on and take care of my mother (Fig. 6.14).

La mula tuerta (The one-eyed mule)

The one-eyed mule is better than any donkey: It knows all the mountain paths. Donkeys and mules are essential because they are the only helpful transport system for working in the mountain. There are no roads accessible to motorcycles or cars (Fig. 6.15).

Primero el alma y luego ya veremos (First the soul and then we'll see)

Healers apply traditional herbal-based remedies and heal both the body and the spirit. They know how to name and identify diseases, cure snake bites, and heal witchcraft. When the nearest health center is more than two hours away by motorbike across unpaved roads, they are often the ones who save lives (Fig. 6.16).

Tejiendo generaciones (Weaving generations)

Traditionally, the houses' roofs have been built with the materials that the environment offered, with palms of different types. These palm roofs allow fantastic passive thermal conditioning. However, since the appearance in the forties of zinc tiles used by Dutch companies, palm weavers have become increasingly rare (Fig. 6.17).

Fig. 6.13 Meeting at sunset. El Cruce neighborhood. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Mi calle son mis amigos (My street are my friends)

The street is the place that allows the social fabric. Since childhood, everything happens outside the doors: the exchanges, the games, the meetings. Walking through the streets implies saying hello, approaching the houses, and stopping to play for a while. The streets are not foreign but their own; streets are not spaces of anonymity (Fig. 6.18).

Sólo se entiende caminando descalzo (It is only understood walking barefoot)

Some trees allow gatherings in front of houses that are never taller than the trees that protect them. The houses are far enough apart that the voice warns the house on the other side of the street. Crossing by donkey is better if the streets are not paved (Fig. 6.19).

Pasa la vida (Life moves on)

She always went out with two chairs: one for her and the other for her friend. We talked about life and the colors of life. When I returned to give her this photograph, the two chairs were empty, and she was dying in bed, asking me to hang the two-meter photo inside her room to see life looking so colorful (Fig. 6.20).

Los tiempos de otro desarrollo (Another development times)

The Salas Santero family home is about one hundred and twenty years old. Doña Adriana is one of the few who came to the Níspero from another region, Córdoba. Over time, this wooden house has undergone essential modifications by changing the material of the original kitchen hut for a contemporary factory construction in concrete blocks (Fig. 6.21).

El filósofo (The philosopher)

Just sit at sunset and wait. The philosopher will talk to you about the meaning of life, love, hope, and time. He will offer you coffee and accept what you offer him. If you walk past, he will nod to you. If you stop, he will ask you what you think (Fig. 6.22).

Fig. 6.14 Carrying wood from the bush. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Nuevas ilusiones, las mismas risas (New illusions, the same laughs)

The Banqués Sanmartín granddaughters laugh when "the gringo" waves with his camera. In the background, in front of the "bohío," is the patio where the women talk. There is a living space in the shade. It means the pause between this life in the street and the other by the fire (Fig. 6.23).

Caballitos de madera (Rocking horses)

The house of culture is a simple concrete structure covered with a metal tile. It was built by a company as compensation for crossing the community territory with a gas pipeline. It is the children who talk about culture in the house of culture (Fig. 6.24).

El futuro huele a barro (The future smells like mud)

The family that has lived in this house forever built it using "bahareque" with "guadua" (bamboo) and mud. The house currently has a roof with logs of wood and zinc tile, while the floor keeps the trodden earth as material, like most of the houses in El Níspero (Fig. 6.25).

Resistente (Resistant)

In the narration of life stories, the family tells how the house has permanently been inhabited by someone who has needed shelter. It is common to find personal and family exiles and round trips in life stories, assuming the contradiction of reconciling their ancestry and permanence in the territory with dispersion and movement (Fig. 6.26).

Noctámbulo (Night owl)

In this space, materiality is essential because it relates the house to the very origin of the materials used in its construction. The wood, the mud, and the trodden earth have to do with the mountain, the hill, and the rurality converted into an element of significance and permanence in the territory (Fig. 6.27).

Que te acompañe el trino (May the trill accompany you)

Building cages and raising small canaries is a culture that integrates social classes, especially

Fig. 6.15 Boy on a mule, coming back from working in the bush. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

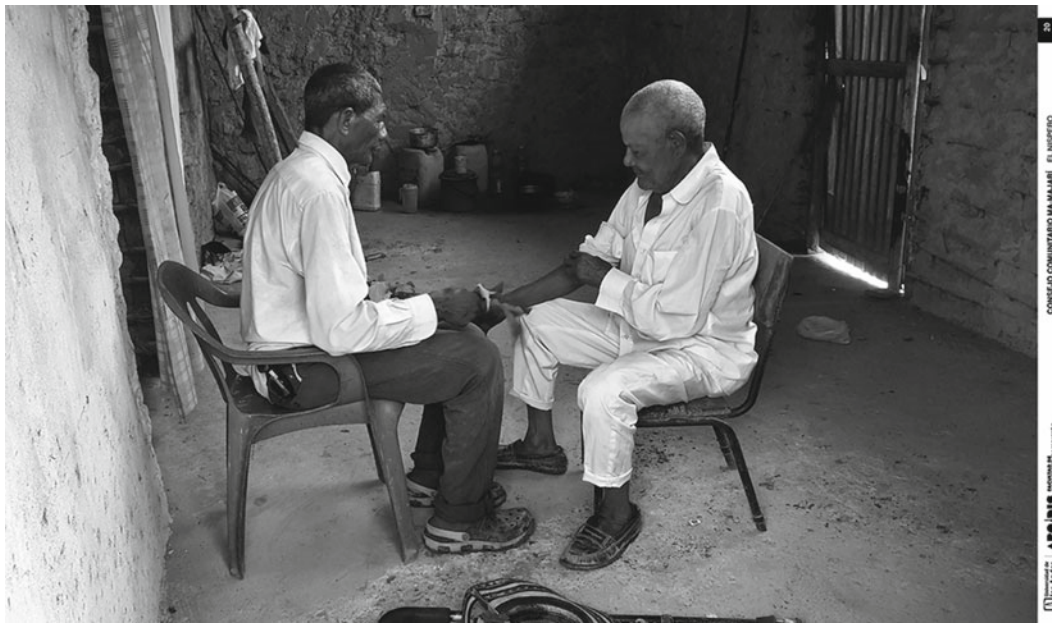

Fig. 6.16 Healer, applying traditional remedies

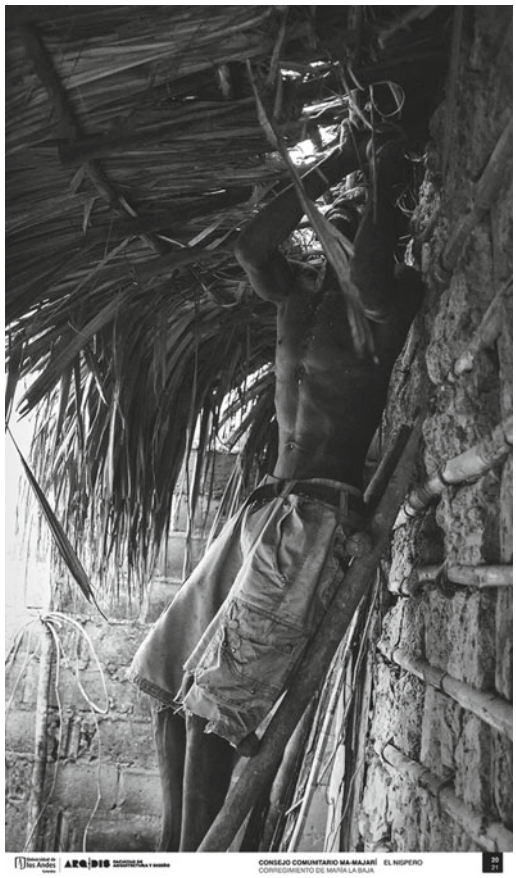

Fig. 6.17 Palm weaver. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

young people in the Caribbean. It is an art that demands discipline, care, and respect. There are canary cages in all the houses, and many young people walk with them (Fig. 6.28).

Llevas historia en la piel (You have history on your skin)

Practically all of the uses and customs that define Afro-descendant culture in which the community recognizes itself belong to oral traditions or cultural expressions with a marked sense of orality that takes place in the home. Visit the knowers and participate in their stories and collective narratives of history, knowledge, and dreams (Fig. 6.29).

Mujeres (Women)

The community goes to midwives, knowers, and herbalists. They talk, they seek remedies, and they weave community. The knowers will receive the visit at the threshold, an extended spatiality of the domestic, which articulates the street, the social. At the entrance, stories will be told, and the space will extend as far as the voice can reach (Fig. 6.30).

Cuando suena el cuerpo I (When the body sounds I)

It is sung and danced in public. Nevertheless, the sound of the "llamadora," of the "tambora", more powerful, extends in space like the branches of the tree, calling the territory. And the community dance under the tree, in the square, or beside the well (Fig. 6.31).

Cuando suena el cuerpo II (When the body sounds II)

Over time, the dance has been taking place in the collective spaces that the community has been building: in front of the church or in the recent house of culture. The spaces that collect collective activities, meetings, and gatherings are especially significant. They are spaces where a celebration of shared identity is reproduced (Fig. 6.32).

Cierren los ojos (Close your eyes)

The Bullerengue is a sung dance that allows to heal the individual and heal collectively. One could speak of the manifestation of dynamic spatialities of expression and visibility of culture toward articulated spatialities of the encounter. In these meetings, all the spaces have the construction of collective identity in their vocation (Fig. 6.33).

Fig. 6.18 Children playing in the street. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.19 Trees in the street, neighborhood of Arriba. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.20 Woman waiting for a visit, Abajo neighborhood. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.21 Ancestral wooden dwelling, founding of El Nispero. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

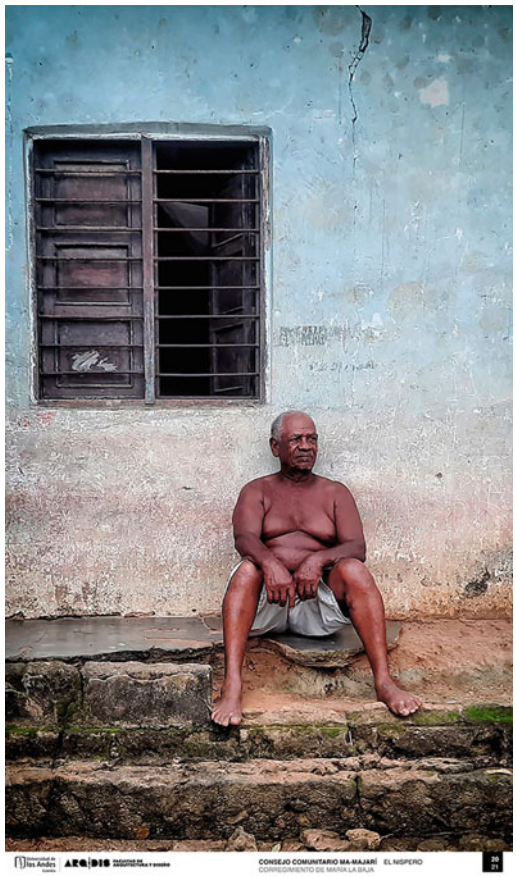

Fig. 6.22 At the door of the house, at sunset. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2021. @Daniel Huertas

Fig. 6.23 Girls at the door of the house, in the background the patio. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Cuerpo, sonido, resuena (Body, sound, resonates)

Oral tradition constitutes the main component of the ethnicization of black communities. Different oralities and narratives express different projections of the social, and that implies different spatial sequences: the song, the public talk, the conversation, the confession, and the whisper. The complexity of the narratives reveals the complexity of their spatial production (Fig. 6.34).

Paredes de luz y barro (Walls of light and mud)

The Chiquillo family's home keeps in the same condition since it was built eighty years ago, although the current zinc roof replaced the original palm roof. In this building, you can appreciate the multifunctional character of the spaces, which are not assigned to specific functions and in which the furniture is practically non-existent (Fig. 6.35).

Fig. 6.24 Children playing in the culture house. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

De palma y tierra (Of palm and earth)

The "bohío" is on the patio with a log and palm cover. The patio is open, connecting the house with the adjacent house of the relatives. From dawn to dusk, the stoves in the houses are permanently on, constantly receiving help to improve the homes, compadres, or relatives with whom to talk (Fig. 6.36).

El fuego está encendido (The fire is on)

The origins of the houses are diversified, recovering construction traditions and typologies of Indigenous, African, or Caribbean influence. The relationship with the palm weaves and the liana joints, the influence of bahareque and mud finishes, or the plank enclosures and wooden lattices evidence this diversity of influences and sources of development (Fig. 6.37).

Cocino para sentir que estoy viva (I cook to feel that I am alive)

Some rice, plantain, and some onion, and if possible, a piece of chicken or beef. Enilda has arrived at La Victoria, displaced by the violence. With occasional help, she has been building a small mud house and a wood-fired kitchen. As the house grows, the kitchen moves. Always open, like freedom (Fig. 6.38).

Tres generaciones (Three generations)

Inhabiting is not just residing, being inside, or occupying a room. It gives everyday meaning to our time and our space. The "bohío" has represented the family unit since ancient times. It is a space where the word is summoned with fire, and it is where communication and one's own identity emerge (Fig. 6.39).

Fig. 6.25 New "bahareque" house. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2021. @Daniel Huertas

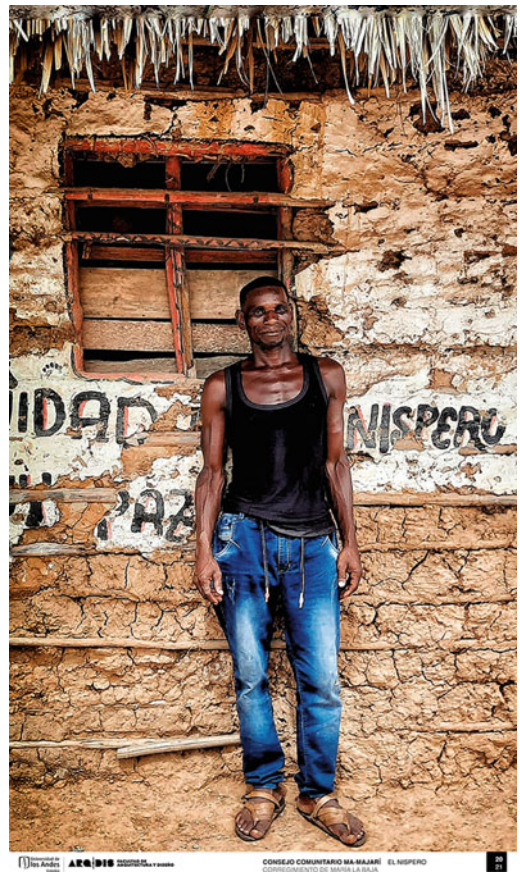

Fig. 6.26 Elías Sanmartín in front of the family home. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2021. @Daniel Huertas

Al fondo hay voces (There are voices in the background)

The dynamic space of the street, the secluded space of the patio, and the static space of the house. A rhythmic spatiality, with different pauses that always imply the rhythms, manifested in space in thresholds, places of presence. In these houses, thresholds to look through the space: from the street to the patio (Fig. 6.40).

Monte y culebra (Mount and serpent)

From here up, everything is mountain and snake. Donkeys and mules allow access to the cultivation areas up in the mountains and collect the milk from the cattle. There are few opportunities to work in populated areas, and men should move to the cities or work in the fields (Fig. 6.41).

Fig. 6.27 Traditional "bahareque" dwelling, at sunset, Abajo neighborhood. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2020. @Daniel Huertas

Jardines (Gardens)

The patios are associated with women when they are linked to the kitchen, while they remain associated with men when they are linked to cultivation. The patio in the house strengthens the practice of a solidary coexistence that allows permanence in the territory, food sovereignty, and the expression of own uses and management (Fig. 6.42).

Kasariambe (Kasariambe)

The "lumbalú" is the ancestral burial ritual, the last cultural custom of African origin, especially Angolan, among the Maroons: a ceremony in which music is played with sacred drums and songs express the pain of departure. It is executed in the community during the nine nights following death to honor the deceased's soul (Fig. 6.43).

La Santa Rita (The Holy Rita)

The Catholic tradition occupied one of the highest places in a Christian slaveholding society. The black had to choose between two alternatives: adapt to the values of white culture, assimilating the habits and customs of a culture that did not belong to him, or rescue its roots in Afro religions, which maintained African traditions in their cults and celebrations (Fig. 6.44).

Fig. 6.28 Young man with his little bird. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2021. @Daniel Huertas

Fig. 6.29 Apolinar, knower. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

La sombra del futuro es alargada (The shadow of the future is long)

The palisades originate in the defensive construction systems used in the "palenques" to delimit the properties. Again, elements available in nature are used, in this case, sticks that are joined with barbed wire (Fig. 6.45).

Levantado con muchas manos (Raised with many hands)

Traditionally, the Afro and Palenquero house was built as a refuge, often without carpentry. A house that only showed the door as an opening that related the public space with the patio. In contrast to the woven and open pre-Hispanic

Fig. 6.30 Rita and her mother, knowers. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.31 Afro night, girl dancing. Ma-Majari Community of El Nispero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.32 Afro night, dancing child. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.33 Afro singer. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.34 Dancing "bullerengue". Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2020. @Daniel Huertas

Fig. 6.35 Bahareque interior in an Afro-descendant ancestral dwelling. Ma-Majari Community of El Níspero, Montes de Maria, Colombia 2019. @Daniel Huertas

Fig. 6.36 "Bohío" with a palm cover in an Afro-descendant ancestral dwelling. Ma-Majari Community of El Níspero, Montes de María, Colombia 2019. @Daniel Huertas

houses, the African-influenced houses were closed, protected, and tied to the earth (Fig. 6.46).

Actitud (Attitude)

Identity is a dynamic construction. The new generations demand new readings of identity, which is why it is necessary to understand spatial structures as associations of immaterial elements, not as a consolidation of material distributions. As an articulator of the identity processes of Afro-descendant communities, housing needs to be a protagonist in the renewal of cultural systems (Fig. 6.47).

Tierra, territorio (Land, territory)

It has become common practice to impose foreign land use classification and concessions on community councils for infrastructure construction and development projects. This practice may

Fig. 6.37 The "bohío": the traditional wood stove. Ma-Majari Community of El Níspero, Montes de María, Colombia 2019. @Daniel Huertas

favor inequality, social exclusion, displacements, and fragmentation and jeopardize differentiated cultural models. Therefore, it is crucial to guarantee that communities remain with dignity in the territory (Fig. 6.48).

El Desarrollo aquí se construye con las manos (Development here is built by hand)

It would be necessary to update the production capacity of an Architecture that approaches, travels, and understands the worldviews of Afro-descendant communities, an Architecture capable of summoning ancestral conceptions of the world, nature, the rhythms of time, and the intangible. Projecting is not only a social strategy but also a storytelling strategy (Fig. 6.49).

Alcanzar lo invisible para transformar lo visible (Reaching the invisible to transform the visible)

I learned that being overwhelmed is coupling our worlds with the worlds of the other to discover complicit thoughts. From here, an updated version of the world can be imagined (Fig. 6.50).

Fig. 6.38 Cooking in the firewood hut. La Victoria neighborhood. Ma-Majari Community of El Níspero, Montes de María, Colombia 2021. @Daniel Huertas

Fig. 6.39 Traditional family kitchen. Ma-Majari Community of El Níspero, Montes de María, Colombia 2019. @Daniel Huertas

Fig. 6.40 Traditional access to the patio from the street. Ma-Majari Community of El Níspero, Montes de María, Colombia 2020. @Daniel Huertas

Fig. 6.41 Peasant on a donkey, returning from the field. Ma-Majari Community of El Níspero, Montes de María, Colombia 2021. @Daniel Huertas

Fig. 6.42 The courtyard behind the house. Neighborhood of Abajo. Ma-Majari Community of El Níspero, Montes de María, Colombia 2020. @Daniel Huertas

Fig. 6.43 Cemetery at the exit of the road. Ma-Majari Community of El Níspero, Montes de María, Colombia 2020. @Daniel Huertas

Fig. 6.44 Church of Santa Rita

Fig. 6.45 Street between palisades, Arriba neighborhood. Ma-Majari Community of El Níspero, Montes de María, Colombia 2019. @Daniel Huertas

Fig. 6.46 Original Afro-descendant wooden house. Ma-Majari Community of El Níspero, Montes de María, Colombia 2020. @Daniel Huertas

Fig. 6.47 Children in the future visualization workshop. Ma-Majari Community of El Níspero, Montes de María, Colombia 2020. @Daniel Huertas

Fig. 6.48 El Níspero land and water reserves. Ma-Majari Community of El Níspero, Montes de María, Colombia 2019. @Daniel Huertas

Fig. 6.49 "Bahareque" window in La Victoria neighborhood. Ma-Majari Community of El Níspero, Montes de María, Colombia 2021. @Daniel Huertas

Fig. 6.50 Girl photographing her house in La Victoria neighborhood. Ma-Majari Community of El Níspero, Montes de María, Colombia 2021. @Daniel Huertas

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The Time Capsule: Memories of Viequense Architecture

7

Kathryn Elizabeth Larsen

Abstract

Collecting oral histories can be a key research method for inclusivity, when written architecture education and history are centered around non-inclusive perspectives. This article deals with the author's family oral history and phenomenology in architecture on the island of Vieques. The research addresses SDG goal number 10, which aims to reduce inequalities, as well as SDG goal number 3, which stands for good health and well-being. Both these SDG goals are affected by the historical colonial framework of Vieques. Vieques is unique in that it resisted initial colonization, resulting in a blend of Taino, African, French, and Spanish influences. Eventually, it became a testing site for the US military over the course of the author's grandmother's lifetime. The residents today are still governed by the colonial constructs that come with being a United States Territory. Because of this, they have faced serious health repercussions, including the razing and destruction of local buildings for military testing, and the lack of funding for a hospital on the island in the wake of Hurricane Maria's destruction.

Keywords

Caribbean architecture · Colonialism · Vieques · Inclusivity · Diversity · Oral history

7.1 Introduction

Vieques is a small municipal island separate from the mainland of Puerto Rico, and for over five years, there has not been a fully functioning healthcare center on the island. In 2017, Hurricane Maria destroyed the existing Susana Centeno Healthcare Center. For nearly four years, Vieques and Puerto Rico have navigated bureaucracy to acquire hospital funding from FEMA to rebuild it (Serrano Román 2021).

At the heart of the bureaucracy is the fact that Puerto Rico is not a sovereign nation, but a U.S. Territory. This makes it deserving of U.S. funding for disaster relief from hurricanes. SDG goal number 3 stands for good health and well-being, yet the health of Vieques has been long impacted by colonialism throughout its history. Vieques holds record sickness rates in the Caribbean (Pelet 2016). They face higher cancer rates, are eight times more likely to die from cardiovascular disease, and are seven times more likely to

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die from diabetes than other municipalities in Puerto Rico (Pelet 2016).

It is not a stretch to assume that the poor health of the island, beyond limited access to health care, including preventative care, is tied to the activity of the US Navy on the island. For almost sixty years, the US tested toxic bombs on the island, with chemicals and metals including uranium and agent orange (Pelet 2016). While the US has therefore essentially poisoned Vieques, they have also the key to funding for Vieques, to provide necessary healthcare infrastructure.

SDG goal number 10, which aims to reduce inequalities, is also a key SDG goal relevant to Vieques. In the last year, employment on the island declined by 18%, and income inequality grew by 0.195% during 2019–2020 (Data USA 2023). Vieques' main source of economic development is heavily tied to the tourism industry. As local Puerto Rican architect, Germarilis Ruiz told me.

"We all go to Vieques for the beautiful beaches and for the bioluminescent bay, but Vieques is one of the poorest municipalities in Puerto Rico. We do not see it [from the mainland of Puerto Rico] because we visit for vacation."

My grandmother, who was born and raised on the island, was initially concerned about my research focus. "I'm not sure why you want to hear about Vieques. Growing up, it was *muy aburrido*. Very boring place." However, the more I spoke to my grandmother, the more she shared. I heard important phenomenological memories of interacting with architecture that no longer exists, and perspectives of life on an island with significant infrastructural issues.

7.2 Methodology

I interviewed my grandmother and parents orally over the phone, taking notes on the buildings she remembered from childhood. Using archival photos from the US Library of Congress, postcards, public access maps, and maps from the Fortin Conde de Marisol on Vieques provided to me by architect Germarilis Ruiz, I was able to cross-reference my grandmother's stories. Finally, I used architectural drawings and diagrams as an analytical tool to compare findings.

7.3 The Viequense Neighborhood

Last year, my parents began coaxing stories from my abuela and visiting Vieques regularly. My grandmother was born in 1941 in Vieques. Already at this point, the US forces were displacing Viequense residents and acquiring land near Isabel Segunda. They had already begun acquiring my great-grandmother's neighborhood in Llave (Fig. 7.1). "When I was two or three, the Americans were already there. They had land around the water," she told me. "They talk about how there is now a bioluminescent bay- we didn't even know that was there."

"Do you remember how the architecture used to be around your neighborhood?" I asked.

"Oh yes. We did not actually live in Isabel Segunda," she told me. "There was a road we would take there, but we actually lived in the country. There, it was a mix of French and Spanish styles. And the houses around me all had names on them, like La Casa del Frances, the Frenchman's House." What my abuela was describing was the unique Creole style of Vieques. Called criollo, in Spanish, the houses in her neighborhood were a unique blend of Spanish, French, Indigenous, and African architectural influences (Carrascillo 2013).

7.4 The Bohio Typology

When Christopher Columbus came upon Vieques, the Taino were living in bohio: polygonal timber-framed houses, covered with straws and reeds. By the late 1800s, illustrations show the incorporation of porches and covered openings in bohio, likely a West African influence from the enslaved peoples trafficked to the Caribbean for the sugar trade (Green 2022). The design of the bohio evolved as well from the nineteenth to twentieth century, from a polygonal shape to a mainly rectilinear timber housing design, with a

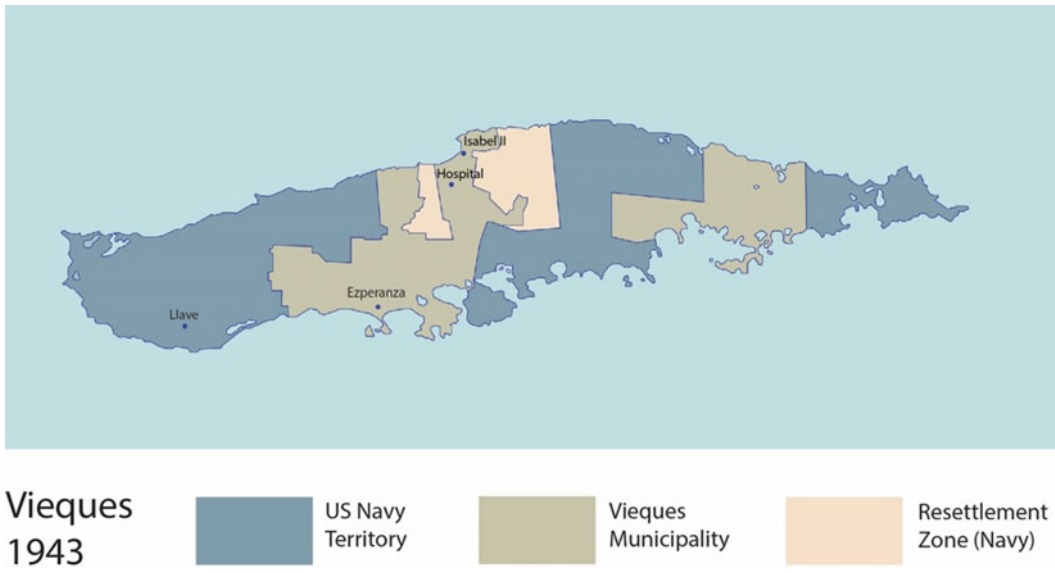

Fig. 7.1 The US Navy began buying up land from the sugarcane plantations and displacing residents from their homes in Vieques in the 1940s. The diagram is based on existing diagrams in Fortín Conde de Mirasol/Kathryn Larsen

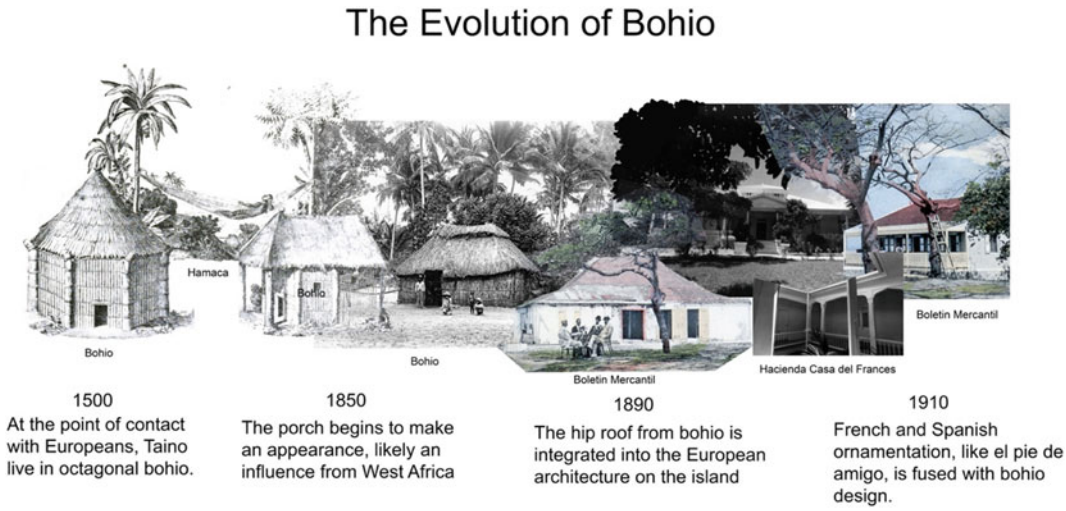

Fig. 7.2 Collage showing the evolution and creolization of the bohio house typology as Vieques was settled, including images from postcards. All images used for the collage are in the public domain/Kathryn Larsen

hip roof covered in thatch (Fig. 7.2). The timber for the houses likely came from the abundant natural rainforests and trees on the islands around Puerto Rico. El Yunque on the mainland of Puerto Rico is the only tropical rainforest in the US National Forest System (Discover Puerto Rico 2023).

Unsurprisingly, the architectural history documented and preserved in public archives is limited to colonial architecture. The prestigious buildings worth documenting were not the bohio of the natives, but what Europeans and Americans brought to the island. The Spanish-designed lighthouse on Vieques, along with all of its

original plans and elevation drawings in hand, was documented, as well as other European-constructed buildings (Siegal and Cazull 1992). To better understand and cross-reference my grandmother's stories and the progression of the Creole typology over time, I relied on postcards from the twentieth century.

The houses in postcards show that a majority of homes along the main streets integrated elements such as covered balconies, with gingerbread trim. The shape of the roof evolved from bohio over time, and eventually became influenced by French and European roof structures (Fig. 7.2). Some of the oldest homes incorporate French elements, like el pie de amigo (friend's foot), an iron ornamental structural support. As time passed, elements like el pie de amigo evolved as an ornamental structural support, to pure ornamentation on the facade of criollo buildings (Carrascillo 2013).

7.5 Colonial Architecture

The heavy French influences on Vieques stem from the fact that Vieques was colonized later than other islands in Puerto Rico. The local Taino population organized resistance against colonial rule. Two caciques, chieftains of the Taino tribe, named Cacimar and Yaureibo, lead a revolt against the Spanish invaders. The revolt was unsuccessful, and the Taino were imprisoned, enslaved, and murdered systematically by the Spanish, with many survivors shipped to the Puerto Rican mainland (Bermúdez 1998).

Eventually, the island became a pirate port, as attempted settlements by the English, French, and Danish failed. Ultimately, to encourage colonial settlement, the Spanish government let any Europeans pledging allegiance to Spain establish residence on the island. For instance, the founder of the island, Teofilio Jose Jaime Maria Le Guillou, was French. In the later part of the nineteenth century, enslaved people of African descent were trafficked to Vieques from other Caribbean islands, to work in the sugarcane plantations. After the US defeated Spain in 1898, Vieques, like the rest of Puerto Rico, became a US Territory (Bermúdez 1998).

Despite being influential in terms of typology, structure, and climate design toward the criollo architectural style, bohio influence on colonial architecture was largely not discussed in architectural history until the late twentieth and early twenty-first century (Dolan 2004). It was better for the European colonists to copy and paste the architecture from their own lands onto the island and subtly adapt traits from the bohio, rather than to openly take influence from it.

If copy-paste seems too harsh a term, consider the architect who built my abuela's primary school, Antonin Nechodoma. He was a Czech architect credited with bringing Frank Lloyd Wright's Prairie style to Puerto Rico. Nechodoma would almost entirely duplicate floor plans, making omissions and minor changes as needed contextually. For example, the Luchetti house in San Juan, Puerto Rico, was an almost identical copy of Wright's Ullman House floor plan (Fig. 7.3).

However, there are notable differences in his designs that reflect on Caribbean needs. The central hearth of the Ullman house was eliminated for the Luchetti house, and Nechodoma added a service wing for the servants of the manor (Fig. 7.4).

This fusion of copied architecture from overseas, combined with local Caribbean climate design needs, also shows in the school he designed for Isabel Segunda. Nechodoma designed many of his public school buildings in a neoclassical style, and it was the same for the 1907 Vieques Public School, as seen in photos from the Library of Congress Archive. However, instead of glass windows, which one might commonly see in neoclassical architecture in North America and Europe, an archival photo from 1907 shows shuttered windows open on several of the facades (Fig. 7.5).

These shuttered windows would have served as an important source of natural ventilation for the building and served as an important cooling factor for hot summer days. The open louvers of the shutters would not only preserve ventilation

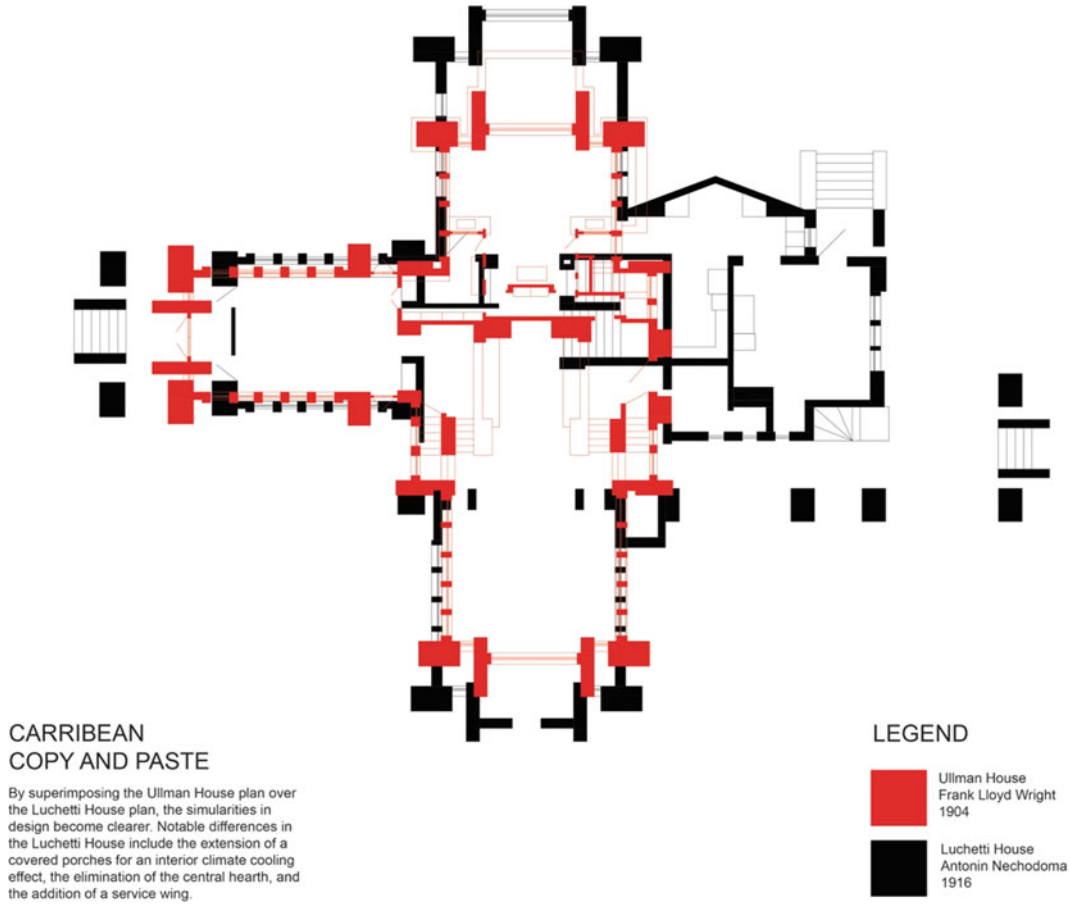

Fig. 7.3 Frank Lloyd Wright's floorplan juxtaposed with Nechodoma's floorplan/Kathryn Larsen

while closed but also prevent direct sunlight from streaming into the building, which faces due west.

The school itself is still situated today across the Plaza Publica Luis Muñoz Rivera. My abuela remembers the Plaza fondly. For her, it was the heart of Isabel Segunda. At the very center of this heart lay the Catholic Church, built first in 1844 by the Spanish, and flanked by the primary and secondary schools around the plaza (Fig. 7.6).

The plaza was lined with trees and centered around a water fountain. It was designed in Spanish principles according to the Laws of the Indies, stating that any entrance to the plaza should be designed in which to protect visitors from wind, sun, or rain (de Paredes 1681). The Law of Indies even has an entire section on the sale and composition of lands, waters, and parcel lots, even specifying the number of seedlings and trees per plot that should be maintained (de Paredes 1681). This preliminary urban planning document would have been used by the Spanish as the basis of planning laws across all colonial settlements.

When my parents returned from Vieques, my abuela excitedly asked them about the plaza. Unfortunately, today, the heat is too strong to comfortably enjoy the space today as it was once intended. My mother told me.

"The town is dead and hot. The community of the town mainly moved to the mainland of Puerto Rico, and the rest of the community left is elderly. All the young hipsters and non-natives are clustered around the beaches, where most of

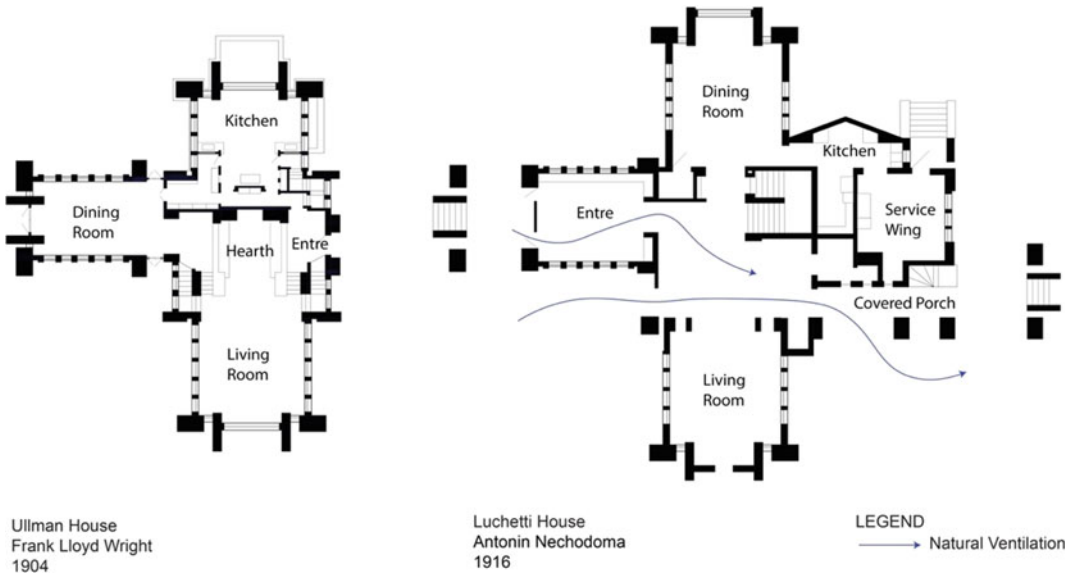

Fig. 7.4 Functional diagram of the Ullman house versus the Luchetti House/Kathryn Larsen

Fig. 7.5 Nechodoma's public school. Notice the open ventilating windows and shutters to control daylight exposure in the interior/Library of Congress. The image is in the public domain. https://www.loc.gov/item/90710366/

the industry and work is tied to tourism. Even the barrio where our family lives is between the town in Isabel Segunda and Esperanza." This was in stark contrast to my abuela's memories.

"Whenever there were school plays, we would do it in the plaza. For festivals for the patron saints, we would always go down to the plaza," she reminisced. "We didn't live near the waterfront because the smell of gasoline from the boats and ferries was so strong, it would make you sick." She shared that the plaza was the main source of entertainment for all of Isabel Segunda, and much of that entertainment centered around celebrating Catholic festivities.

Fig. 7.6 Postcard showing the plaza in Vieques. The green elements helped shade and climatize the public space and was an essential part of Spanish colonial urban planning/Curt Teich & Co. The image is in the public domain. https://commons.wikimedia.org/wiki/File:Isabel_II_-_Vieques_Plaza_and_old_fort.jpg

7.6 Church and Religion

It comes as no surprise that, in my abuela's memories, the most important building was the Catholic Church. The church was originally built by the Spanish in 1843, and was a hasty construction built out of wood, ultimately only lasting 12 years. As one of the first buildings in the square for colonists, its role was to enforce the new morality of the island under colonial rule. The temporary wood construction was eventually replaced between 1855 and 1860 with a more permanent masonry construction. Each iteration of the church thereafter consisted of masonry (Siegal and Cazull 1992).

"I was practically raised like a nun," my grandmother told me. "For holy week, we would cover the stained-glass windows in the church, and then organize in a parade led by the priest, across all the streets of Isabel Segunda. All day we would march and retrace Jesus' steps as he carried the cross. If he stumbled, we stumbled. If he fell, we fell."

She loved the original design of the church in her childhood, and how it related to the other houses in the area, with its bright yellow facade and white trim.

"You know, I left the island, and I didn't come back. I only came back when my own grandmother, Simona passed, for her funeral." This would have been in 1983. "They changed the facade of the church," my abuela told me. "It used to match the area, but they modernized it. It took something away. I didn't like it."

By looking at photographs over time, I could see that my grandmother was right. The entrance to the church and its facade had been influenced by modernism. The steeple above the entrance was removed and the gable was streamlined, removing part of the character and charm of the original façade. In addition to this, a tower was added. Today in 2022, the masonry and color of the church have similarities to the church in

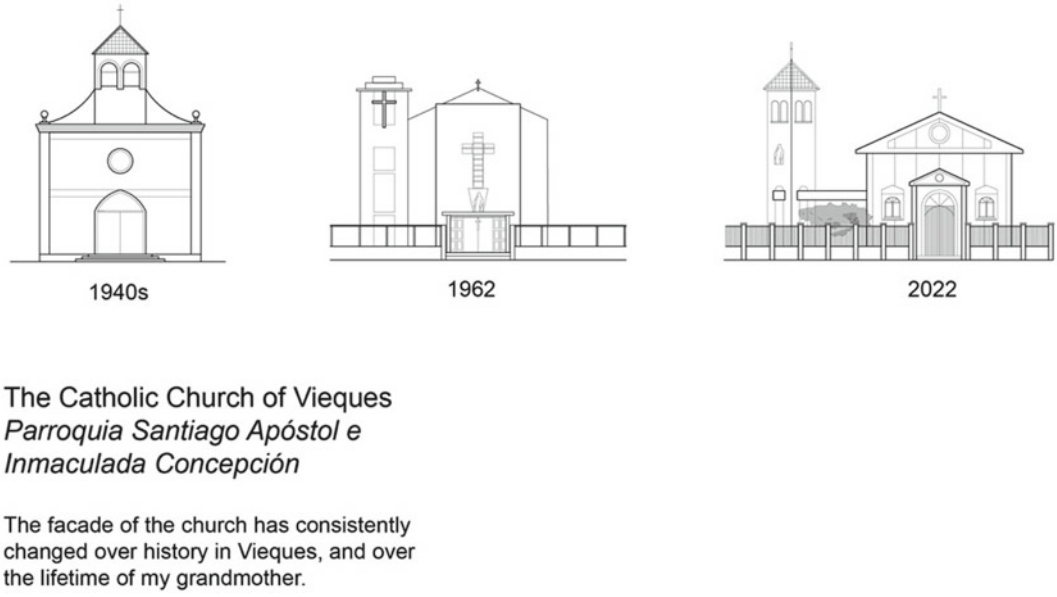

Fig. 7.7 Façade drawings of the Vieques Catholic Church over time, drawn from postcards and personal photos across the years/Kathryn Larsen

1940, and the tower was changed to resemble the 1940 steeple (Fig. 7.7). Just as the church no longer fit the plaza in my grandmother's memories, neither did my grandmother fit in her old hometown. She never went back to Vieques or Puerto Rico after that funeral in 1983.

7.7 The Influence of a Hospital

On a whim, I asked abuela why she chose to go into medicine. I asked if there was a role model, or an influence growing up that inspired her to pursue it. "Oh yes," she said. "The only hospital was near our house." She launched into stories of how the nurse took her under her wing and gave her small tasks to do in the ward.

Near is relative, I learned, as she had to take a long and bumpy road for several kilometers along the main highways of Vieques to get to the hospital—likely along road 201 and road 200.

"But it was terrible," she told me. "There was no real emergency room. We had such a talented doctor, and the nurse was so talented that she could probably have been a doctor herself as well. But if anyone needed emergency care, or surgery, they had to take the ferry to the mainland." She paused. "So you see, so many people died just trying to get help. It was horrible." I had the feeling that the fear of death or injury on the island, combined with the influence of living near the local hospital, must have been a driving factor in my grandmother ultimately pursuing a medical degree (Fig. 7.8).

The hospital on the island of Vieques was called the Jose Benitez Guzman Municipal Hospital in my grandmother's time. I hypothesized that the nurse my grandmother referred to in her memories was Susana Centeno, who worked as a nurse practitioner and volunteer at the hospital between 1930 and 1961 (Página del Este 1996). In 1996, the hospital was named in her honor. Sadly, Hurricane Maria in 2017 destroyed the Susana Centeno Family Health Center (Acevedo 2019).

I was able to confirm this the next time I visited my abuela for Thanksgiving. I shared some of my research with her and asked if the nurse was Susana Centeno. I could see the surprise in my abuela's eyes when I named her old mentor, and when I told her that the former health center had been named in Susana's honor,

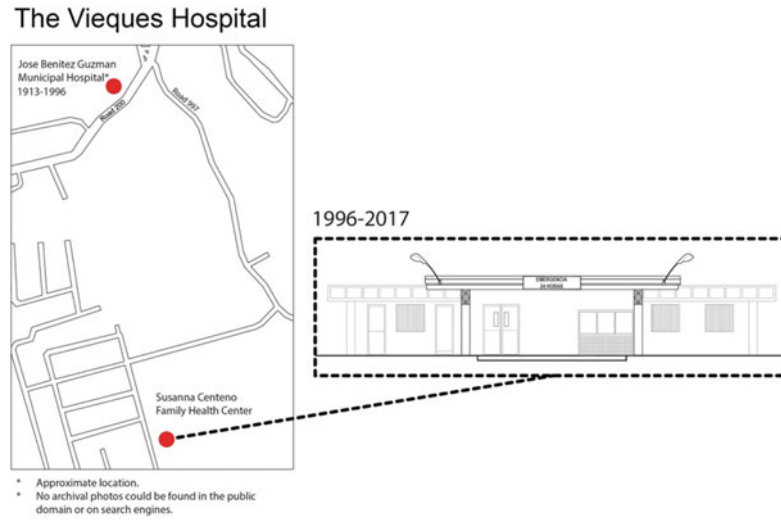

Fig. 7.8 Growing up near the hospital of Vieques became an inspiration for my grandmother to study medicine and become an MD. There are no photos that I could find of how the hospital looked like in my grandmother's time/Kathryn Larsen

my grandmother was incredibly pleased to hear this. However, she cautioned me again about visiting Vieques without any nearby hospital access.

"Your parents go swimming in that bay, but if they get bit by a shark, there is no help nearby," she warned. "People bleed out and they die before they make it to the mainland."

My grandmother's fears are founded. In 2011, a tourist was bitten by a shark off the Mosquito Bay coast. Due to the lack of medical island care, hours after the attack, she had to be airlifted to the mainland, where she, fortunately, was able to receive care (Owings et al 2011). Even though a new hospital in Vieques is finally being built by 2024, the push to remodel the hospital came after 13-year-old Jaideliz Moreno Ventura died from not being able to receive medical care in time (Acevedo 2021).

Even after sixty years, the infrastructure of Vieques still suffers. They must navigate the complex US-Puerto Rico colonial infrastructure, to receive essential funding and aid from organizations like FEMA. Initially, FEMA only gave enough aid to replace a diagnostic center like the Susana Centeno Family Health Center, and even then, would not fully release more than 4 million in funding as of 2021 (Acevedo 2021).

7.8 Conclusion

I tried to approximate the location of my grandmother's old neighborhood on Google Maps. A 1935 Puerto Rican census showed that my great-grandmother Cruz's family land was in Llave barrio. In 1899, a census shows that there were over 1000 residents living in Llave and Mosquito neighborhoods (United States War Department 1900). In 2015, there were just thirty (City Facts 2023). Eventually, the Navy assumed control and razed my great-grandmother's neighborhood to the ground. After she left Vieques, the Navy continued to carve up the island (Fig. 7.9).

I once heard a saying that goes, "there used to be a tree here, but the man who remembers it is gone." My abuela is in her eighties now. Her generation is the last to remember what Vieques was like before the US Navy occupation impacted daily life. Yet, if my grandmother had stayed on the island, she might not even be alive today. The US Navy tested bombs around the island and fired depleted uranium shells (Fig. 7.10).

Today, the cancer rate of Viequenses is 27% higher than those that live in other islands in

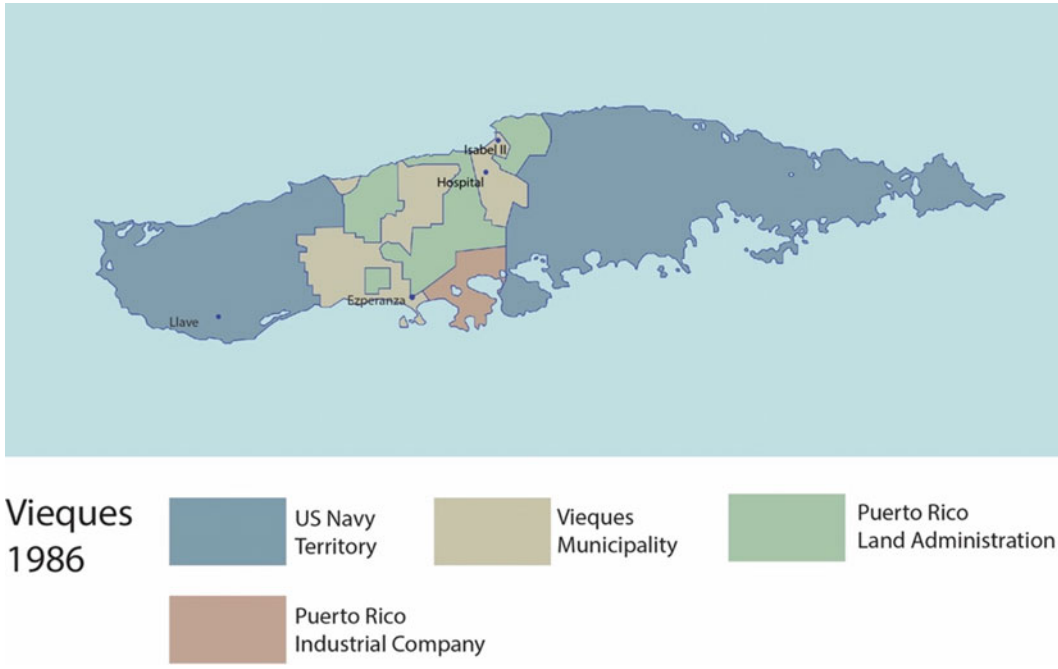

Fig. 7.9 After 43 years, the US Navy continued to appropriate land, displacing more residents from their homes, until 2000. The diagram is based on existing diagrams in Fortín Conde de Mirasol/Kathryn Larsen

Fig. 7.10 Photo showing the bombs detonated by the US Navy toward the west end of the island/Germarilis Ruiz

Puerto Rico (Umpierre 2021). Any solution put in place to improve the health of the island and achieve the SDG goals thus must navigate the complicated relationship of the US territorial relationship with Vieques municipality. Awareness of this history is the key to integrating new structural changes that can benefit the community on the island—a history that includes the stories of locals and their architectural legacy.

In my case, I felt the tremors of this history by learning about my own culture and family stories. I felt the complex emotions: the pride and the shame, the fear, excitement and longing for something better through my grandmother's memories. My proudest moment this summer happened when she flew to the Netherlands in order to sit in the front row of my master's thesis defense. In front of abuela, I became an architect.

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The Boy and the Parrot He Carries: When Inner Dialogues Meet

8

Husam Abusalem

Abstract

This paper delves into an artistic exploration centered around an artwork located in Oslo City Hall. The painting, titled "Handelslivet i gammel tid med Oslo Børs i sentrum," created by Karl Høgberg in 1950, captures a vibrant scene depicting trade and commerce in Oslo. At the heart of the painting, amidst the bustling activities, is a young boy carrying a parrot, serving as a singular representation of an exilic body within the city hall. The paper engages in a dialogue with the artwork and the surrounding decorative ensemble of the city hall, aiming to critically analyze and interpret the presence and significance of the boy and his parrot. The narrative explores the complexities of migration, representation, and the power dynamics inherent in public spaces. Drawing from autoethnographic reflections and the writer's embodied experiences, the text invites readers to contemplate the meaning and implications of the boy's presence within the larger narrative of Oslo's history and its public consciousness. Furthermore, the paper challenges conventional categorizations and seeks to reframe the discourse around exilic bodies, emphasizing the need for recognition and acknowledgment in shaping a more inclusive and just society. Through an art-based research approach, the paper encourages a deeper understanding of the interplay between art, politics, and societal dynamics, while also fostering critical dialogue and reimagining the public space.

Keywords

Oslo City Hall · *Rådhuset* · Karl Høgberg · Trafficking · Minorities

8.1 Introduction

The text that you read here is an open invitation to the reader to engage with an artwork located at the centre of Oslo, specifically within Oslo City Hall. The painting, which is made of oil-paint on wooden panels, came into being between 1949 and 1950, and it was painted by *Karl Høgberg*, who named it *Handelslivet i gammel tid med Oslo Børs i sentrum (Trade in Old Times with Oslo Børs at the Center).* As one can imagine from the descriptive name, the painting captures the trade and business aspects of Oslo. Commissioned by the Oslo Stock Exchange, the artwork was gifted to the city hall upon its opening (Sørensen N.A.).

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Fig. 8.1 *Handelslivet i gammel tid med Oslo Børs i sentrum*' by *Karl Høgberg* painted in 1950, photographed by the author, 2022

The paper takes the shape of an interactive/artistic text with a soft boundary tone that blends academic writing, autoethnography, and narration (Detels 1999). It seamlessly transitions between these different modes, allowing the reader to engage actively with the content. At various points, the reader is encouraged to pause and reflect, often accompanied by visual references. As such, I invite you, dear reader, to turn to the next page and observe the painting displayed there. Feel free to either follow the advice of Armstrong (2000) and/or Bresler (2006) and linger on its aesthetics, move closer, and observe every brushstroke, every colour, and every character. Observe the movements and energies conveyed within the diverse scenes depicted. Alternatively, you may feel like following Von Wright's (1971) approach, which envloves forming an empathic understanding of the painting rooted in qualitative research. Or, you can simply take a quick glimpse at the painting and embrace your first impression (Fig. 8.1).

What draws your attention? What piques your curiosity? What scenarios do you imagine occurring in the painting? What is the meaning of it being located in Oslo City Hall? Is there anything you would like to change? What does this painting make you feel? What can be done?

8.2 What Draws Your Attention?

At the centre of this vibrant and diverse image, we see the Oslo Stock Exchange building standing prominently with its characteristics of a classical style, surrounded by bustling scenes of commercial activity. At the right side of the paintings, boxes are being carried. A woman is examining a textile in a marketplace while checking a well-dressed man. Tiny sculptures are being sold nearby, and a cross-section of a building is displaying a sign stating 'commissions' and 'forretning'. Within it, officials are signing papers on the upper level, while an elderly couple is running a small business on the lower level. The couple is also conversing with a man on a white horse. At the left side of the painting, a ship named something ending with '*...*ANNE**' has just arrived at the harbour from distant regions. Ship workers, sailors, and possibly the captain are carrying the cargo out. Just beside the boat, a sunburned, robust man is making a deal with a well-dressed, well-groomed individual. Lost in between is a young dark-skinned boy carrying a parrot. All of these scenes are being safeguarded and blessed by the Roman god of trade, travel, and profit, Mercury.

At first glance, it is the boy and the parrot that draws my attention. Perhaps the fact that it is the only presence of a body that I can relate to

attracts me to focus on the boy and the parrot he carries. It got me curious; are there any other exilic bodies in this room other than the boy and the parrot he carries, and myself? I looked around to discover it was only us, the boy in the painting, and myself in the room. I, indeed, feel the need to follow Armstrong's (2000) advice and come closer and interact with the boy.

8.3 What Piques Your Curiosity?

A loaded painting, but what made me curious is, indeed, the boy and the parrot he carries. What is he doing in there? It is a painting full of adults making deals. Is he a trader as well? Or is he being traded? The sunburned man is resting his hand on the boy's shoulder. Is he calming him down? Or patronising him? Is he an ordinary sailor? Or is he a pirate? What is the other well-dressed man negotiating with the sunburned man? If the painting is depicting trading, then they must be striking a deal. But, what are they trading? Could it be the boy and the parrot he carries? Is this…is this human trafficking in the heart of Oslo? The boy seems a bit scared; he is the only person with closed eyes. It seems as though he has chosen to shut out the reality unfolding around him, seeking solace in an imagined better place alongside the parrot.

The presence of the boy and the parrot in the painting raises questions about their story and how they came to be in Norway. Gunnar Sørensen (N.A.) described this painting and the presence of the boy, which we will come to later in the text, as evidence of overseas trade with distant regions. As far as the public collective memories in the Norwegian consciousness tell, Norway was not part of the enslaved people trade nor the brutal business of human trafficking. Norway also does not recognise any colonial heritage or ties. Was the boy on the ship that just arrived? How did he end up there? And what were the circumestances that led to his presence in Norway?

It gets more confusing when one remembers that the painting came into being in 1950. Does it depict the contemporary trading practices of that time? Was not slavery abolished long before then? Alternatively, could it be portraying an older, more distant history of the city? This raises questions about the accuracy of different perspectives. Does the artist, Karl Høgberg, hold knowledge or insights that elude us? Furthermore, how do we reconcile his depiction, potentially implicating human trafficking, with Norway's collective denial of involvement in the transatlantic slave trade and colonialism? Or maybe it is the influence of his teacher *Axel Revold*, and, in particular, his painting *Geography* which is located at Grønland high school. However, a discussion of that painting is better suited for another text.

8.4 What Scenarios Do You Imagine Occurring in the Painting?

What is the fate of that boy and the parrot he carries? Did the sunburned man seal the deal by pushing him forward with the hand that had been resting on the boy's shoulder? Was he enslaved then? Or maybe he worked in the circus and ended up meeting Edward Munch and getting painted beside Cleopatra in Munch's paintings. Is he the person who was referred to as Sultan Abdul Kareem?

Facing 'the boy and the parrot he carries' on the opposite side of the great hall, there is another painting depicting demonstrations for workers' rights and women's rights; banners and signs can be seen in the centre of the painting. In his painting, *Reidar Aulie* reflects on a moment in time when the essential rights of modern society have been granted (Fig. 8.2).

The *'Arbeiderbevegelsens utvikling i Norge' painting* is what the boy and the parrot he carries see all the time. What thoughts occupy their minds as they gaze upon it? Is the boy closing his eyes to imagine the union labour movement as an alliance? Do they imagine the signs demanding their freedom and rights as well? What does the absence of their rights mean to the reflection Reidar Aulie is depicting then? Is the absence of his rights a constant reminder of the importance of social movements and alliances? Is that why

Fig. 8.2 Edited version the '*Arbeiderbevegelsens utvikling i Norge'* painting by *Reidar Aulie* (1950) photographed and edited by the author, 2022

the strike is paused in time at the centre of the painting? Or does the absence of the boy's and the parrot's rights serves as a constant reminder of the colonial atmosphere of this room? The boy may also break free along with the parrot. One is roaming the lands of Oslo while the other is roaming the skies of the city. Or maybe he just happened to be there by mere coincident, and it is all in my head. Perhaps it is we who fabricate these elaborate scenarios.

8.5 What is the Meaning of It Being Located in Oslo City Hall?

At the heart of the most diverse city in Norway—Oslo, one can find the magnificent city hall building. Constructed between the 1930s to 1950, amidst the tumultuous times of the Second World War and Nazi occupation. The building stands as a manifestation of the moment of liberation. Its ornate decorations serve as visual testaments to significant moments in Norwegian history, ranging from the heroic resistance movements against the Nazi occupation to the struggles of workers' movements and union strikes. Amongst these valuable murals lies the 'Handelslivet i gammel tid med Oslo Børs i sentrum' by Karl Høgberg. The city hall itself serves as a public space with various purposes. It is a venue for weddings, a meeting place for the city council, a site to commemorate the creation of modern Norway and the heroic resistance that shaped it, and a setting for the annual Nobel Peace Prize award ceremony. It is also a haunted space where the boy and the parrot he carries may still be subjected to enslavement.

Since 1990, the Nobel Peace Prize celebration has been held annually in the city hall (Nobel Prize Outreach AB, 2022). The hall is adorned with flowers, arranged chairs, and a stage where the laureates of each year are seated. Ironically, in the background of this illustrious stage stands the 'Handelslivet i gammel tid med Oslo Børs i sentrum' painting. Every year, countless photographs are taken, capturing inspiring individuals who dedicate themselves to making the world a better place. In the background of these images, the presence of the boy and the parrot is palpable to me, yet it seems to be invisible to those inhabiting the room. What does that mean? Whom are we leaving behind? How come the boy has never been seen or heard? Could his closed eyes be a symbol of detachment from a world that has failed to recognise him and the parrot he carries?

Do not we comprehend our world through our bodies and embodied experiences? If so, what significance does the presence of the boy and the parrot hold for those who encounter them in the heart of Oslo? What kind of message does it convey? With him being the only exilic body presented in the murals of the city hall, is that the only way one can imagine the presence of exilic

bodies residing in Oslo according to its city hall celebratory murals?

What Can Be Done?

8.6 Towards Reparation: Meet the 2023 Nobel Peace Prize Laureates!

The 2023 Peace Prize is to be awarded to the human trafficked and possibly enslaved boy and the parrot he carries both from distant regions but to be found in Oslo for the past seven decades (Fig. 8.3).

> The peace prize laureates represent all societies in the distant land, diaspora, and what time could have made it home here in Oslo. Their unwavering resilience and tireless commitment to peace have endured for over seven decades within the obscure confines of Oslo's city hall. They have borne witness to the courageous and outstanding efforts of every other Nobel Peace Prize since 1990, yet not a single time have they been acknowledged. Together, they demonstrate the significance of never giving up hope, even in the face of years marked by hypocrisy. They stand proud as the only manifestation of exilic bodies at the heart of the most diverse city in Norway, Oslo. ~~(Nobel peace committee, 2023).~~

You may have noticed that the in-text citation has been strikethrough. This is because the speech mentioned did not happen. It is rather wishful thinking by the author to bring attention to the importance of revisiting and rethinking the city's public spaces and public art. The proposed nomination serves as an expressive act towards reparations. The artwork is what could be considered a forged Nobel Peace Prize Diploma awarded to the only representation of an exilic body at Oslo's City Hall, where the Nobel Peace Prize celebrations have been held since 1990. Hence, the connection between the boy, the parrot, the Nobel nomination, and its atmospheric presence in the hall is of an importance. The following text delves deeper into the context of the artwork, the underlying concept, and the theoretical explanations for the chosen medium to express the research outcome.

In the previous section, we engaged in an imaginary dialogue, attempting to envision the thoughts occupying the mind of the boy and the parrot he carries. This exercise aimed to explore what might be going through his mind as he stands amidst the city hall, surrounded by murals that celebrate liberation for all except himself.

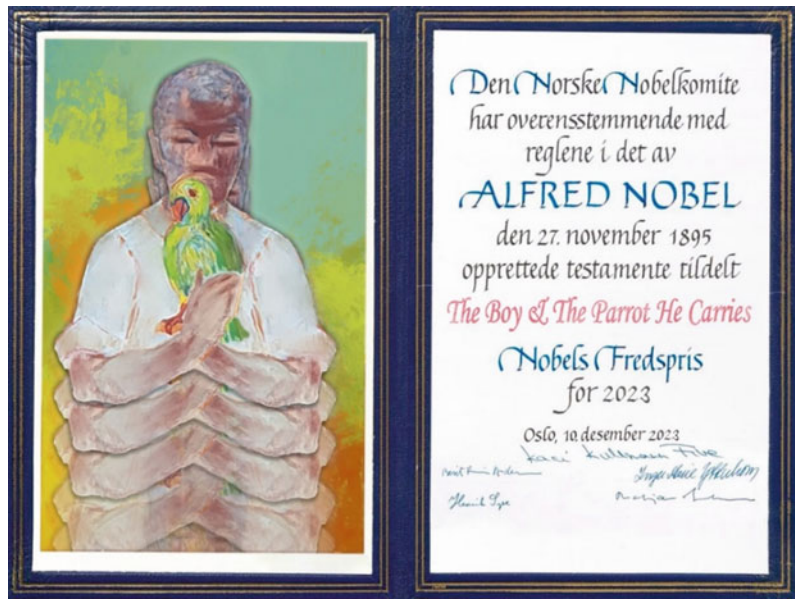

Fig. 8.3 Artwork by the author, 2022

However, as neither raising awareness of the lack of proper permanent representations of the exilic body in the public realm nor critiquing problematic artworks are enough to create an inclusive urban space that embraces everyone, an active act of recognition and acknowledgement is urgently needed to move towards reparation. To this end, I have initiated the nomination of 'the boy and the parrot he carries' for the Nobel Peace Prize, designating him as the last enslaved boy in Norway—a process that commenced as part of this paper. This artwork serves as a tangible embodiment of the pressing need to recognize 'the boy and the parrot he carries' and their enduring resilience. They stand not as mere bodies on the move but as heroic symbols of resilience, representing all exilic bodies within the diaspora.

With that in mind, this artwork attempts to confront these common depictions and aesthetics of exilic bodies too often confined to the image of the 'suffering subject' estranged from any past or valued personal experiences, relegating them to a state of tabula rasa. It aims to utilise the Nobel Peace Prize nomination process as a tool of political action against prejudices, preoccupied assumptions, and indignifying representations in the public space that often undermine, disregard, and even erase non-white experiences. This nomination represents a progressive stride towards initiating a long and necessary healing process.

8.7 Further Discussion—Nobel Peace Prize

Not only have 'the boy and the parrot he carries' attended 32 Nobel celebrations thus far, but they have also witnessed 48 laureates receiving their well-deserved diplomas. Many of these laureates have been honored for their remarkable contributions in combating child slavery, human trafficking, advocating for children's right to education, and addressing numerous other issues that 'the boy and the parrot he carries' symbolize. It is, therefore, about time that 'the boy and the parrot he carries' too receive their own recognition. During the celebration of the Nobel Peace Prize, the laureates are bestowed witha diploma and an artwork that holds contextual significance to their respective work. It is also about the time that 'the boy and the parrot he carries' are, at the very least, represented in one of these artworks.

This artistic research uses (and intentionally misuses) the nomination process and its celebratory documents as an invitation to rethink the presence of the *Handelslivet i gammel tid med Oslo Børs i sentrum* painting within the public space of Oslo. Besides the fictitious Nobel Peace Prize Diploma, I officially nominated 'the boy and the parrot he carries' for the Nobel Peace Prize award in 2023. Though the chances of winning the prize are close to none, my inspiration is that the presence of 'the boy and the parrot he carries' will not go unnoticed, or so I hope.

8.8 Further Discussion—Choice of Words

The boy and the parrot he carries: The deliberate choice of the title "The Boy and The Parrot He Carries" serves to initiate a discourse surrounding the rationale behind depicting a black boy alongside a brightly colored bird. The initial assumption is that the painter may have intended to present them as exotic others. Furthermore, the narrative consciously refrains from labeling the boy as a trafficked individual or an enslaved person. Instead, he is portrayed primarily as an innocent boy, an individual whose name and history remain unknown to us. Additionally, the text avoids attributing ownership of the parrot to the boy, treating them as distinct entities, albeit with a focus on the boy as the central figure in the artwork (e.g., "the boy and his parrot").

Distant regions: Regarding the use of the term 'distant regions', it is in reference to the text written by Gunnar Sørensen (N.A.) about the painting *'Handelslivet i gammel tid med Oslo Børs i sentrum'* for the Oslo municipality's art collection. In the description, Gunner says: '*A dark-skinned youth with a parrot suggests trade*

journeys to distant regions' (para.1, N.A., (Translated by the author)). However, this description fails to critically reflect upon or problematize the presence of the boy amidst a trade festival, nor does it encourage the reader to contemplate the deeper meanings conveyed by the painting. Consequently, the term "distant regions" was employed in this text to highlight an additional layer of othering evident in the artwork's description.

Exilic body: When tackling issues related to migration, many terms and categories emerge such as 'asylum-seeker', 'refugee', 'irregular' or 'illegal' migrant, and 'forced' or 'voluntary' migrants. Though one can ostensibly define the different clusters and categories of migration theoretically by referencing the official definitions provided by the United Nations, these simplified definitions fail to capture the complexity of migration nor its intricate nature and its vast diversity. In reality, these categories are largely interlocked and people often shift from one category to another (Koser, 2007). Consequently, this project seeks to use a term detached from the legal terminologies used to describe moving bodies across borders such as migrants, refugees, asylum seekers, and many other categories. The term chosen for this purpose is 'exilic body', which encompasses a broader sense of agency beyond the confines of humanitarian crises and political agendas.

8.9 Closing Comments

The text presented here is of an artistic nature, consisting of both narrative and visual artworks. The narrative is heavily based on the questions that dwell in the mind of the writer at the moment of encountering an artwork in a public space, as well as reflective thoughts. These texts are rooted in the writers' embodied experiences and ways of knowing. The use of questions stems from the belief that the more we wonder about the world, the better we and the world would be. These questions also serve as an invitation for the reader to partake in the inner dialogue transpiring within the writer's mind, while simultaneously evoking a parallel inner dialogue within the reader's own mind. Do these dialogues align? Ascertaining such alignment is no simple task. Methodologically, this approach to art-based research could be classified as autoethnographic multi-layered reflections, with a unique twist that embraces the potency of subjectivity and embodied experiences within the research process. Thus, this text draws inspiration from that perspective and encourages the inclusion of subjectivity and embodied experiences in responding to the posed questions.

Often, in our daily lives, many objects we come across tend to fade into the background as time passes and distance grows. But sometimes, there are moments when an object assumes the role of the focal point, becoming the organizing force that captivates our attention. It holds the attention of the person encountering it and 'refuse to let go… and finally release us from their grasp only to dissolve back into the overabundant world' (Abram, 2007, p. 1138). These words aptly encapsulate the essence of the writer's encounter with the painting and, more specifically, with the boy carrying the parrot he carries. The presence of the boy's body and somehow the simultaneous absence of his embodied presence within the room engendered a multitude of questions within the writer's mind. This, in turn, prompted the writer's desire to share these questions with the readers and nominate the boy and the parrot he carries for the Nobel Peace Prize.

The intention of this text is not to criticize the art scene, but rather to deconstruct what we take for granted. It also serves as an invitation to engage in constructive discourse aimed at shaping and reshaping our public spaces. Barone and Eisner (2012) believe that scholarly research in general and art-based research in specific are essential tools for the bettering of our surroundings. He believes that through the means of research, positive differences occur. They continue to admit that power relations and politics dwell within every single aspect of our surroundings. Yet, they highlight the emancipatory aspect of art and art-based research, and therefore their ability influences the public consciousness

Fig. 8.4 Edited version of the '*Handelslivet i gammel tid med Oslo Børs i sentrum*' by Karl Høgberg painted in 1950, photographed and edited by the author, 2022

in this politically charged world. To conclude, this text, along with the accompanying artwork, invite the reader to a conversation within oneself and with the writer's inner mind. It is, in a way, akin to a guided meditation, inviting the reader to let their guard down and collectively learn, relearn, and unlearn the things we often take for granted.

8.10 Last But Not the Least, The Boy and The Parrot He Carries Have Left

See Fig. 8.4.

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Spatial Renewal and Lost Voices

9

Gunnar Sandin

Abstract

The deliberation that precedes or runs alongside the remaking of cities, buildings, and landscapes seems almost by default to generate situations with unsatisfied stakeholders, neglected citizen groups, or completely ignored voices. What does it mean to find, listen, and respond to those concerned by the alteration of built environments? Here, in this paper, citizen participation, its ideological and political intentions, as well as its formal integration in planning, is discussed in relation to cases with a significantly broad range as far as both geographical location and cultural conditions are concerned. The cases—from India, Australia, Jordan, and Sweden—reflect highly different histories and political circumstances, but these cases, regardless of the type of planning and construction culture, do still collectively reflect the problem of what "right to the city" means. This essay points out threats to democratic rights, such as deliberate omittance of groups, unfair grouping of opinions, and informal official planning actions. It is discussed here how these threats become ethical and factual problems in dialogue, and in a final reflection, what could be seen as needed for dialogues to work. The overall statement—in this short survey that builds on previous studies and reflections of the four cases—is that "extended dialogic thinking" is a way forward. For that to appear, reciprocal, multimodal, consolidated, and durable attention should characterize the dialogic act and its different phases.

Keywords

Dialogue · Inclusion · Citizen participation · Architecture · Urban planning

9.1 The Right to the City—And the Dilemma of Dialogic Inclusion When Lived Space is Altered

Citizens' opinions and involvement in urban design, in landscape planning, and in architectural production still have low formative value, compared to the strong forces of financial interests, political calculation, or routine architectural solutions. Even in cases when participatory objectives are explicitly stated—as in legal protection of citizens' rights to have a say in city planning, or in singular interest-driven or inclusion-oriented architectural projects—there will, it seems, always be parties less considered,

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not sufficiently recognized, or completely left out.

A recurring cause of such omittance is the hesitance to fully open for dialogue, due to the economical benefits of faster building processes, leading to a narrowing down of possible qualitative social input in the planning and procuration processes that dominate architectural projects. From the side of professional practices (planning, design, construction), it is often supposed that inclusive or participatory acts in building projects bring complexity to the degree that dialogue becomes unproductive (Miessen 2010). Nevertheless, in current goal-oriented politics aimed at the quality of lived life, socio-spatial justice, and heightened equality (UN SDGs 11, 16, 10), architectural space is seen as actively contributing to existential wellbeing. Hence, the designed lived environment is perhaps taking a more profound position as a common and political interest in the social realities, and becoming something more than technological performance or superficial aesthetic objectification. Values more attributed to lived life are also increasingly seen as more sustainable, both economically (less costly social remedial measures) and ecologically (more climate-friendly and care-worthy places).

The human right to a home or to a shared public space usually needs some kind of legal protection. The right to space could however also be seen as an existential aspect of space itself, in fact, the very ground of experiencing oneself as a human being among other human beings. Butler (2011) discusses in *Bodies in Alliance and the Politics of the Street* this ground as "the right to have rights", which is a right not given by a political system, but by the mere fact that (individual or collective) action at a place is a demonstration of the basic human will to make space for herself. This fundamental right corresponds in a way with Henri Lefebvre's "right to the city" (Lefebvre 1991) even if there is also an important difference between the two, in that Lefebvre's right is based on a critical dialectics tied to the power and pitfalls of capitalism, and to ways of thinking and making space, while Butler also includes more clearly the impact of individual and groups identity. Lefebvre is not, to the same extent as Butler, recognizing the intersubjective formation of identity as fundamentally linked to the production of space (Butler 2011). Nevertheless, there is a common denominator in their respective recognition of inclusion being an important part of what "right to space" means. The right to space, then, is present in the architectural production of space, whether we reflect upon it through the examination of participatory building projects, through politically established democratic rights, or through recognition of basic existential needs.

The deliberation taking place before and during the materialization of architectural projects is as we know for the most part a negotiation between those with building rights, those with money, and those with design and construction skills. Only in strictly formalized stages in certain official procedures, or in projects specifically designated to participation, do we see direct communication with the citizens and end users that are affected by the making of the built environment. Nevertheless, dialogue as a significant social aspect of architecture has in later decades become a more significant part of design processes, partly because it brings projects closer—in vision stages as well as in planning and procurement processes and even in construction phases—to what is desired from a social perspective (Awan et al. 2011, pp. 56–65). Social inclusion is tightly coupled with modes of dialogic communication, whenever environments are made by someone for someone else. Dialogues regarding lived space and its architecture, we must not forget, go beyond the simplified polarization between "powered" and "have-nots" (Arnstein 1969) since the communication appears along multiple axes: between politicians and builders, between commissioners and architects, between civil servants and users, between citizens and politicians, and so on. Moreover, dialogue appears in multi-agentic mixes of these constellations depending on the type of project (Till 2005).

To make more concrete these speculative notes on inclusion and the right to lived space,

we will briefly revisit four cases that have been analyzed in previous literature on architectural decision-making and planning.

9.2 Revisiting Four Cases of Built Space with Lacking Inclusion

The examples here, from India, Australia, Jordan, and Sweden, will—despite not only their quite different geo-political conditions and backgrounds but also precisely because of that cultural and global range—cast different kinds of light on the dilemma of inclusion (Fig. 9.1). Following a brief review of these four cases—previously studied in detail elsewhere—a reflection is made regarding some mechanisms behind lacking inclusion, followed by brief suggestions of the communicative efforts needed, for us to be able to call dialogue "inclusive".

9.2.1 A Mapping Initiative in Calcutta, India

When the architect, activist, and social theorist Jai Sen in 1975 started to take an interest in the developments of East Calcutta, he found that settlers in a river waterfront area of nearly two million people would be affected by massive redevelopment (Sen 2007). The people he met there as a professional social services advisor had "not even heard of" the large redevelopment project (Sen 2007, p. 19). Sen initiated a four-year program of action, research, and public education, the "Unintended City Project," the aim of which was to support communities' possibilities to speak for their rights regarding sanitation services, ration cards, postal delivery, voting rights, etc. Sen coined the term "unintended city" to name those large areas of habitat that did not exist on formal maps, using the epithet "unintended" also for the communities in Calcutta whose existence and labor were "used by formal economic, planning and governance structures" without being provided any "real place" (Sen 2007, p. 17).

Fig. 9.1 The sites and geographical range of the four reviewed cases

Sen's mapping exercise of these areas, pursued and sustained over several years by his group Unnyan (of voluntary planners and architects), had some impact on politics and policy, in the sense that for a limited period (1984–1989) "the incidence of evictions decreased, the incidence of militant resistance increased, and there was some dialogue" (Sen 2007, p. 25). According to Roy (2009), Calcutta's planning—as in general on the globe—is situated between two types of informalities: the informal handling of official planning matters and the informal insurgent response from people affected by it. Sen's attempt at bringing at least a minimum of formality, here maps drawn from visiting the ground, enabled a dialogic channel and some recognition of the population, and later facilitated connections to new roads, etc. The remaining effect was however limited, according to Sen, who later came to suggest more direct engagement with people, in order to strengthen their agentic vocabulary (Sen 2007).

Sen's project in Calcutta and Roy's comments on the planning idiom of the same city (and elsewhere) indicate that to uphold a resilient communicational culture that recognizes relevant concerned parties, the creation and consolidation of sufficient formal channels of communication have to emerge through a language with multimodal elements (such as maps) that is mutually understood.

9.2.2 Denial of Culture in Kumarangk, Australia

Another example of planning authorities' disregard of residents' rights to land is the Kumarangk case, or Hindmarsh Island case, in Australia in the late twentieth century, starting with a planning proposal to connect an island with a bridge. The case became seminal in representing Aboriginal rights to land versus official federal law's statements regarding property rights (Van Krieken 2011). After long and agonizing legal processes, the official plan to build the bridge was taken. The case caused a rift in Australia regarding land use politics, as the exploitation was seen by many as a depriving of space for Indigenous people, especially Ngarrindjeri women, and accusations (held true in court) were made about these people that they were fabricating grounds for their rights. In a complicated trial process, accusations and convictions followed, regarding violation of rules of the management of official affairs. The dialogue, or rather the flaws in the dialogic contract that surrounded the case, led to reconsiderations of laws and procedural matters regarding land rights, while also triggering research on legal protection of interests in land use (Van Krieken 2011). This geo-political case of planning, and part of recent Australian land-use history, evoked also issues on how "rights to land" are expressed (Hillier 2007). What "counted as 'legitimate' knowledge" by planning authorities and legal procedures in fact excluded competing knowledge as deviant, undermining "the 'moral' consensus of progress" (Hillier 2007: p. 85). The legal system, once installed to protect the rights of people to their land, at the same time as having the function to regulate the development of land use, became in this case a depriving of a community's situated cultural and sacred habits. Van Krieken (2011) concludes in a thorough investigation of the case that "Participation and procedural fairness […] thus end up becoming merely battlegrounds upon which those power relations are fought out by other, legal, means"(Van Krieken 2011: p. 145). When stating "equal before law", equality showed here to be not possible. Hillier observed as a problem that "the power of the 'establishment' has defined what counted as 'legitimate knowledge'" and that this law is based on a logic that supports "capitalist relations of production, where time is money." (Hillier 2007: p. 85).

It falls out as a conclusion of Hillier's planning-oriented reasoning and Van Krieken's human rights analysis that land alteration that depends on the sharing of language codes will suffer and lead to sustaining conflict, unless basic cultural differences are acknowledged. It also shows how the periodization of a capitalist understanding of time clashes with that of lived space–time (Hillier 2007).

9.2.3 Reaching Decisions in a Jordanian City Council Meeting Culture

In an investigation of planning decisions taking place in a Jordanian city, Al Khalidi (2018) points out certain decision-making mechanisms in the main executive board and a city district board, by pointing to the web of decisions taking place there on an everyday basis. Al Khalidi anonymizes the city, labeling it *Nodecity* not only for research ethics reasons but also because it makes her able to discuss in more general terms the informal types of acts of decision-making that appear in city planning in general (Al Khalidi 2018, pp. 39, 80). Al Khalidi points out the extreme pressure on, and ad hoc solutions to planning matters in Jordanian cities that have had to receive a massive number of refugees, recently from Syria and for an extended period from Palestinian regions. Jordan, she says, "with minimal resources of land…has had to cope with…urgent geopolitical circumstances, with planning practices changing from low-paced statutory planning to more acutely strategic or problem-solving approaches driven by daily demands" (Al Khalidi 2018, pp. 216–217). Al Khalidi investigates planning meetings in detail, in particular informal and deviating acts in the given structures of the handling of urban alteration matters. Some of these acts point at how individual servants or board members can have

contact with other individuals – citizens – while the official meetings are going on, through the support of unofficial devices and procedures, such as allowing bodily presence at crucial moments, answering to persistent knocking on meeting-room doors, or by using mobile phones for remote reach. These types of informal acts are silently agreed-on habits, affording direct links to decision-making.

We see in the Jordanian case then, a separating kind of participation where the citizen interests may be individually handled, in a time conditioned by political urgency mixed with traditional planning pace and protocol. Such circumstances lead to a situation with highly particular modes of communication that run within, outside of, and parallel to existing formal protocols, which puts a limit to how much can be handled as principal errands, rather than as temporally conditioned matters.

9.2.4 Partial Inclusion in a City District in Malmö, Sweden

The last case is a co-design initiative in Malmö, Sweden, intending to engage local youth, musicians, and music-producers rooted in the city district Rosengård. This district has been stigmatized for a long time (Sernhede 2007) as a troubled district with high rates of unemployment and criminality and has therefore seldom been regarded by the municipality as a culturally progressive area. As a response to this neglect, a co-design project was run by researchers from Malmö University in cooperation with public media companies, Swedish Television, and the City of Malmö, claiming itself as devoted to supporting the local scene through knowledge-based entrepreneurial work (Björgvinsson and Keshavarz 2020). At certain crucial moments, the researchers and the media company failed to include relevant local participants, which led to "a rupture in the social fabric of organization" (Björgvinsson and Keshavarz 2020, p. 256). The initiative, with well-meaning intentions and a significant budget including EU granting, consequently found in self-evaluating retrospect that the model of participation was too centered on the intentions of initiators' own wills. The researchers Björgvinsson and Keshavarz suggest that the long-standing Scandinavian participation models once internationally appreciated for their inclusion (Gregory 2003; Albrechts 2004) need to be rethought, and instead consider the act of "part-taking", meaning a true mutual engagement with parts that possess decisive agency beyond that of a "flat" role of (passive) "participant" (Björgvinsson and Keshavarz 2020).

Another participatory project in the same city district, called *Rosens röda matta* [Eng: The Red Rose Carpet], was staged by the official planning authorities in Malmö as a place for dance-oriented activity aimed specifically at young female inhabitants in the area. However, this objective led to attributing certain gendered roles of activity, hence became limiting from an equality perspective (Sandström 2019), and as a consequence the place did not in reality come to represent the inclusive image that was fabricated as a success by the municipality (Sandin 2023).

The target group in these two cases—youth—was from a participatory perspective technically given a certain voice, but since it became harder to justify these projects in a larger cultural perspective, these well-meaning initiatives also led to new variants of local exclusion.

9.3 Dialogues for Inclusion in the Design of Built Environment

We have seen examples of how people in different ways, in different cultures, and under very different existential conditions were left out of planning, design, and building processes. In the Calcutta case, an ad hoc voluntary reaction by a person with architectural and planning competence made it possible to increase the agency of an unrecognized and poor segment of the population. In the Kumarangk case (Hindmarsh Island), a post-projective dialogue in court had to replace a process that lacked dialogic inclusion from the outset. The habit-driven decision-making process in a Jordanian city showed the

difficulty of making urban space decisions without a formal process aligning with protocol. Finally, the co-design attempts in Malmö showed well-willing and partly successful initiatives that did not attain sufficient detail and attention to local group constellations, nor to the larger identity-political picture. These four cases presented a variety of dilemmas; they showed various kinds of official will to make spatial alterations, "improvements" as it were, that did not balance people's right to their lived space, a right which consequently was diminished (if not right-out destroyed).

We have seen not only lack of dialogic will, but also how dialogues meant to be inclusive in fact may create exclusion. Final decisions may for instance sometimes be taken in off-dialogic moments or constellations, such as when "obstructing" agents may be waited out, or informal contacts between political power and actors of financial importance are given procedural priority (Roy 2009; Al Khalidi 2018). Such informal ways of proceeding inevitably ruin basic democratic ideals, and rights to the city are thus instantly abandoned, either in explicit ignorance of local voices (Hillier 2007) or in more silent omittance of large percentages of populations, such as when linguistically displaced groups are not reached by planning authorities (Nylund 2014). Exclusion due to insufficient dialogic possibilities or media (Sen 2007), can actually provoke citizen responses with insurgent means (Roy 2009). Consequently, the possible dialogic quality thus ruined easily turns into a long-standing conflict situation hard to repair.

For the case there actually *is* a dialogue during a planning or design process, it must be remembered that communicators that drive the dialogue usually carry a certain learned and vicarious "stakeholderness" (Metzger 2013), in the sense of a professional exercising of communicative standards. The result, hence, of such dialogues is highly dependent on the degree to which these experts are honest, sensitive, willing, and passionate.

We have seen here that an already conflict-ridden local social order can be intensified in dialogue processes. There is no guarantee that

Fig. 9.2 Qualitative features of dialogue in architectural/urban renewal

hard-working official or spontaneous dialogue initiatives intervene in a positive way in the local controversial circumstances, related to for instance difference in cultural background. As far as local controversies are concerned, there are however also methods that can support such intervention through stepwise common engagement (Fig. 9.2). One such method is *consolidation* through successive common learning of local wishes and preferences (cf. Cameron Grant-Smith 2005). While in official dialogue there always is a risk for mere "therapeutic" distraction, pretending real social improvement (Arnstein 1969), a more creative and constructive therapeutic method can however also be seen as a serious working approach (Sandercock and Attili 2014), if it acknowledges *reciprocity* in dialogue.

Endurance in dialogue is crucial, acknowledging also that there might be different types of voices, different representatives in different phases of a dialogic project. Dialogue, then, is a matter of finding forms for further dialogue, or caring for further post-project social development of the place and its qualities. It may in such situations be of importance that languages, sometimes also unorthodox languages separate from the usual planning and procurement jargon, are negotiated and established. *Multimodality* in communication—such as spontaneous use of photography, self-made images, braille, simple model- and sketch-making in real time, and walks and talks – can be necessary for a broad reach (Schalk et al. 2018).

Even if clear and demarcated projects may reach partial social breakthrough, we have seen that they also run the risk of being used merely as examples in political, corporate or academic branding. However, even for cases where non- or minimal physical renewal is achieved, the enduring power of reciprocal dialogue stands a good chance to contribute to a common sense of future care of places.

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Inclusive Sustainable Urban Design Using the Owerri Urban Village, Imo State Nigeria

10

Basil Agoha

Abstract

Urban settings many a time seem to disadvantage the indigenous and vulnerable people. Owerri is not left out in this problem. Owerri 'Nchi-Ise' is an ancient historic community that served as old Owerri provincial colonial headquarters and in 1976 became the Imo State Capital. With the indigenous people, it has historically heritage buildings, features, and sites, some of which have been decimated and defaced. These are 'Ugwuekwema' ancestral site, 'Otamiri' and 'Nworie' rivers, community squares, waterfronts, wetlands, shell camp, colonial military shooting range, Douglas Road, and lake Nwaebere. The paper identifies these so as to preserve them as part of the urban village assets. Geographic Positioning System was used to identify the actual location of these while Geographic Information System, GIS, was used to identify the components, photographs, and interviews for more data collection. A carnival route is used to link most of the heritage and historical sites used by the indigenes during the annual 'Oruowerri' festival. This is to reduce road blockade associated with the festival procession. Created along the route are parks, urban forests, wetland, and beaches along 'Nworie' and 'Otamiri' rivers. It was discovered that the project would not only improve tourism, climate change, renewable energy, the urban economy, tourism, historical preservation, and community participation in planning and recreation but would preserve the ecology of the place and create urban forest with the two rivers' wetland, indigenous flora and fauna re-established, re-discovered, and protected. The project gives a sense of belonging to the indigenous minority and vulnerable people while accommodating the larger urban population. It would also preserve the culture of the people, vernacular architecture, improve the urban agricultural potential of Owerri, and improve communal lifestyle and inclusivity for both human and non-human elements of the ecosystem.

Keywords

Community participation · Heritage · Historical sites · Inclusivity · Urban village

10.1 Introduction

'Ooowere shortened as Owere' (meaning he snatched), anglicised by the colonial government as Owerri, had five (5) kindred to form the Owere-'Nchi-Ise' (five kindred) community. The

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Igbo sociological stratification is from family, kindred, village, and community upon which all other activities revolve. Owerri was therefore an ancient traditional community settlement built on this social structure, that transformed into the then colonial Owerri Divisional Provincial Headquarters in 1906 later, headquarters in 1914, and then later, the Imo State Capital City in 1976 (National Archives 1917). With the unpreparedness of the people for urban status in 1976, the indigenes were vulnerable and disadvantaged. This affected both the tangible and intangible heritage assets, some of which have been decimated, defaced, or going into extinction. These include 'Ugwuekwema' (ancestral hill) the highest point then in the city, Otamiri and Nworie (child of second market day 'Orie'), the rivers as natural flood water receptacle, community squares, waterfronts, first, mangrove forest areas, public open spaces, wetlands, agricultural farmlands, the old District Officer's route known as the Douglas road, lake 'Nwaebere', (child of mercy), traditional cuisines and costumes, customs, dances, ceremonies, road nodes, tree places, landmarks, rites, and rituals.

The Shell camp is significant in oil, gas, petroleum, and fossil energy economy as it was the place that marked the discovery of the first oil well in Nigeria, West Africa, and indeed the whole of Africa at 'Iho', Imo State, in 1937 and then later at Oloibri in Rivers State in 1956 with Shell D'Archy relocating to Port-Harcourt from Owerri in 1956 (Winter 2002). The urban village has a carnival route with skybridges, underground traffic-commercial tunnels, pedestrian walkways, parks, urban forests, waterfronts, shops, drainages, and residential apartments to link the physical sites, garnished with traditional rituals. The route is to be used for the ancient and famous annual 'Oruowere' cultural festival procession, with traditional rituals integrating and galvanising the intangible heritage along the line. Traffic obstruction would be reduced, 'Nworie' and 'Otamiri' rivers protected with value improved through sustainable features.

The project would not only improve tourism, urban forest vegetation, climate and agriculture, the economy, and recreation but would preserve the ecology of Owerri Capital city. Urban agriculture opportunities, forest wetland, and indigenous flora and fauna protection are preserved, giving the indigenes a sense of belonging, inclusiveness, and citizen participation while accommodating the urban dwellers. The project would also preserve the culture of the people, vernacular architecture, and improve the African communal lifestyle and inclusivity for both human and non-human elements of the ecosystem. The Urban Village scheme therefore at the microcosm level mirrors the interdisciplinary, multicultural, universal, and sophisticated interlinked built environmental system which the Sustainable Development Goals advocate.

10.2 Literature Review

An Urban Village as the micro convergence of the earth's built environment systems provides the platform of synergy for old and new, village and city, rural and urban, ancient and modern, young and old with gender co-existence, in practice. For the built environment designer, it inclusively brings together all components of the ecosystem with climate adaptation for improved urban life, rethinking resources for value addition, and encourages resilient human and non-human communities. It also improves environmental health and builds partnership for the urban, semi-urban, sub-urban, rural, and village community for positive social and environmental changes. The green, serene, and peaceful nature of the village rural community with birds, animals, and vegetation draws people from busy cities and vice versa is not lost in an urban village but blends seamlessly to improve environmental health and wellbeing. It is characterised by the precursors of both the micro and macro physical, socio-cultural, economic, and environmental systems of the population from which the urban area evolved.

The Urban Village has an active original settlement and traditional heritage, within the urban boundary of the Owerri Capital city. Although the indigenous population has customary legal right to land, the land status is for the general development of both the original inhabitants,

leasers, and migrants in the urban setting, (Mohamad and Azahan 2017). There is therefore the need for the preservation of the original socio-economic, socio-cultural, and physical environment of the people through creative integration while not neglecting positive changes brought about by urbanisation. Although the preservation and sustainability of the biotic and abiotic ecosystem of the environment are as old as man, the methods may vary due to location, geography, socio-economic, and socio-cultural differences but the principles, goals, and objectives are similar.

The driving force has been to improve on the positive aspects of the population, natural features, activities, and the built environment while minimising the negative influences of the environment and urbanism for improved wellbeing of all. In the ancient Owerri Nchi-Ise community, a prominent feature was the waterfront socio-economic, socio-cultural activities, technology, skills and crafts, recreation, entrepreneurship, and mentoring activities which encouraged generational transmission of values in an inclusive and communal manner. The waterfront was where crafts, technical skills, children and adult recreation, dances, rituals, storytelling, oral history, traditional parables, and traditional foods preparation and sharing took place. These activities do not only seem to have disappeared but are fading away speedily. As the source of clean water, sections of the rivers were designated religiously for fetching drinking water, washing, swimming, washing, religious activity rituals, and river sporting activities. The waterfront was therefore busy with the lifestyle activities of the indigenous people.

Although the concept of evolution and the survival of the fittest are prevalent in most evolving cities as the result of capitalist economic tendency, its extreme application is not only inimical but self-destructive of the very existence of the people, hence the need for inclusive traditional life of the indigenous people at both the micro and macro levels of the urban socio-economic environment. Since development involves any process that creates the propensity and opportunity for growth, progress, positive change, or addition of physical, economic, environmental, social, demographic, and technological activities in the society, survival instincts are inevitable in any developmental process. It should therefore give rise to the higher-level quality of life of the population, creation of local and regional income, and employment opportunities without necessarily inflicting damages to the resources of the environment (sid-isreal.org 2021).

Hence, the need for consciously channelling resources enabled individuals and various layers of society to achieve a better quality of life with specific measurable goals. This was targeted to be realised by the end of 2000 AD. However, evaluation showed that the programme not only had little or minimal achievement of the goals, but seemed to have led to results that seemed not to take care of not only the larger population of the society but the neglect of the future generations. This thus led to the new policy concept of Sustainable Development Goals, SDGs, by the year 2030. The fear of the programme going the way of the MDGs has therefore led to the mobilisation of various strata of critical stakeholders of the society of which architecture is a foremost avenue for making substantial positive changes. Sustainable development is seen as that which is not only inclusive and resilient but meets the needs of the present without compromising the ability of the future generations to meet their own needs so as to ensure a dynamic balance between the three (3) legged pillars of economic growth, environmental care, and social wellbeing. Accordingly, it is a complex, holistic, system-based, interconnected, equitable, intergenerational, inter-ecological, global effort, that has environmental justice component, with long-term defined acceptable limits and targets that require transparency. Its evaluation and monitoring require complex short-term, mid-term, and long-term techniques and approaches to manage so as to track deviations as they occur.

The Sustainable Development Goals (SDGs) therefore emphasises these and architecture as a foremost physical environmental development agent in the built environment cannot ignore these issues. All the seventeen (17) SDG areas, namely no poverty, zero hunger, good health and

wellbeing, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequality, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and finally partnership for the goals, are either direct challenges to the architecture profession or are results of the profession in the short-, medium-, and long-term measures.

As the world is a global village, negative influences even at micro levels cumulatively build up to affect the macro system at the global levels. By 2030, AD when the success of SDG is supposed to be evaluated, the global population is projected to increase by over 500 million people, (Mazna 2022). This translates to the global need for at least additional 180 million housing units, 2.2 million primary schools, and 2.7 million secondary schools, facilities, and physical infrastructure. It calls for reduced carbon emission, adaptation of existing facilities, respect, and integration of local methods and materials. Others are technology and craft, energy and water conservation, in-fills and retrofitting of existing physical infrastructure, reduced working and transiting distance for use of facilities, heat island reduction, and reflectivity of hard surfaces and roofing materials.

Hence in the integrated nature of the universe, sustainability and inclusivity are prerequisites for collective survival, thus the appropriateness of the architecture profession. Looking at the architect as the agent to holistically integrate the SDG into the built environment at all levels of the profession is therefore expected. Inclusivity in this sense must involve the totality of both human and non-human elements of the built environment, the above land, land, under land, water, in water, and underwater at microscopic levels as these contribute immensely to the wellbeing of the entire ecosystem. The evidence of this oneness and integrated nature of the universe manifested in Climate Change, Covid-19 pandemic and the recent Russia-Ukraine war where the world is affected together in no small measure, cannot therefore be ignored.

10.3 Materials and Methods

Darwin's theory of evolution states that 'all species of organisms arise and develop through the natural selection with inherited traits and variations that increase the individual's ability to compete, survive and reproduce with the weak ones dying gradually or going into extinction through natural selection' over time, (khanacademy.org > dar, 2022; en.m.wikipedia.org > wiki 2022). While the systems theory advocates the unique oneness of any system entity, though with individual independent and interdependent components, the effect of each component of the system on each other cannot be over-emphasised. These therefore re-echo the unique and integrated oneness and nature of the world system as a unit. Furthermore, sustainability advocates the fulfilling of the needs of the present generation without compromising and jeopardising that of the future generation, by ensuring a balance between dynamic resilience of the system in economic growth, environmental care, and social wellbeing of the people, (becasesantander.com 2022). Inclusiveness, therefore as the principle of providing equal access to opportunities and resources for those who might otherwise be excluded, disabled, or arginalized due to social, physical disabilities, minority, or ethnic orientation status, is paramount in the world system.

Applied therefore to the urban system, while Darwin's theory of evolution encourages survival of the fittest over time in a system, resilience, sustainability, and inclusiveness enhance positive adjustments to co-existence in the evolution of social system of the city environment, which enhance overall growth and development. In spite of the seeming threat by formal urban planners in not integrating the heritage sites in Owerri, most of the components therein have persisted, enduring the harsh urban incursion due

to the fact that the sites have formed part of the very existence and tradition of Owerri people. This therefore typically agrees with Sustainable Development Goals. Whether as individual or group, every component in the city system has one contribution or the other to make in the interdependent life in the built environment, with architecture largely as the influencer. Socio-culturally, through multi-sensory intangible experiences of the urban village, tangible cultural experiences are stimulated to help transmit the values from generation to generation. This is done through oral tradition that guides residents, visitors, and tourists through physical architectural designs as museums, galleries of Owerri, dotting the carnival route in the form of arts, crafts, fashion show, local cuisine and food exhibitions, riverside, heritage sites, buildings, open spaces, and artifacts (ich.unesco.org, 2022).

Owerri the Imo State Capital, with the twin city of old and new Owerri, Figure 10.1, as the study area, provides the case for the urban village research. It has five (5) traditional villages of Amawom, Umuechchi, Umuihugbaa, Umuonyechere, dotted with heritage assets, hence the name Owerre Nchi-Ise. It was the headquarters of old Owerri Colonial Province before the 1960s and currently the State Capital of Imo State, Nigeria, since 1976. It is bounded by Egbu, Orji in the East, Amakohia Uratta and Irete in the North, Nekede and Naze in the South, and Umuguma in the West, with which it has boundaries. It is located within longitude 5.5096 °N, and latitude 7.0391 °E with about 158 m above sea level, (Fingerhuth and Patners 1977). Although 'UgwuEkwema' site is one of the highest points which empty natural flood water into 'Nworie' and 'Otammiri' rivers, there are other natural and artificial flood collection basins such as the lake Nwaebere, in Ikenegbu housing estate. Blocking of the natural flood routes has led to incessant flooding of roads and houses thereby inflicting pains on the populace and jeopardising public and environmental health of the people. As the Owerri Capital Territory is rapidly expanding based on the twin city plan, the need for identification and historic preservation of the rich heritage of the people to explore the potentials without compromising the needs of current and future development of Owerri is very necessary. Hence the urban village programme.

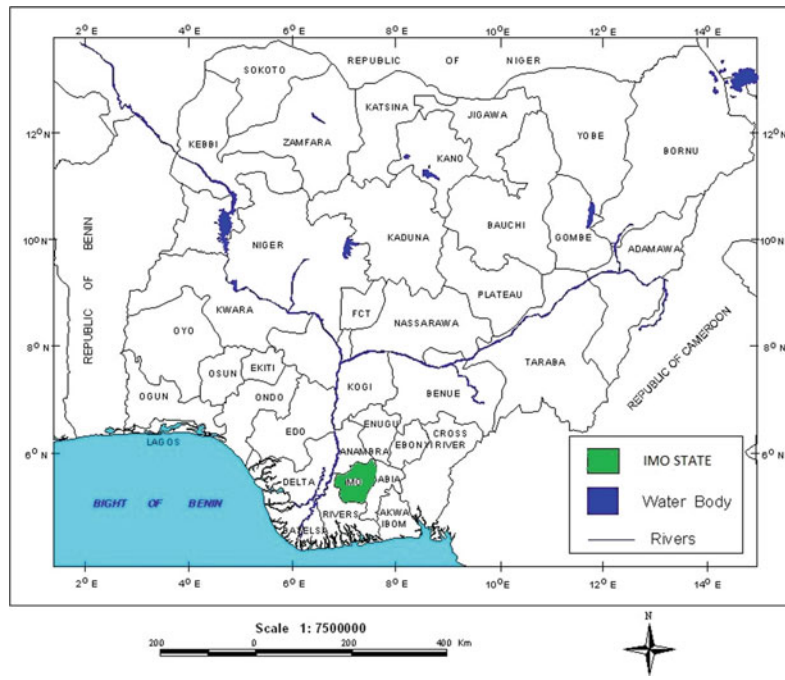

Fig. 10.1 Imo State in Nigeria. *Source* Agoha, 2016

To get the materials for this research, Geographic Positioning System, (GPS) of Garmin V72 hand held GPS machine spot 2.5, instrument of two (2) metre resolution was used to georeference and fix the actual position of Ugwuekwema ancestral community square, kindred squares, historical sites, components, and nodes. The Geo-eye satellite images of 2015 were used to monitor the conditions, transformation, and changes. This was used to know and separate the component elements of the city such as foot paths, roads, buildings, and trees separated into layers using the GIS, ArcGIS 10.3, Global mapper 16.1, Erdas Imagine 9.2, Franson coordinate transformation surfer 9, IBM while Geographic Information System, GIS, identified and gave the satellite images of the sites and different components. Interviews, photographs supported with drone facility, and personal observations were also used to get more data (geography.about.com 2015).

As in Owerri, urban villages are dotted with a lot of historic heritage sites and ancient villages that have survived generations. These sites are buildings, artifacts, structures, natural feature sites, areas, corridors, water bodies districts, and monuments with documented associations of historic events, notable persons, rituals, or institutions which form the cultural heritage of the people (Peter 2014). Cultural heritage has both tangible and intangible components. While the tangible ones like buildings, historic places or sites, monuments, and artifacts are seen and felt, the intangible ones are used to stimulate the sensory organs to fully appreciate the tangible heritages. The tangible heritages can be natural or man-made and includes arts, crafts, music, dances caves, rocks, mountains, and valleys while the intangible ones are practices, representations, expressions, symbols, knowledge or skills, folklore, customs, beliefs, oral tradition, performing arts, social practices, rituals, traditional food or cuisine, and languages, associated with the people, (United Nation Educational Scientific Cultural Organisation, UNESCO 2003; en.m.wikipedia.org 2022).

The intangible heritages as sustainable and resilient features are normally passed on from generation to generation, preserved orally, through storytelling, dancing, music, drama, traditional foods, and cuisines (Elgidius and Claudia 2020). Intangible heritage elements form part of the culture of the people and many a time are responses and interactions of the people with the natural environment of an area. Hence the attempt to separate nature and culture with these linkages has not been successful and may never be, therefore, the need for built environment professionals (Chuka and Elgidius 2022). Since the people are involved in the execution of these intangible activities, the heritages are not only internalised, preserved, and passed on but ensure citizen community participation and value addition to the heritage elements as materials for research and development. This approach is very important in Africa where most of the heritage sites and elements are yet to be properly identified, listed, and documented. The annual procession garnished with the intangible and soft activities tells this story very clearly, during the 'OruOwere' festival.

The heritage elements as materials create brand personality since they can be transformed with brand characteristics, and brand identity that can evoke strong brand image now and in the future (Mohamad and Konstantina 2021). Due to the complex nature of the urban village, its success involves a partnership with the government and its agencies at Federal, State, and local areas, the public, the private, service and Information and Communication (ICT), providers, financial institutions, and indigenous people. A comprehensive sustainable approach for the urban village would take care of historical sites and restoration, urban development and growth, socio-economic, socio-cultural development, natural and ecological restoration, flood control and prevention, public amenity and infrastructure, leisure and recreation, and connection of networks linkages with various consultants to create a viable identity.

10.4 Results

This research shows that in an emerging historic city and urban development, the issue of citizen participation as an element of inclusiveness is a serious challenge in the evolution of urban areas, urban planning, and development, hence there is always the conflict between the planning authorities, the residents on one hand and the indigenous population. Heritage buildings, sites, identity, serene village setting, flora, fauna, voices of birds, animals and whistling trees, fresh air, natural elements, and resources are almost lost to the government and other residents with the aborigine feeling marginalised and disorientated. In Owerri Nchi-Ise, this story is the same, as the people were not prepared for the changing status of the area, from Owerri provincial headquarters to the present Imo State capital. Although the master plan identified and took care of the indigenous population through the twin city planning concept, the consummation of the effort is yet to be realised fully, Fingerhut and Partners (1977), Fig. 10.2.

With the creation of the old and new Owerri in one urban area, there has been inadequate conscious historical and identity preservation of the indigenous assets of Owerri Nchi-Ise people, leading to frequent disenchantment and disorientation. The old Shell camp in Owerri with workshops, laboratories, classrooms, and staff residential buildings and offices, transformed into vocational school, technical college, and currently Alvan Ikoku College of Education, has not

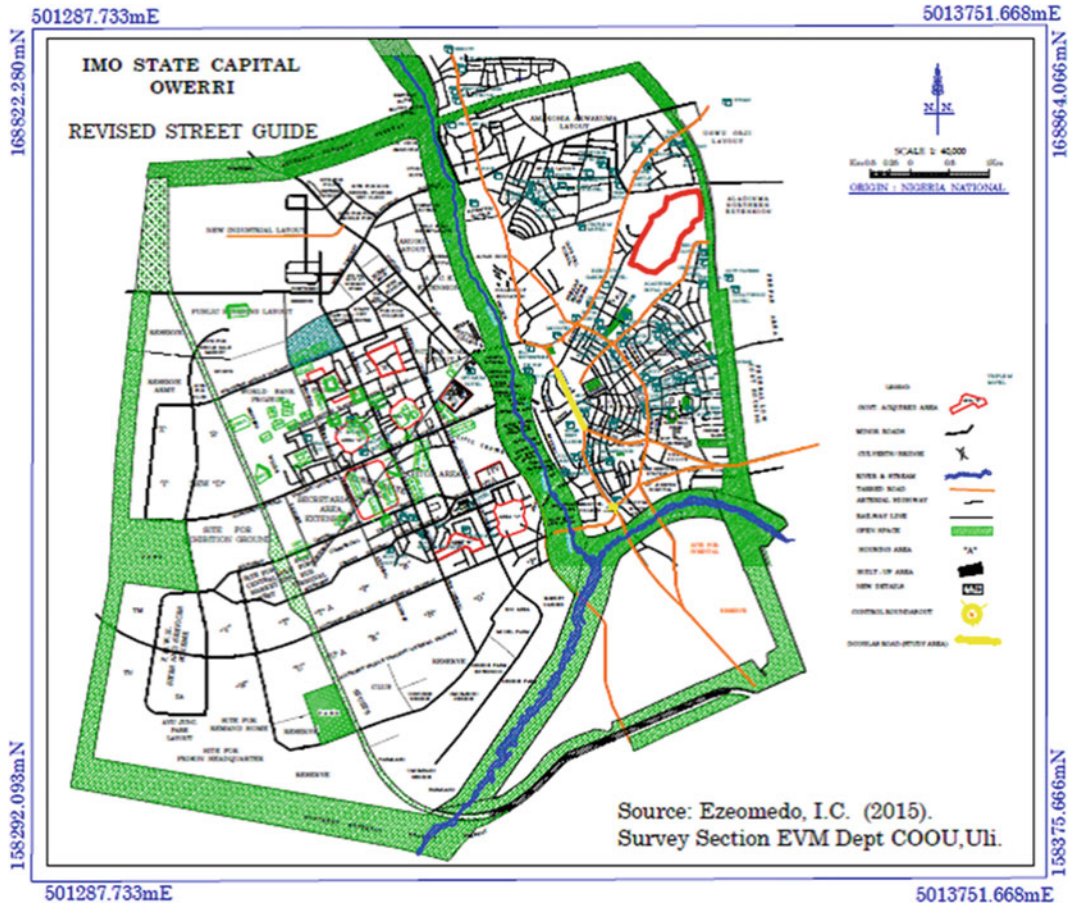

Fig. 10.2 Owerri twin city masterplan. *Source* Fingerhut (1977)

been adequately preserved as heritage assets. Its workshops became government Industrial Development Centre, IDC, with the medical facility forming the nucleus of the Owerri General Hospital and now the Federal Medical Centre. The colonial District Officer's timber house called the Douglas House which formed the nucleus of colonial government has been destroyed and transformed into the Government House as the seat of the government of Imo State. The old race course area which used to be the recreational facility of the District Officer, (DO) now forms part of the General Post Office and other government facilities.

The old Douglas route which used to form the route for 'shoulder-carrying' of the DO during visits to places under his jurisdiction and the slave trade route now forms the famous Douglas Road at the heart of Owerri. Other important roads are the Tetlow, Wetheral, and the Royce roads named after the colonial Town Planners of Owerri. Hence in order to reduce conflict and loss of identity, so as to establish confidence in the people in the emerging urbanisation, the concept of Owerri Urban Village is being proposed to not only preserve the tangible and intangible heritage assets of Owerri Nchi-Ise, but to improve the socio-economic, socio-cultural, and environmental quality of the Owerri Capital city, so as to enhance recreation, tourism, quality of the urban environment, life, and wellbeing of the people.

10.5 Discussion and Conclusions

The tangible heritage sites identified are the Ugwuekwema traditional site, the Otamiri and Nworie rivers, the village waterfronts, the old Shell camp, Amatabataba (colonial military shooting range), which was the first shooting range for colonial Regimental force in Owerri as the first shooting range site, the lake 'Nwaebere' site, the Douglas Road, Royce and Wetheral roads, and old Race Course. These sites are used to showcase and accommodate the intangible activities such as the 'OruOwerre' annual festival procession, the roasted yam eating ceremony, traditional dances, traditional costumes, food, cuisine preparation and eating, cultural display, ritual, and ceremonies. The traditional footpaths to the ancient village waterfronts now tarred roads such as Umezuruike street, verge into the new 'Akanchawa' road lining the 'Nworie' river and crossing it at the first, second, third, and fourth inland roads or avenues Figure 10.2 to link the old and new Owerri of the new twin city masterplan.

These sites and routes linked up to form the proposed carnival and tourist routes, (Figs. 10.2, 10.3, and10.4), through which ceremonies, rituals, and the annual 'OruOwerre' traditional festival procession move to form tourist route museum for visitors. Other features are movie in the urban forest of initial 2 million trees with traditional and indigenous trees around the rivers and the lake 'Nwaebere'. Others are sky bridges, shops, and underground tunnels across the major roads of Egbu, Douglas, Orlu, and Okigwe in Owerri city. There is the need for the proposed 'Ugwuekwema' Tower with museum, seminar and conference facilities, offices, and multilevel and underground car parking facilities. Flood water drainage and waste water facilities to control and purify the flood and waste water into 'Nworie' and 'Otamiri' rivers are to be provided. Traditional cuisine restaurants with traditional dance platforms are to be integrated into the existing 'Mbari' kitchen besides 'Nworie' river.

Waste and waste water management facilities, motorised cable round the carnival route, bicycle, shaded pedestrian walkways, and renewable solar energy facilities are proposed in the urban village. The dredging of the Nworie and Otamiri rivers apart from improving their ability to receive more flood water would make possible the development of the rivers as a resource for recreation, urban farm irrigation, and other water sporting facilities for recreation, training, and competitions. There is therefore the smooth linkage from the tarred waterfront footpaths in old Owerri through the 'Nworie' river into new Owerri as the first, second, third, fourth, and fifth inland roads. This linkage apart from uniting the old and new Owerri makes the development of the waterfront and wetland of the rivers'

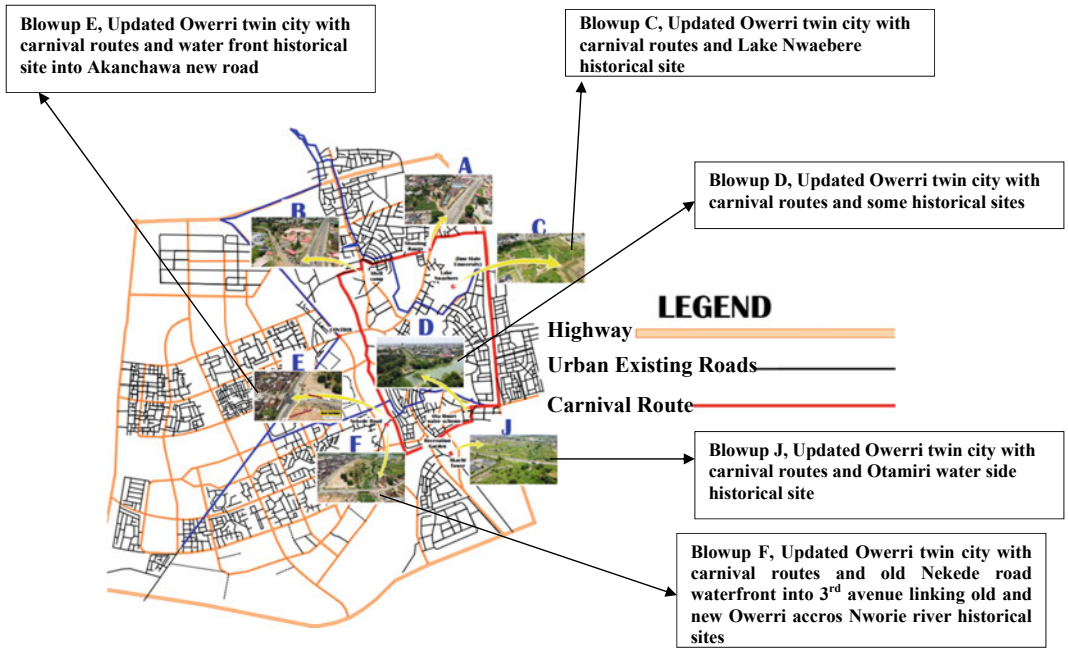

Fig. 10.3 Updated Owerri twin city with carnival routes and some historical sites. *Source* Author's field work, 2022

Fig. 10.4 Blowup A, Updated Owerri twin city with carnival routes and shooting range historical sites, housing Ministry of Agriculture Extension. *Source* Author's field work, 2022

recreational and tourist potentials very high. The dredging of the Nworie river would increase the height of passage under the bridges thus increasing the potential of river sporting activities.

Although the river banks have been largely abused, the space would be reclaimed and restored under the Owerri urban village programme as there is inadequately planned landscape activity going on with the proposed tree-lined pedestrian walkway. The proposed carnival route would pass through and adjacent to the road separating the old Owerri built up area and the river bank with scenic view of the rivers. Figure 10.3 gives an updated Owerri twin city map showing the current state of some of the historical sites in Owerri and the carnival route in red colour (Fig. 10.5).

Urban village as proposed is to link the old and new Owerri so as to explore the full potentials of the various heritage sites. The route also provides dance decks, spots, café, traditional food kitchen delicacies, restaurants and food courts, and cuisine for the festival visitors and participants. Waste management recycle and reuse facilities would be established such as producing organic fertiliser for urban agriculture and use of metal containers for shopping and other facilities, cottage industries for festival costume, and other traditional wears. Other issues raised in this study are the creation of identity brand for the Owerri people and the

Fig. 10.5 Blowup B, Updated Owerri twin city with carnival routes and Shell camp historical sites, housing Alvan Ikoku Federal College of Education. *Source* Author's field work, 2022

'OruOwerre' festival. This identity is for both visible and invisible assets to reduce discontentment and feeling of marginalisation among the indigenous people while increasing holistic inclusivity, sustainability, and national pride of the people. The project when fully realised would also provide a case study avenue for integrating the indigenous people in all emerging urban areas in Nigeria as a contribution to the Sustainable Development Goals. This paper would reinforce the idea design, the presentation design, and architectural, engineering, and service working drawings for the Owerri Urban Village project development.

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Study on the Residential Design Based on Spatial Model of Local Ethnic Traditional Dwellings in China's Rural Renewals

11

Lei Tie

Abstract

In China, various ethnic groups live in extensive rural areas and have their own traditional residential buildings with distinctive characteristics gradually formed in a long time. These dwellings, as the reflection of the ethnic culture of their inhabitant, have different spatial models with different value systems, which have been conjoined with the cultural customs of each ethnic group. However, with the improvement in living standards, traditional dwellings cannot meet the needs of modern life. Therefore, the Chinese government has vigorously promoted the modernization of rural areas in recent years. In the process of rural renewal, new residential buildings and plannings are mostly copies of urban modern ones. Local traditional spatial models and ethnic cultural customs have not been fully respected, or even completely ignored, which makes these new buildings lose the sense of ethnic self-identity, and makes the inheritance of ethnic traditional culture lose its carrier. Based on the issue above, this article is going to explore how to continue the spatial model and its cultural value rooted in local ethnic traditional dwellings on the basis of meeting the needs of modern life in rural newly-designed buildings. The research selects the main typical ethnic rural areas in China and summarizes the spatial models from the three levels of spatial schema, meaning, and behavior. Through the case study, it discusses the issue above from these three levels and proposes the basic mode to solve this problem.

Keywords

Spatial model · Residential design · China's rural renewal · Ethnic traditional dwelling

11.1 Introduction

As a typical "rural society", the Chinese countryside has a long history and profound accumulation, and after a long period of development, local ethnic groups have formed stable ideological concepts and traditional customs, which still continue to deeply influence the society and life of contemporary rural areas, even in the current urbanization and globalization. With the rapid opening and development of the long-closed villages twenty years ago, this solid tradition has directly collided with urban modern life, and the binary opposition between ethnic tradition and universal modernity has become the main issue

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in all aspects, especially in architecture. With the continuous advancement of urbanization, a large amount of material and personnel flow between cities and villages, modern living items and urban ideas continue to flow into the countryside, and as a result, the way of life of local peoples is gradually modernizing. However, with the improvement of the quality of life and the modernization of the way of life, many problems in the use of traditional residential buildings have become increasingly prominent. In order to solve these problems, urban modern residential buildings are continuously introduced, especially in the construction of local residential buildings led by the government, the architects hired from the city directly apply the urban modern residential design. Although these kinds of urban modern residential buildings can well meet the modern lifestyle and have the convenience that traditional buildings do not have, they do not conform to the traditional culture and living habits of the local people, and some local people are unwilling to live in these modern buildings. This is why, despite the large amount of modern urban dwellings in the countryside and the inconveniences of traditional residential houses, people still build a large number of traditional houses constantly, and only partially use modern building materials for economy and durability. It can be seen that, in fact, modernity and tradition are still not well coordinated here, and the two are still in a parallel state. Then, how to integrate the modern way of life with traditional culture and behavioral habits? how to explore a new living space that can not only meet the modern way of life and standards, but also continue the traditional culture and customs of the local ethnic group? If we solve these issues, then local rural construction will move toward a sustainable development path. And this is the focus of this paper.

So how to solve this problem? We need to clarify two issues. First, what are the specific aspects of the traditional residential building space that are closely related to the ideas and behaviors of local ethnic groups, and what kind of living space can make it feel like home? What problems exist when architecture adapts to the modern way of life? Only after studying these two problems can we continue to discuss the integration of tradition and modernity. These two problems will be discussed separately below.

11.2 Spatial Model of Traditional Dwellings

In terms of space, each ethnic group has its own unique ideas and behavior habits, which will be reflected in the corresponding residential building space. This article will define the item, which could reflect these ideology and behavior habits of ethnic groups, as a spatial model. Additionally, because different ethnic groups have different ideas and behavioral habits, they naturally have their own different spatial models. Since this paper mainly studies the relationship between space and human behavior, this paper adopted the methodologies of architectural phenomenology and architectural anthropology and used their mature theoretical achievements to construct the concept of spatial mode.

Specifically, the spatial model can be divided into three closely related levels, spatial schema, spatial meaning, and the behavior in the space. The three form a complete system from abstract to concrete. They respectively include spatial cognition, psychological identity, and daily use, and can fully reflect all levels of the relationship between the occupants and the space. Spatial schema refers to the way in which living space is organized, and they are often a reflection of the ethnic cosmology, social relations, and family structure; the meaning of space is to reflect the value, meaning, and hierarchical order of each space organized in the spatial schema. Spatial schema is not an abstract existence, the spaces located on different spatial schemas often have different value meanings and levels; while spatial behaviors are behavioral habits that occur corresponding to different spatial values and meanings; Together, they three form a space system, which satisfies the occupants to recognize the space and implement their behavior habits without obstacles, thereby gain a sense of self-identity of “at home”. As Yi-Fu Tuan said:

"What does it mean to be in command of space, to feel at home in it? It means that the objective reference points in space, such as landmarks and the cardinal positions, conform with the intention and the coordinates of the human body." (Yi-Fu Tuan 2001) Therefore, it can also be said that only in the space, which conforms to ethnic own cognitive values and where behavioral habits can be implemented without any obstacles, the ethnic group can feel in control of this space and feel at ease.

Here, the three levels of the spatial model exist as a whole. If the spatial schema is the sole one to be emphasized, it will lead to the so-called inheritance of the tradition staying in the form composition of plans, but in the actual spatial experience, the structure may not necessarily be experienced. If the meaning of space cannot be filled by behaviors, it will only be a symbol and cannot satisfy the implementation of traditional behavioral activities. Only the combination of the three can satisfy the full self-identity of the ethnic group from spatial cognition to spatial behavior. The three of them are combined to satisfy the unique life of the local ethnic groups from the spiritual and material aspects, respectively. For the spiritual aspect, the spatial schema and meaning value in the traditional Chinese architectural spatial model is the spatial projection and construction of the traditional culture, so they themselves are well adapted to and satisfy the pursuit of the spiritual world such as the cognition of the universe, family order and ancestor worship.

There have been quite systematic studies and rich results in China on the spatial layout, space use, and symbolic meanings of the traditional Chinese residential spatial model. Taking the traditional houses of the Han nationality in northern China as an example. The local traditional residential buildings are typical courtyards, usually three-sided courtyards, with the building on the north, east, and west sides, and the wall and the entrance gate on the south side. For a smaller yard, only one side of the east or west side has buildings, and the other two sides are walls. All doors and windows of buildings face the inner courtyard, thus they all form an introverted courtyard building group. The inner courtyard becomes the core connecting all the houses, and it is also the main place for the family's outdoor activities. The houses facing the inner courtyard on the north side are the main building of the courtyard building group, usually with three or five rooms. Even if the main building has five rooms, its core is still the middle three rooms which usually are merged as a whole. This layout can be called the "three-room" model (Dunzhen 2004), which is the most common layout of traditional Chinese residential buildings. The hierarchical order of the houses in the courtyard seems to be a true portrayal of the family hierarchical order. As a symbol of authority, the main building on the north side is the living core of the family and the place where the elders sleep, and is the noblest house in the entire courtyard, with the highest height. A room in the middle of the main house is the most sacred place for the whole family. In this room, on the offering table facing its entrance, there are tablets of gods and ancestors and worship activities will be held during festivals. The wing houses on the east and west sides are used as children's living or auxiliary rooms, and the height cannot exceed the main house. The toilets are generally set in the southwest corner of the courtyard. The layout of all these functional spaces is classified according to the symbolistic meaning of their locations, the most sacred space is located in the middle of the noblest main house. The layout of the whole building seems to be a realistic projection of family order and world cognition. The location and orientation of the entrance gate are not determined by the site and public roads, but are entirely determined by "feng shui", even if this will cause conflicts with the terrain. Here, the structure and meaning of the space are completely unified with the spiritual pursuit of the occupants. As for the purely material way of life, the space organized according to the spatial schema and meaning, from the most sacred ancestor sacrifice to the most secular toilet, can satisfy their behavioral habits well, especially those traditional customs

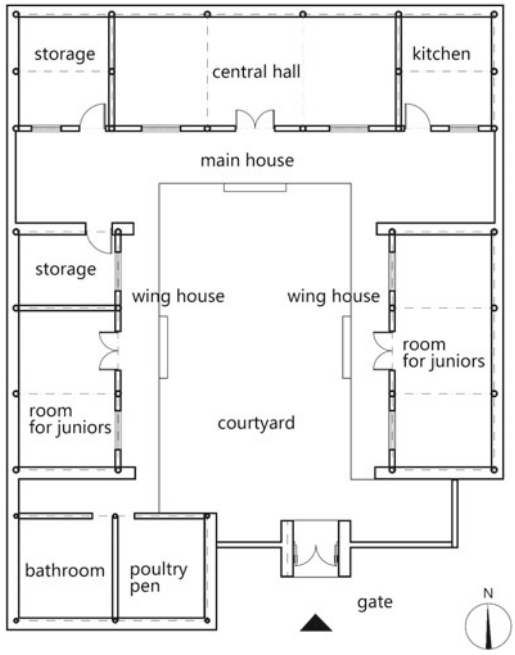

Fig. 11.1 The layout of a typical traditional courtyard of Han nationality in northern China (drawn by author in 2022)

based not on basic physiological needs, but the ethnic ideology, such as festivals and sacrifices (Fig. 11.1).

11.3 The Contradictions Between Traditional Living Space and Modern Lifestyle

With the modernization of lifestyles, the adaptability between traditional spatial models and traditional lifestyles has been broken, and the contradiction between modern lifestyles and traditional spatial models has become increasingly prominent. In order to fully and accurately grasp this contradiction, this research focuses on the example of traditional courtyard houses in northern China and conducts detailed records and research by means of field research, resident interviews, observation records, and local chronicles. The research team visited a total of 32 typical villages in five provinces of Gansu, Qinghai, Xinjiang, Inner Mongolia, Shaanxi, and Shanxi in the past three years, collected survey data from 75 households, and summarized the changes in life. The changes in lifestyles are mainly reflected in the following three aspects.

11.3.1 Changes in Living Style

In traditional Chinese rural courtyard buildings, the main house on the north side is the core of the whole family and consists of three continuous rooms with different functions, of which the middle one is the central hall, mainly for ancestor worship, and the two lateral rooms are for living and sleeping, respectively. The three rooms are connected to each other without partitions to form a large space, which is responsible for the family's daily rest and hospitality. In northern China, most of the sleeping space is the heated Kang (traditional bed-stove), which is used for sleeping at night, and mostly for living and dining during the day. The family is used to sitting cross-legged on the Kang and dining around a low table. In the cold winter, people have the habit of using Kang as a heating tool. Therefore, a large number of living functions are transferred to the Kang, and conversations between family members, housework activities, and children's homework are all completed on the Kang. In the traditional way of life, people follow the living habit of resting at sunset, and there is not much interference between sleeping and living in the "three-room" without partition. This multifunctional mixture does not bring obvious inconvenience, but with the advent of modern lifestyles, this kind of inconvenience in the use of space has become increasingly prominent.

First of all, the arrival of the TV has completely changed the layout of the living space, and TV began to become the focus of the layout. The usual layout is to use the end wall of the living space as the background wall of the TV, and the sofa is arranged along the front eaves wall, which is perpendicular to the TV. There are two reasons for this arrangement. One is that in northern China, in the cold winter, people have the habit of sitting on the Kang to keep warm. The TV is arranged on the end wall on the opposite side of the Kang, which is convenient

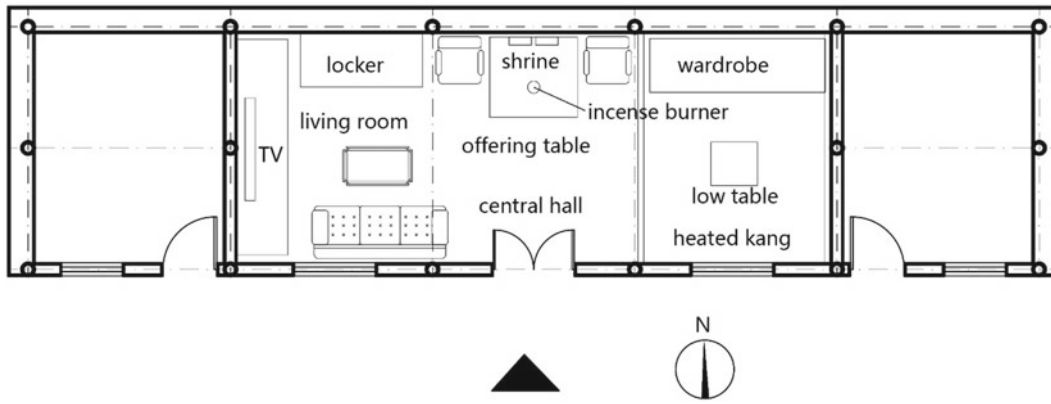

Fig. 11.2 The plan of a typical "three-room" in the main house (drawn by author in 2022)

for watching while sitting on the Kang. Another more important reason is that the depth of traditional houses is relatively small. If the sofa and the TV are arranged parallel to each other, the sight distance is too small. However, the arrangement of the seat and the TV in a perpendicular way brings about the problem of comfort in use. When watching TV, you need to turn your head, and keeping this posture for a long time can easily lead to physical discomfort;

Secondly, with the introduction of television, especially the involvement of the Internet, people's nightlife is becoming more and more diversified, with the villages and cities alike and the time to go to bed is obviously delayed, especially for young people. For the main house, which undertakes the living function of the whole family, the mixing of sleeping space and living space leads to increasingly serious interference between them.

Thirdly, the modernization of this way of life is also notably reflected in the fact that a large number of living activities have begun to be transferred from the kang to the ground, especially with the popularization of coal stoves, even in winter, dining, conversation, reading, and other activities are transferred to the ground. Especially the younger generation is not used to sitting on the kang. In this way, the living space that originally only undertakes a part of the living functions needs to undertake all the living activities, which makes the traditional living space too small and crowded, and the interference between different activities is serious. Therefore, the expansion of living space and the further subdivision of functions has become an urgent need (Figs. 11.2 and 11.3).

11.3.2 Higher Requirements for Room Space Quality

The higher requirements for space quality are mainly reflected in the improvement of space function requirements and the improvement of space quality, which are mainly reflected in two aspects. For example, the three rooms accommodate the main daily functional activities, but with the improvement of living standards and the gradual modernization of daily activities, the mutual interference between different functions in the same space has become increasingly significant, and people's tolerance has gradually weakened. For example, in addition to the above-mentioned contradiction between watching TV and sleeping, there is also the contradiction between family life and daily visitors, because people pay more and more attention to independent space and personal privacy. These all make the traditional multi-functional space gradually become outdated. Another improvement in space quality refers to the higher requirements for the scale and layout of the space itself, especially for lighting and view.

Fig. 11.3 A typical "three-room" in a main house, top: living room; middle: central hall; bottom: heated Kang, (photograph by author in 2022)

11.3.3 The Convenience of Room Connection is Required More

For residential houses in northern China, except for the three connected rooms in the main house, most of the remaining buildings are independently arranged and connected through the inner courtyard or outdoor corridors, which brings much inconvenience to daily life, especially the bathroom, usually separated, is extremely inconvenient to go to in rainy days or winter, because it has a negative meaning in traditional spatial model and needs to be deliberately kept away from the main house and the kitchen. Even for those moving into modern homes, having the bathroom next to the kitchen can be psychologically difficult to accept. Then, how to ensure the convenience of room connection while respecting the traditional spatial model and collective unconsciousness in newly built housing requires further discussion.

The emergence of all these main contradictions is actually a manifestation of the inherent contradiction between modern lifestyles and traditional spaces, and the easiest way to solve this problem is to directly use urban residences based on modern lifestyles. The living model based entirely on functional convenience and high-quality space fully meets the needs of modern life. Even so, the main problem is that the spatial model of urban modern housing cannot conform to traditional living customs, because the modern living pattern is completely based on the physiological comfort of the average person, and is not oriented toward the living habits of a certain ethnic group. The key to solving this problem is to establish a living space that can meet the modern lifestyle and at the same time conform to its traditional spatial model. How to do this will be discussed below through two typical residential design cases in rural China.

11.4 Cases Study of Design Models that Combine Traditional Spatial Models with Modern Lifestyles

There are many ethnic groups in China's rural areas, and correspondingly there are many kinds of traditional dwellings. However, from the perspective of spatial models, these dwellings mainly include two categories, one is axial, and the other is centripetal. The above-mentioned

traditional Han dwellings in northern China are of the axis type, that is, the entire courtyard building is organized around the main house on the north side, while in the "tree rooms" of the main house, the central hall, as the most important space, is the center to organize the living and sleeping spaces on its sides. In the centripetal space mode, there is a core space as the center, and other spaces surround it. Mongolian yurts and traditional Tibetan dwellings are typical examples of this type of spatial model. The following is the design case study of these two typical spatial modes.

11.4.1 Design Case of Mongolian Modern Residential Buildings in Inner Mongolia

Yurts are traditional Mongolian residential buildings with distinct spatial hierarchies, and are typical representatives of the centripetal spatial model; at the same time, with the modernization of lifestyles, the multi-functionality of its space makes different functions interfere with each other more and more seriously. Based on these two points, it is quite typical to take this design of Mongolian modern residential buildings as the case of this study.

The research on traditional yurts in Inner Mongolia has also achieved quite rich results in China. As the living space of nomads, yurts are widely distributed in Inner Mongolia. The main components include woven walls and felt as vertical envelop enclosures, purlins as roof structures, and skylights for smoke exhaust and ventilation. However, with the popularization of modern means of transportation and communication equipment, continuous migration has become unnecessary for grazing, and the herdsmen's residences have begun to be fixed. Local government has carried out the construction of a large number of resettlement houses for herdsmen. Yet usually these houses are copied from urban modern houses, and less attention is paid to the original spatial models and living habits of local residents. We had an opportunity to participate in the construction of this kind of community led by the government. In view of the problems existing in the built houses, we decided to design based on respect for the original culture and living habits of local residents, and hope that this design could play an exemplary role. Therefore, we first conducted investigations on 12 local households through on-the-spot investigation, interviews with residents, and observation records.

The traditional yurt in Inner Mongolia has only one interior space, and the division and limitation of space mainly depend on furniture and floor textiles. From the center of the circle to the periphery, the inner space is divided into three layers in sequence: the center of the circle is the core of the whole space, where the sacred stove is placed, which is the symbol and core of the whole family; the outer layer is living and sitting space where carpets and felts are laid around the stove, it is a place for living and eating during the day, and sleeping space at night; the outermost layer is for the furniture, mainly including wooden boxes for storing quilts and other utensils. Seemingly the space of a yurt is very simple, actually, its spatial model has rich meanings and a distinct hierarchy. In its whole space, the north and west are noble, and the north and east are humble. The significance of this orientation also corresponds to the idea of male superiority and female inferiority. With the stove as the center, the north is the sacred area, where the seat for the elderly is placed, and the south is the secular area, where the entrance is usually set and the living utensils are placed. The northwest side is where the shrine is located. As a more noble area, the west side is mainly for storage boxes for horses, games, and various utensils for men, while the east side houses cupboards, water tanks, and women's utensils and storage boxes. Although modern urban housing meets the needs of modern life, it cannot reflect such a traditional spatial model and living habits. Based on this, we try to design a new residential building that can satisfy the modern way of life and at the same time reflect the traditional spatial model of the local ethnic group (Fig. 11.4).

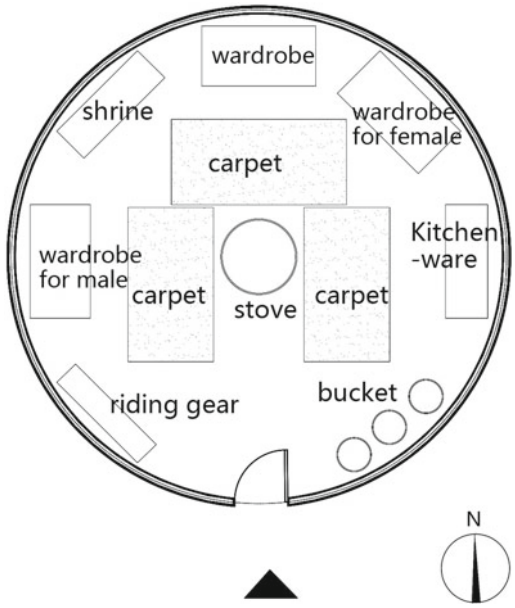

Fig. 11.4 The plan of a typical traditional yurt in Inner Mongolia (drawn by author in 2022)

In this regard, we first refine the spatial model of the traditional yurt, including spatial schema, spatial meaning, and spatial behavior. Based on these three points, the spatial model of yurts can be summarized as follows: its spatial schema is centripetal; taking the stove as a center, the north and northwest sides are the areas with the highest value, and the south side is relatively less valuable; the behavior and habits in the space include not only daily life, but also spiritual activities such as religious sacrifices. At the same time, we also need to consider the modern way of life. Here, it mainly refers to two points. One is to separate the functions that interfere with each other in the same space, and put them in different spaces; the other is to meet the needs for watching TV.

Based on the above analysis, we developed the design plan. First, we adopted a centripetal spatial schema. Here, the centripetal spatial schema can have multiple choices, such as following the traditional circular space with a strong centripetal, or adopting the square space with a weaker centripetal. The former follows the tradition, but because of the irregularity of the plan and space, it brings difficulties in furniture arrangement; the latter has a relatively weak centripetal, but has good adaptability in furniture arrangement, and is convenient to construct, which is suitable for low-level local construction technology. Therefore, we have adopted a compromise. The central living space adopts a polygonal layout scheme, taking into account the centripetal structure and adaptability of home layout. To isolate the sleeping space from the living space, the bedrooms are individually arranged around the polygonal living space. At the same time, we believe that the spatial schema should be really experienced in the space, not just the be the compositional relationship on the plan. Therefore, the entrances to the bedrooms are all facing the central space, and even in the bedroom, you can still feel its centripetal relationship with the central living space. In the center of the living space, a stove integrated with a tea table is set up in a traditional way, around which, traditional carpet or modern sofas, and TV are arranged. The shrine is still set up on the northwest corner, and the entrance is still on the south side. The roof is combined with the stove exhaust pipe, and the skylight is set according to the traditional yurt. Although this design has not yet been constructed completely, it has been affirmed and supported by most herdsmen in field research and interview (Fig. 11.5).

11.4.2 The Case of Gansu Han Rural Modern Residential Design

Gansu Province, the northwestern region of China, has a long history and is the birthplace of the Han nationality, and its traditional residences are the typical courtyard-style buildings mentioned above, which are also one of the key research objects. As a local Han nationality rural demolition and resettlement housing project, this design case abandons the practice of directly relocating urban modern houses. Based on the local ethnic spatial model, it continues the tradition while meeting modern living conditions.

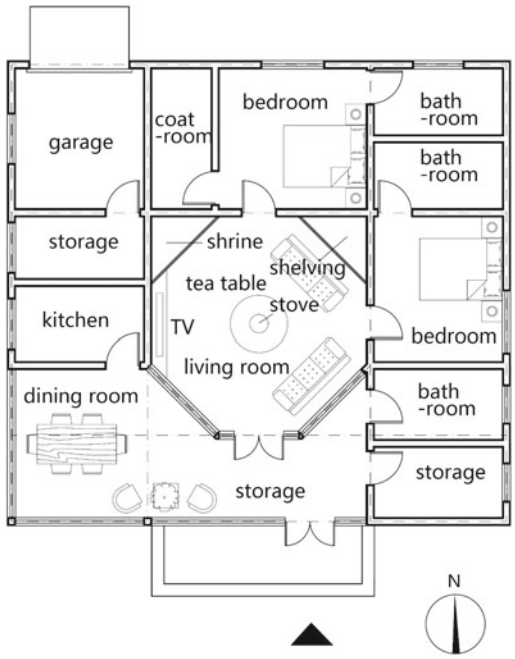

Fig. 11.5 The plan of our design incorporating spatial model of traditional yurt (drawn by author in 2022)

As a typical courtyard-style building in the north, its basic layout has been explained above, and its existing problems have been summarized above in more detail: the connection between different houses is inconvenient, and the mixing of functions of the three-room in the main house brings about mutual interference and the incompatibility of modern lifestyles with traditional space layouts.

The local spatial model is also divided into three levels. In terms of spatial schema, this living space presents a typical axial spatial schema. Different from the centripetal spatial schema, all spaces are organized around the north–south axis running through the main room, presenting a kind of progressive spatial sequence from the inner courtyard to the main room, and then to the shrine. Additionally, its spatial meaning is in line with this spatial sequence, from the secular space in the inner courtyard to the more symbolic main house, and finally to the shrine. At the same time, as the core of the family and the sleeping space for the elders, the main house has a higher symbolic value than the rooms for the younger generation on the east and west sides of the courtyard. The behaviors and habits associated with this value system are mainly reflected in activities such as ancestor worship and sacrifices that take place in the central hall.

Based on this spatial model, we first used an axis-type spatial schema in our design, retaining the basic inner courtyard and the main house on the north side, and connecting them through the axis. The main house still retains the layout of three-room for the living use of the whole family, while the dining room and kitchen are located on the east side. Due to the limitation of the site, the junior bedrooms are located on the second floor. The central hall in the center of the main house adopts a symmetrical layout. The desk is placed in the traditional style in the center of the north wall, and the incense burner and the altar for sacrifice are placed on it to highlight its sanctity. The living room and bedroom on both sides are adjusted according to the modern lifestyle. The living room adopts a modern layout, and the sofa and TV are arranged against the south wall and the north wall, respectively. The bedroom follows the traditional layout while taking into account the functional division to avoid mutual interference with the living room. Therefore, the bedroom and the central hall are flexibly divided by folding doors that can be opened during the day when you don't need to sleep and still form a traditional layout of three-room. When you need to sleep, you can close the door to avoid the interference of the living room. At the same time, for the convenience of connection between different rooms, the traditional semi-outdoor corridor was changed to an indoor corridor (Fig. 11.6).

This layout is a modernized transformation based on the traditional "three-room" layout. However, the local Han population is densely populated, unlike Inner Mongolia where the land is vast and the people are sparsely populated. Therefore, these modern resettlement houses have stricter land conservation requirements. This "three-room" layout occupies a large area, so it is not conducive to land saving. Except for a few large units, the size of the site given usually

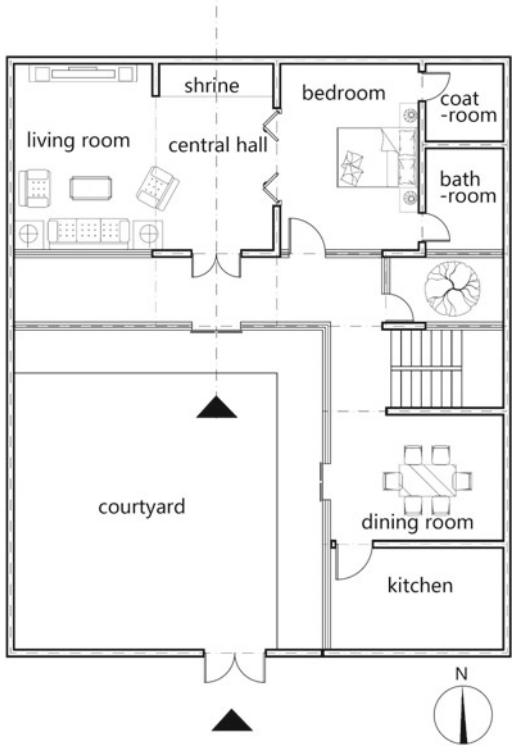

Fig. 11.6 The plan of our design incorporating spatial model of traditional "three-room" layout (drawn by author in 2022)

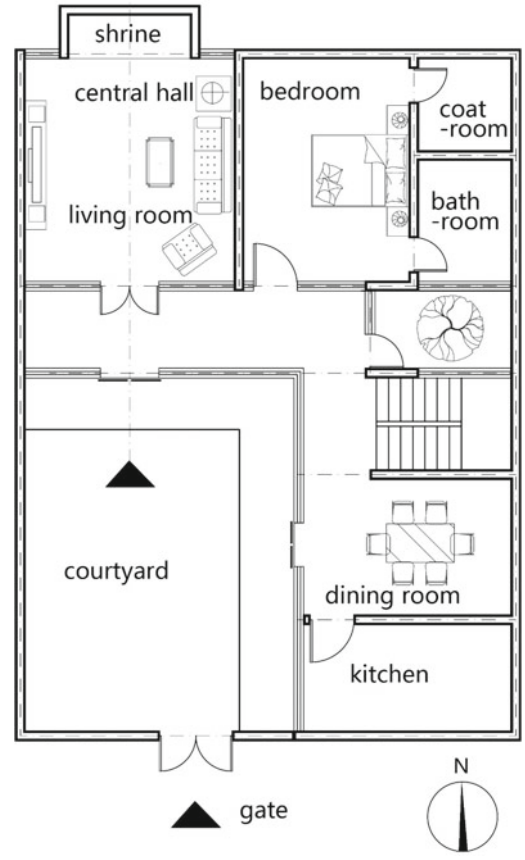

Fig. 11.7 The plan of our design incorporating spatial model of traditional central hall layout (drawn by author in 2022)

cannot meet this layout. Therefore, we have explored another method, that is, the central hall and the living room of the "three-room" are not arranged separately, but overlapped together. This method still retains the traditional axis-style spatial schema. The central hall is appropriately widened and arranged to face the inner courtyard. The wall on the north side of the central hall is made into an alcove, and the table for worship is arranged inside, and on the east and west walls, the sofa and television are arranged. In this way, the traditional spatial model is continued, and the core sacred space is retained, which not only satisfies the traditional ancestor worship activities and the psychological sense of ethnic belonging, but also meets the needs of modern daily life. The bedroom is arranged next to the living room, the kitchen and dining room are still arranged on the west side of the inner courtyard, and the junior bedroom is on the second floor (Fig. 11.7).

It can be seen from the above two cases that there are roughly two modes of combining the modern lifestyle with the traditional spatial model. The first mode is to modernize traditional space based on its spatial model and make it meet the modern lifestyle while retaining the ethnic tradition. The second mode is to overlap the modern living space with the traditional space structure and integrate the two so that the occupants can enjoy the modern lifestyle and gain ethnic self-identity and a sense of belonging.

11.5 Conclusion

At present, China is carrying out large-scale rural construction in order to improve the quality of rural space and life. However, the improvement of rural environment and life cannot be completely based on the perspective of modern architects who are accustomed to modern architectural design in cities, and focus more on visual aesthetics and design with universal values. Instead, architects should put themselves in the shoes of local ethnic groups to understand their spiritual world and traditional customs, and use this as a starting point to make tailor-made designs, so that residents can experience the freedom and comfort of "home" and self-identification of ethnic identity. Based on this idea, this article explores how to combine the two most typical spatial schemas of residential buildings with modern lifestyles. Of course, this kind of exploration is a preliminary study, and the case presented is not the only answer. With the variables related to the ethnic traditional ideas and customs in the residential building space being extracted through three levels from abstract to concrete, the inheritance of tradition can be avoided from being vague and superficial, and be based on the perspective of the occupants, so that people can truly feel a sense of belonging in the actual living. This method is the pursuit of this study. The three-level division makes the extraction method of this traditional spatial model more specific, and consequently more operable and more generalizable. At the same time, the research in this paper is only an exploration focusing on the living space inside, in fact, there are many aspects and a series of problems in buildings on how to respect the local ethnic groups. From a view of space, there are not only problems of living space within the family, but also a series of problems of the public spatial schema of residential settlements, and at the same time, there are also problems of architectural form and materials. This article only discusses the living space, but this does not mean that other problems do not exist. The real exploration is to establish a mechanism, which should be a process of gradual improvement in a continuous virtuous circle from plan to completion, from the feedback of use to design. Additionally, through exploring the balance between modern and tradition through constant reconciliation of various problems, finally, a reliable and more recognizable design solution will be achieved. Of course, this requires the long-term cooperation of architects, local residents, and policy makers.

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Part III
Ability

Hephaistos: A Phenomenological Approach to Inclusive Design

12

Martin Marker Boccardi Christensen
and Joshua Waterstone

Abstract

The paper; *'Hephaistos: A Phenomenological Approach to Inclusive Design'* is a critical reflection on collaborative working methods in architectural education. It can be seen as an incisive contribution to inclusionary design and its interface with 1:1 architectural projects within an academic context. With the objective 'to leave no one behind', a fundamental of inclusionary thinking, we designed and built four 'haptic' pavilions for the H22 City Expo, a design showcase for sustainable thinking and urbanism. Insight and focus were provided by our collaborators; four young people from The Danish Association of Youth with Disabilities (SUHM). The project was conducted in collaboration with first-year Architecture, Urbanism and Landscape students at the Royal Danish Academy School of Architecture and was allowed by and benefited with input from a number of collaborators, including Bevica Fonden, IKEA, Spacon and X, Dinesen and SUHM. The intention was to stimulate discourse relating to architecture's experiential potential, respective of diverse physical and mental abilities. Our objectives were achieved by engaging the phenomenological capacity of architecture, creating pavilions focussing on a broad spectrum of sensory experience; sound, sight, smell and touch. The intention was to challenge both the ocular-centric approach typical of abstract architectural thinking and primarily the standardised metric-based approach utilised in modern building regulation standards. Our intention was to reappraise their limitation instead, shifting focus to a more diverse body type and ability model. The paper illustrates how a collaborative working method with the inclusion of key insights from collaborators at critical design stages can reveal new, non-ocular, experiential potential, inclusive of a broader, more diverse user group. Both the built work and our subsequent critical reflection point towards the potential for greater design sensitivity through a heightened awareness of differing ability models.

Keywords

Phenomenology · Inclusive design · Haptics · Collaborative design · Sensory experience

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12.1 Introduction

The following paper describes the ambitions of the Hephaistos Project. In collaboration with The Institute of Architecture, Landscape and Urbanism at the Royal Danish Academy School of Architecture.

From the projects conception, we worked with the notion of sensory accessibility as a means of understanding architecture. Our intention was to stimulate discussion regarding architecture's experiential potential in a manner respective of diverse physical and mental abilities. We sought to achieve our objectives by embracing the phenomenological capacity of architecture; creating four pavilions focussing on sensory experience; sound, sight, smell and the haptic sense of touch. Collectively they can be seen as a family, arranged in a loose ensemble, they engage each other and the immediate context in which they are placed.

Our working method was based on a dialogue-based, peer to peer encounter with The Danish Association of Youth With Disabilities (SUHM). The question we engaged with was not to clarify 'Whether or not' what we developed followed simple design guidelines surrounding accessibility: The aim was to push the boundaries of material stimulation. Creating architecture that, in its phenological approach, would provide sensory accessibility.

The design process and execution has been democratic, without hierarchy, we have challenged conventional power structures within academia, allowing equal contribution by professors and students to the design process. The project was made possible by and in partnership with H22 City Expo, Bevica Foundation, IKEA, Spacon & X, Dinesen and SUHM.

Our approach was informed by Camilla Rhyl, who, in her work, defines the concept of sensory accessibility as equally important an aspect of universal design as physical accessability. Her research documents the importance of sensory experiences, with a particular focus on acoustic experience, as a decisive accessibility aspect for visually and hearing-impaired users.

The project was a direct response to SDG Goal 10; 'Sustainable Cities and Communities' and SDG Goal 12; 'Responsible Consumption and Production'. These were incorporated through the design of an 'urban plan' citing the project in Helsingborg and through the reuse and upcycling of offcut material, donated by our partner Dinesen (timber merchant) (Fig. 12.1).

> Sensory and multisensory aspects of architectural experiences as decisive to architectural quality has been investigated and elaborated on by many architects and researchers. Pallasmaa argues that all experiences of architecture are multisensory, even if we have lost the awareness of it in our contemporary mono-sensory and visual focus (Pallasmaa, 1996)
> -Camilla Ryhl

12.2 Inclusive Process

Our focus was on the design of an infrastructural teaching methodology, without hierarchy, the student cohort and teaching staff worked collaboratively. This process was dependent on a robust pedagogical methodology or active problem-based learning technique (Biggs 2012). Focus was placed on the abilities of the whole group and its collective ability to produce meaningful research. Our structure, a concise day planning method, was infrastructural in its intent. Detailed to the day over the 16-week programme, precise expectations regarding output, format and content type allowed students and the teaching body confidence to produce and appraise material effectively.

The intention of this correspondence was to utilise the skill and ability of the many, foregrounding material with critical content and refining incrementally. The emphasis on the collective over the individual sought to test the single authorship model typical of modern architecture. This methodological approach could be seen as discursive, infrastructural and democratic in its intent. The emphasis on the collective format necessitated speed and precision of communication between groups and programme leaders. Student responsibilities

Fig. 12.1 Isometric view Hephaistos installation H22, Helsingborg Sweden 2022. Image © Spacon & X

changed over the course of the programme from offering initial design perspectives to more focussed design input on building component parts. Reviews were frequent, bi-weekly, and students were encouraged to forego the typical participatory method of offering feedback first to the process.

The input of our collaborators, four young people representing SUHM with cognitive and physical disabilities, further focussed dialogue. Output was focussed on the physical entity; maquette, model and 1:1 construct were the formats chosen. Democratic and accessible to all these constructs shifted emphasis away from the digital format allowing collaborators access. Material could be touched, the full sensory potential exercised, this deliberate diversification, a shift from an optical emphasis asked questions of typical architectural media utilised at first year level and the importance of client and collaborator inclusion during project conception.

Our clients, IKEA and Spacon and X provided a counterpoint to SUHM's input. Curatorial insight and appraisal brought realism and objectivity to an internalised process focussed on studio discussion and workshop production. Client, workshop technician, user group collaborator and academic input completed an alternate

Fig. 12.2 Haptic façade panel displaying natural faults in the wood suspended on bespoke aluminium hanging system. ©

information input model informed by industry rigour. The inclusionary working method designed and implemented, trusted in the potential of the group and its collaborators. The facilitation of peer to peer and collaborator knowledge sharing and review allowed decisive input at the project's conceptual stage and throughout its design development. From this process, a haptic architecture emerged incorporating material innovation, craft method and precision in execution (Fig. 12.2).

> In some cases, the absence of sensory accessibility requires people to leave a given space, even if absolute physical accessibility is present. Access to sensory aspects of the architectural experience is shown to be of such importance that the concept of sensory accessibility must be included on the accessibility agenda and given high priority
> -Camilla Ryhl

See Figs. 12.3, 12.4, 12.5, 12.6 and 12.7.

12.3 Haptic Experience

Exploring Sensory Potentials

The following chapters focus on the four sensory focal points previously described. Each chapter begins with a short introductory text produced by the students themselves. The texts give insight into how each group approached their subject and gives clues as to how their experiments should be understood, in this way, the students defined their own architectural premise and boundaries from within which the projects grow (Fig. 12.8).

12.3.1 Haptic Experience Smell

Smell

'The sensory impression of scent has a direct connection to the part of our limbic system that affects us emotionally. This project wishes to investigate the sense of smell in architecture; how to embody smell within different materials, such as timber and textile, and how to evoke the dusty, sweet smell of the already existent Douglas fir.

We have developed a specific blend of essential oils mixing the scents of fir, bergamot flower, grapefruit, and sage for the pavilion. By concurrently amplifying the scent of pine, we hope to draw attention to the sensory qualities of the palette of materials. Simultaneously, one of the key principles of this pavilion is sustainability in relation to materials and tectonics.

We have developed a design principle for the cladding of the pavilion which is made solely with cut-off remnants of Douglas fir planks and textile cord, without bolts or glue.

We have worked towards developing a scent profile that evokes a certain atmosphere within the space. Mediated by small timber objects in the panels as well as infused cotton threads, the scent inhabits the pavilion. By adding a few

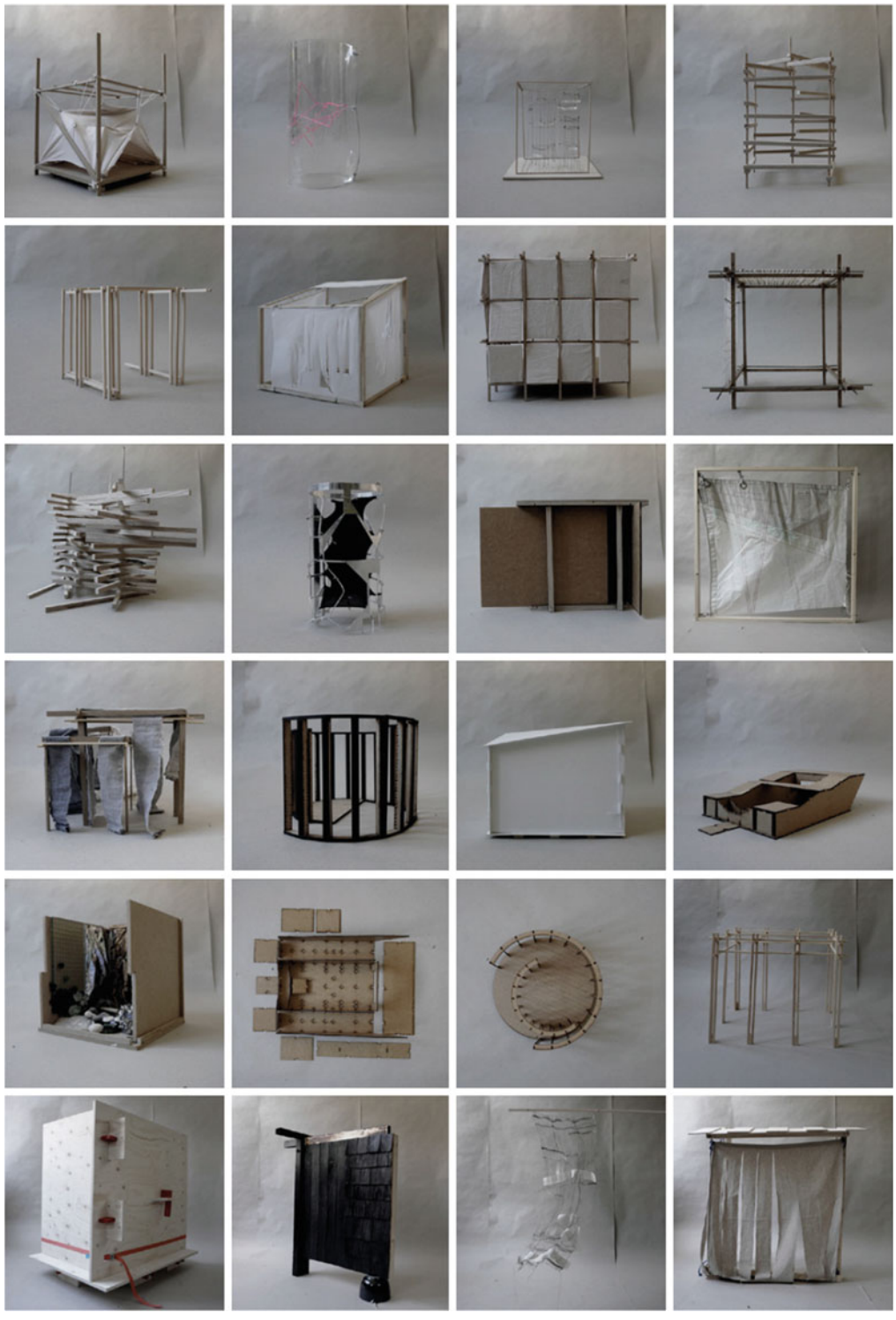

Fig. 12.3 Model studies in card, timber and paper capturing initial studies at concept studies at scale 1:10. ©

Fig. 12.4 1:1 craft in the academies wood workshop allowed input from SUHM collaborators to inform an evolving design process. Material exploration evolved intuitively. Workshop view ©

Fig. 12.5 Students present 1:1 working models and scale models to collaborators from SUHM. Input and critical reflection at the concept stage informed a collaborative design process. Workshop view ©

drops of our scented oil to the hollowed wooden objects existent in the panels, the scent releases itself with its atmospheric ambience within the inner space of the pavilion. The scent is brought to life by the touch of the wind which brings movement to the scent-infused bundles of cotton thread hanging from the panels (Figs. 12.9, 12.10, 12.11, 12.12, 12.13 and 12.14).' Quote; Smell Group, first year KOM Institute of Architecture Landscape and Urbanism, The Royal Danish Academy.

12.3.2 Haptic Experience Light

Light

'With light as our focus, we have tried to explore how visuals can affect our well-being. For most of us, sight is the most prominent sense, and even blind people often rely on different levels of light in their surroundings.

How our surroundings appear affects our mood and emotions. You want to be in a suitable environment whether it is to concentrate or to

Fig. 12.6 Students present 1:1 working models and scale models to collaborators from SUHM. Input and critical reflection at the concept stage informed a collaborative design process. Workshop view ©

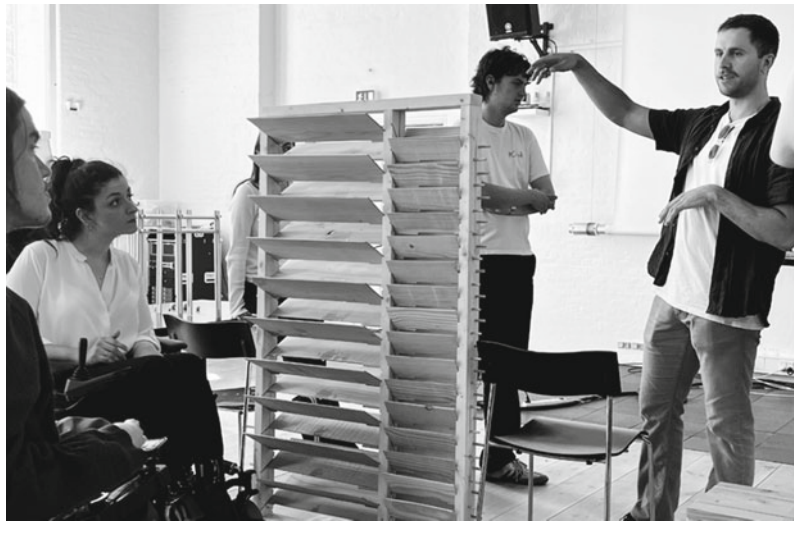

Fig. 12.7 The sound sensory group presents a 1:1 mock-up of the facade system to collaborators from SUHM. Feedback and input at the conceptual design stage informed design development and detail. Workshop view ©

Fig. 12.8 The smell pavilion, installation view on site, H22, Helsingborg, Sweden. Installation view ©

rest. Therefore, it has been a process of continually discussing different solutions. The most crucial point has been the relationship between stimulation and rest (Figs. 12.15, 12.16 and 12.17).' Quote, Light Group, first year KOM Institute of Architecture Landscape and Urbanism, The Royal Danish Academy.

12.3.3 Haptic Experience Sound

Sound

'The sound of the space, the noise of the place. The silence of the resonance, the melody of the audial dance. Through the ears, our surroundings are seen. Through architecture, the making of a sound machine. In the shadow to the power of the eyes The melody evolves, the rhythm arise Through the rhythm we understand The silence of the ball in the hand.

Sometimes sounds occur naturally as a result of the surroundings, and sometimes sounds can be created intentionally. The drop of the ball creates an intentional rhythm, a sound of interaction. The wind passes through the pavilion, and a new kind of hum is present. The two sounds sing together in our presence, but once we leave, the rhythm of the ball will be silenced. Left is only the melody of the wind (Fig. 12.18).' Quote, Sound Group, first year KOM Institute of Architecture Landscape and Urbanism, The Royal Danish Academy.

> Listen! Interiors are like large instruments, collecting sound, amplifying it, transmitting it elsewhere.
> -Peter Zumthor

See Figs. 12.19, 12.20, 12.21 and 12.22.

12.3.4 Haptic Experience Touch

Touch

'There is a world of sensory experiences at your fingertips. Close your eyes and trace the patterns engraved in the wood. What do you see with the tips of your fingers?

Haptic perception refers to the ability to acquire perception through a moving subject's active exploration of surfaces and objects; our body and its movements being the vessel which in its exploration learn about the surrounding world. The forces experienced through touch are translated by our brains into illusory shapes with perceived qualities. Qualities such as size, weight, texture, consistency and temperature are almost instantly recognised and perceived by our minds. The choice of material, treatment and scale are at the core of curating the haptic experience.

Try looking around. What would the objects around you feel like if you licked them (Figs. 12.23, 12.24, 12.25, 12.26, 12.27, 12.28, 12.29 and 12.30)?' Quote, Touch Group, first year KOM Institute of Architecture Landscape and Urbanism, The Royal Danish Academy.

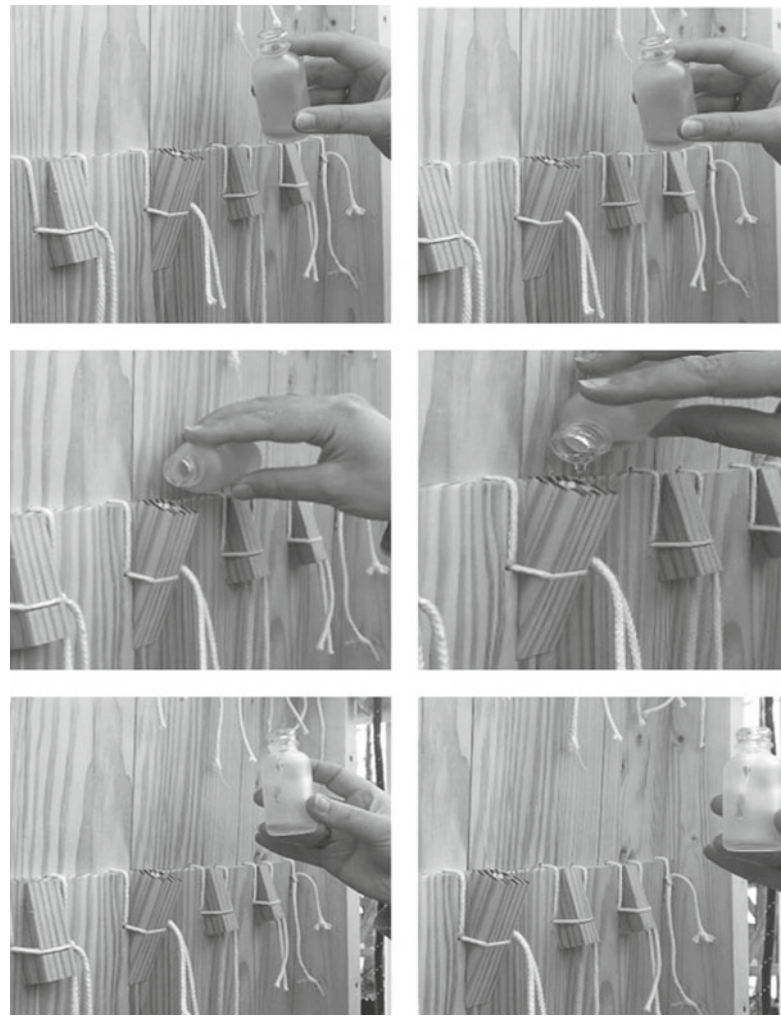

Fig. 12.9 The smell pavilion, installation view, oil diffuser test, on site H22, Helsingborg, Sweden. Installation view. Image ©

12.4 Inclusive Process

Sustainability as Working Methodology and Culture

Hephaistos describes sustainability as a holistic working methodology; an opportunity to reconcile the technical, cultural and environmental ambitions of architecture. Through an ongoing dialogue, our definition evolved to encompass, sustainability as intention, sensitivity to material waste, material character, provenance and artistic expression. Critical to this understanding was the architectural potential to engage a diverse range of abilities, 'to leave no one behind'. We considered our 'making' focussed working method as a vehicle for achieving these sustainable goals. The emphasis on making in a holistic manner,

Fig. 12.10 The smell pavilion, installation view, diffuser detail, on site H22, Helsingborg, Sweden. Image ©

from the project's conception to its completion, was a deliberate response to the intangible, concept-led approach still popular in some contemporary architectural practice. Focus on material characteristics and artistic potential was realised through handcraft and machine methods in large-scale model format and 1:1 as the design process evolved. Onus was placed on the group to engage the material reality. Engineering and optimisation regarding material use, section size and ratio were understood through an ongoing

Fig. 12.11 The smell pavilion, installation view, stitching detail, on site H22, Helsingborg, Sweden. Image ©

Fig. 12.12 Detail section study, scale 1:20, of planed douglas shingle system. Image ©

collaboration with the project engineer. Intuitively detail emerged from the material available.

Our approach, to introduce the students to material reality, expediency, upcycling and reuse was intended to complement newly learnt fabrication methods. High-quality material offcut, furniture grade Douglas fir from Germany's black forest, provided by our collaborators at Dinesen, required care and consideration. Planing, machining, staining and jointing techniques were applied. Naivety revealed unforeseen qualities. Senses were engaged through the application. Craft as an architectural discipline was foregrounded, drawing and optics subordinated momentarily. The emphasis on the physical object at scale was a provocation to ourselves as a collective to engage in craft methods inherent in woodwork and in turn their phenomenological potential. Our hope was to allow the handmade process to engage a more diverse ability model through a broader sensory experience.

Hephaistos has been democratic in its intent. We see this co-authored model as Sustainability, 'as working method'. A deliberate departure from the single author model preferred by professional practice, we challenged conventional power structures and hierarchies, redefining roles and responsibilities. The collective potential to author and execute meaningful research in built form was within the context of our project a definition of sustainability. A working model based on democratic values, sustainability as a holistic, whole project approach reticent of material, method, culture and human engagement. The heart of this experimental design process was the inclusion of our collaborators from SUHM, with their insight, we have discovered the most profound learnings. The real inclusive design begins with the inclusion of those we design for (Fig. 12.31).

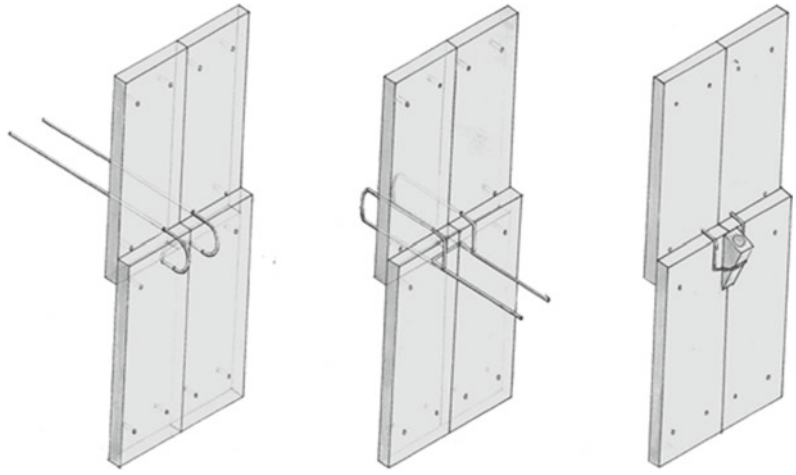

Fig. 12.13 Isometric diagram of modular demountable bound shingle plates, knot technique and timber vessel for essential oil. Image ©

Fig. 12.14 Smell pavilion; interface detail illustrating roof, beam and cladding arrangement. Sensory panel system fixed with proprietary stainless-steel suspension system. Image ©

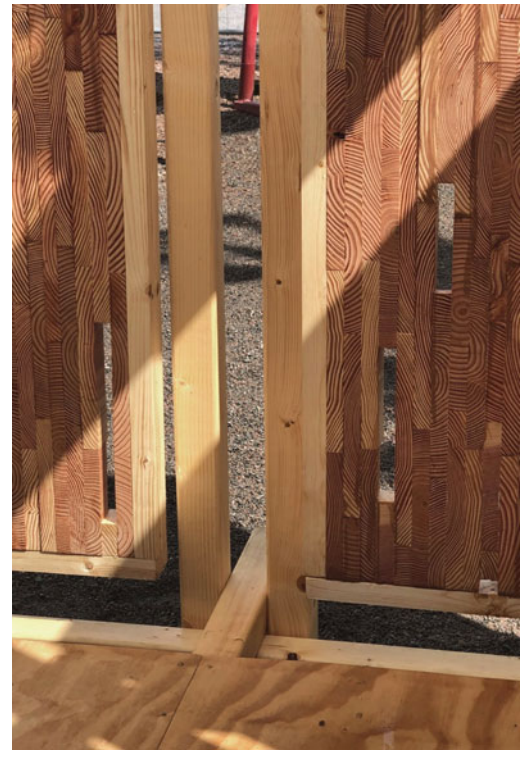

Fig. 12.15 Light pavilion; interface detail illustrating cladding arrangement. Sensory panel system fixed with a proprietary stainless-steel suspension system. Image ©

Fig. 12.16 A single aperture in the canopy is a metaphorical reference to the pavilion's sensory theme. The canopy a collage of up-cycled sails is demountable, it refers to the academy's maritime location. Image ©

Fig. 12.17 Douglas fir strips are butted to present their expressive end grain. Apertures in the panel arrangement frame views of the landscape beyond. Image ©

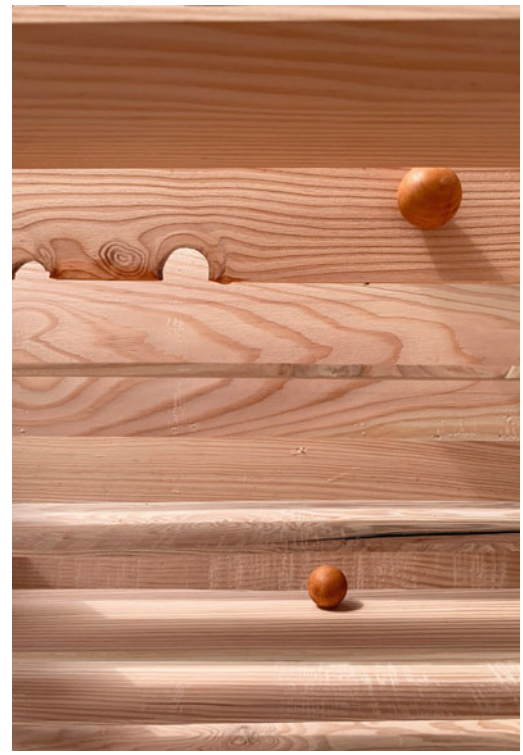

Fig. 12.18 Detail of sound pavilion, haptic cladding panel. Image ©

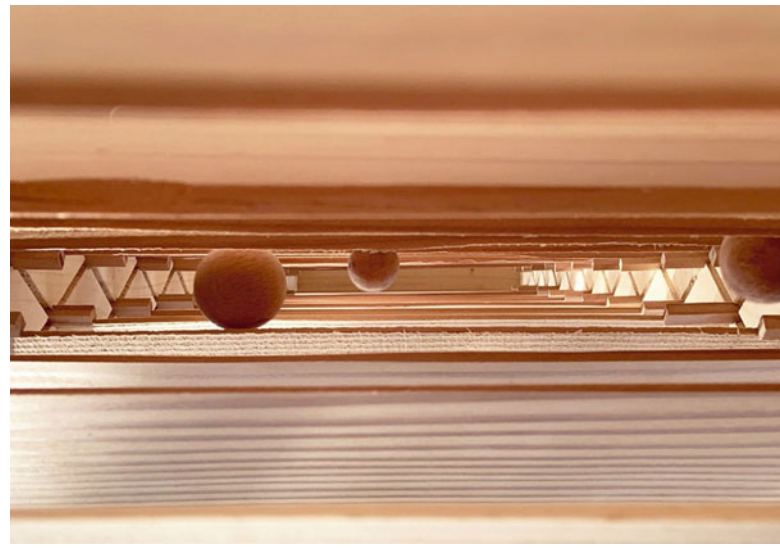

Fig. 12.19 Spherical timber objects pass between Douglas plates, the façade system acts as both a screen and operative acoustic system. Image ©

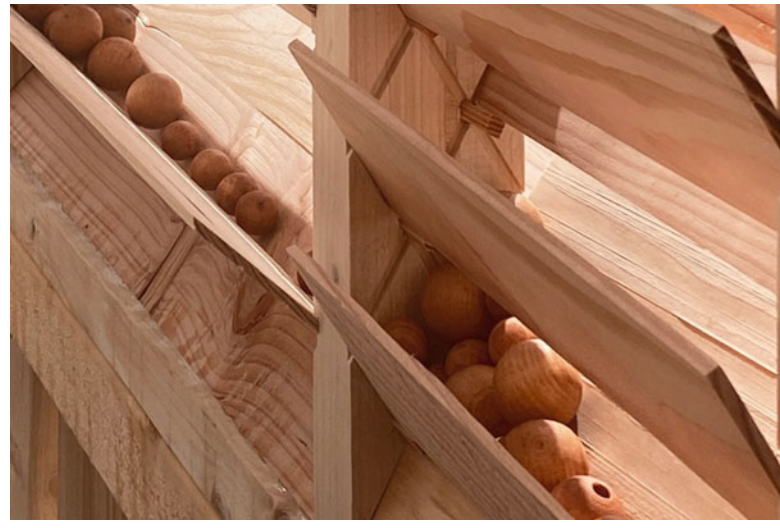

Fig. 12.20 Spherical timber objects collect at the base of each facade component: The filtering of light and sound captured within the volume of the facade. Image ©

Fig. 12.21 Spherical timber objects collect at the base of each facade component: The filtering of light and sound captured within the volume of the facade. Image ©

Fig. 12.22 Spherical timber objects collect at the base of each facade component: The filtering of light and sound captured within the volume of the facade. Image ©

Fig. 12.23 A natural fault in the Douglas timber facade element; machine processing and natural form combined to graphic effect. Image ©

Fig. 12.24 A natural fault in the Douglas timber facade element; machine processing and natural form combined to graphic effect. Image ©

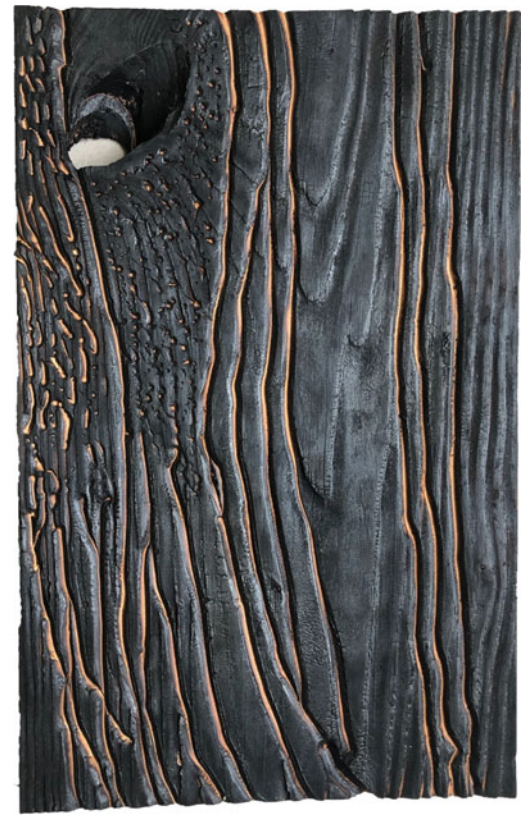

Fig. 12.25 A material treatment experiment using a torching technique referred to as Shou Sugi Ban creates tactile effect. Image ©

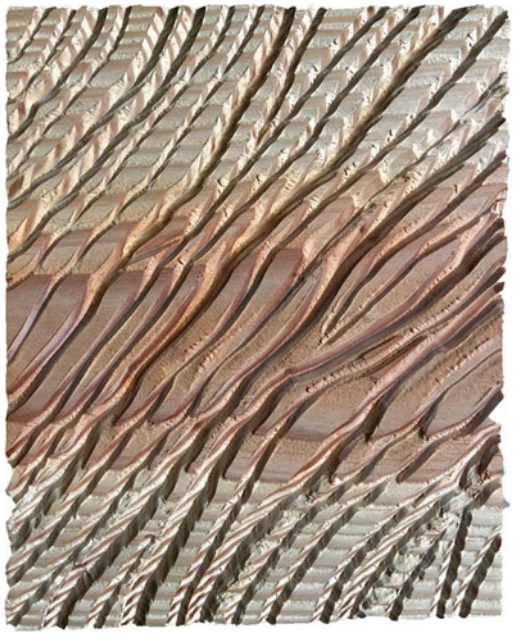

Fig. 12.26 A material treatment experiment using a machining tool creates tactile effect. Image ©

Fig. 12.27 A material treatment experiment using a machining tool creates tactile effect. Image ©

Fig. 12.28 Drawing exercise exploring contours within the wood grain. Image ©

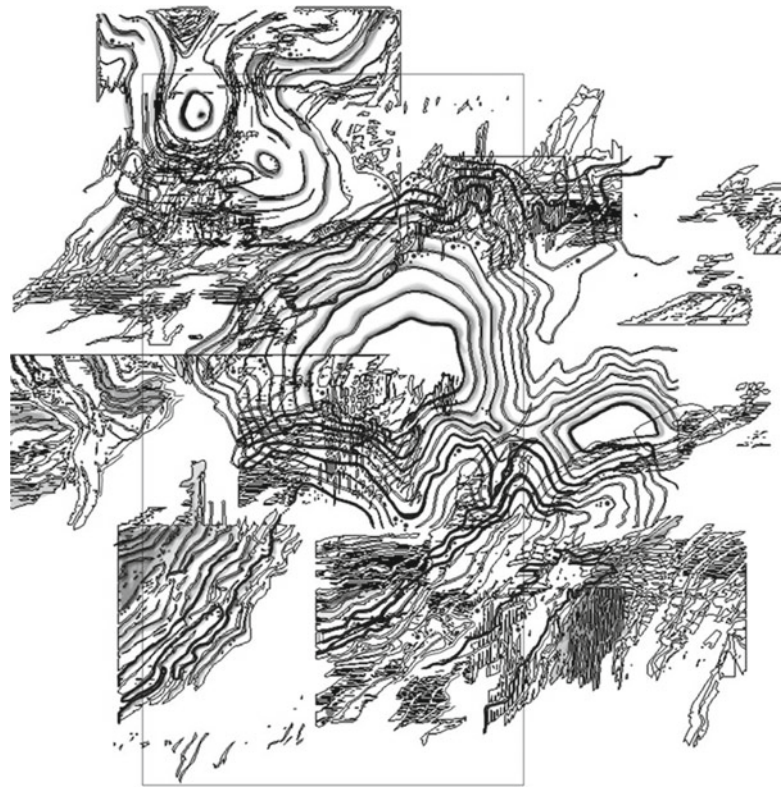

Fig. 12.29 Drawing exercise exploring densities of relief within handcrafted timber cladding elements. Image ©

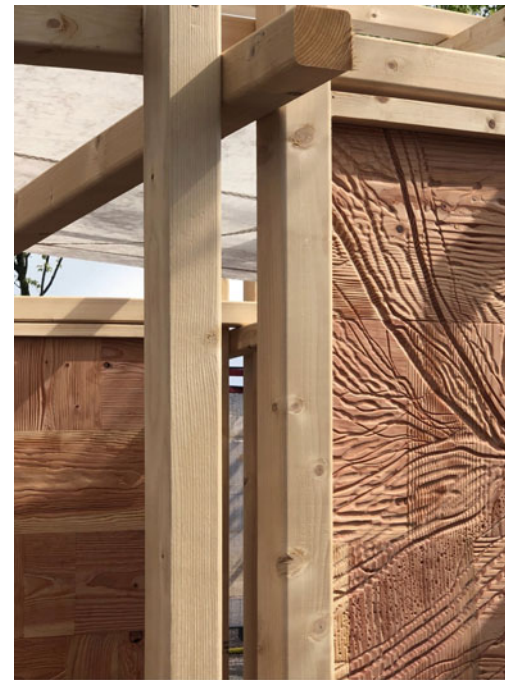

Fig. 12.30 Cladding and structural frame interface detail. The demountable assembly allowed handmade elements to be placed within a pre-assembled framing system. Image ©

Fig. 12.31 Pavilion and furniture installation view, H22, Helsingborg, Sweden 2022. Image © All images: Institute of Architecture, Urbanism and Landscape, Royal Academy of School of Architecture

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13 The Inaccessible Nature of Accessible Nature—How the Concepts of Behavioural Settings and Affordances Can Support the Design Process of Physically and Socially Inclusive Natural Environments with a Potential Health- Promoting Effect for People with Mobility Disabilities

Stine Bekke-Hansen, Gaochao Zhang, Sus Sola Corazon, and Ulrika Stigsdotter

Abstract

Research has confirmed that natural environments can offer many health benefits. However, a large group in society, people with mobility disabilities, are often hindered from gaining these benefits. Enhancing physical accessibility to natural environments is important, but in our opinion, not enough. This position paper addresses the importance of incorporating social inclusiveness in accessibility solutions in natural environments. We present a framework based on theories on affordances and behaviour settings that can guide the design process of inclusive, accessible, natural, and health-promoting environments for people with mobility disabilities. The development of the framework is based on quantitative and qualitative results achieved from a several-year-long research project concerning the design and use of a forest trail for people with mobility disabilities. The framework allows for the integration of two key opposing factors: *naturalness* and *accessibility*. The framework also integrates the important and often overlooked factor of *social inclusion* when designing health-promoting natural environments. Landscape architects must understand their project sites as not only physical spaces, but also as social and emotional spaces. Implementing this framework can support our endeavours to achieve the Sustainable Development Goals and the Leave No One Behind agenda.

Keywords

Evidence-based design · Health design · Human health · Landscape architecture · Leave no one behind · Naturalness · Physical accessibility · Preferences · Social accessibility

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13.1 Introduction

13.1.1 Natural Environments Can Be a Health Resource for People with Mobility Disabilities

Nature is often, by nature, inaccessible. Uneven terrain, dense vegetation, and rushing water give the visitor a feeling of naturalness, but often exclude people with mobility issues from participating on an equal footing with able-bodied people. In landscape architecture, we could argue that this exclusion is an unavoidable consequence of the nature of nature. However, in this paper, we argue that taking a closer look at our practice concerning both physical and social accessibility in natural environments can support health and quality of life for people with mobility disabilities.

We know that visits to natural environments can improve mental, physical, and social health by supporting psychological restoration and stress alleviation (Zhang et al. 2017). Furthermore, they can reduce lifestyle diseases by encouraging increased physical activity and nurture social interactions and a sense of community (ibid.). We know that, compared with the able-bodied population, people with mobility disabilities are more at risk of experiencing both psychological and physical health-related problems, social isolation, and a lower quality of life (Stigsdotter et al. 2018). Despite showing the same preferences for nature as the able-bodied population, people with mobility disabilities visit nature less frequently and risk being left behind, not gaining the health benefits associated with nature visits (Moore et al. 1996; Brown et al. 1999; Lovelock 2010; Corazon et al. 2019). According to the World Health Organization (WHO), approximately 15% of the world's population experience some form of disability, and mobility disabilities are among the most common (WHO 2021). A disability can be permanent or transitory, congenital or acquired, and the need for assistive devices can vary. However, a physical impairment does not necessarily cause a disability. Disability is experienced when the physical environment does not meet individual needs, posing obstacles to physical and social inclusion (Gramkow et al. 2021). Whether a physical impairment is experienced as a disability thus depends largely on environmental features, which highlights the importance of landscape design as a way to support the UN 2030 Agenda for sustainable development, where the principle of Leaving No One Behind is especially relevant (UNSDG 2022).

With this paper, we aim to support health and quality of life for people with mobility disabilities by presenting a conceptual framework that can be implemented in an evidence-based design process and that can guide the design of physically and socially inclusive green spaces. We base the framework on the qualitative and quantitative results gained during an ongoing research project, Move Green, which began in 2015. The project is developing evidence-based solutions for accessible natural environments that support positive nature experiences and health. The project culminates in the construction of the full-scale "Move Green Nature Trail", an accessible and health-promoting trail in a forest-like environment (planned for 2023–24).

13.1.2 Setting the Scene—for Social Inclusiveness in Accessibility Solutions

Several design manuals on accessibility for people with mobility disabilities exist, often with the intent of providing architects with information on how to design an environment free of physical barriers. However, during our research in health-promoting access to nature for people with mobility disabilities, it has become clear to us that, though physical accessibility is a *necessary* requirement, it is not a *sufficient* one. Even the best accessibility design solutions can lead to social exclusion, as illustrated below (see Fig. 13.1).

Imagine a family outing of parents and two children to a forest. One parent uses an electric

Fig. 13.1 Sketch illustrating the fictive family outing

wheelchair due to an impairment. When entering the forest there are two options: 1. a trail for trekking on natural terrain, and 2. a path accessible for people using wheelchairs. The family members without a mobility disability opt for the trekking trail, walking closely together. The trail ascends a hill by following the naturally steep terrain and the family members experience the sounds and smells that result from their moving through the terrain, brushing vegetation growing on the edges of the trail. The wheelchair-using parent takes the accessible path. The path is elevated above the ground to avoid rough terrain and steep slopes. The path takes a gentle route around the hill and is surfaced with grey gravel to make it even and non-slippery.

This is a hypothetical, but realistic example based on testimonials and observations of accessible design solutions gathered through our research. An often-mentioned example is that parallel paths going through the environment are not perceived as part of nature, because either the choice of material or the placement in the landscape prevents immersion in nature and a sense of community, leaving a feeling of being separated from the physical and the social setting (Corazon et al. 2019). Arguably, the two paths in our example do not allow for the same experience of nature, but more importantly, the accessible path lacks qualities that are important for a positive experience in nature and that are necessary to elicit positive feelings and health-promoting benefits for the visitor (Stigsdotter et al. 2017).

13.2 The Framework

To counter the above experience, we must embrace both the physical and the social environment when designing accessible, inclusive, and health-promoting landscapes, which means we need a conceptual framework to guide our understanding. In the area of ecological psychology, Harry Heft (2001, 2007, 2018, 2020) suggests combining the concepts of "affordances" and "behaviour settings" to understand how people and environment interact in both a physical and social sense. This helps us recognize the environments we design as both physical and social entities understood in relation to the individual, supporting a broad definition of inclusiveness in our design.

13.2.1 Physical Compatibility

Affordance theory, developed by the psychologist James J. Gibson (1979/1986) as a theory about perception, has been used in various fields of design and landscape architecture—notably because of its strong emphasis on the transactional perceiver–environment relationship. In landscape architecture, the theory has frequently been used when designing environments for children (More and Cosco 2010, Refshauge et al. 2015), but, to our knowledge, affordance theory has not been applied in targeting accessible and health-promoting natural environments for people with mobility disabilities.

Affordances are perceived qualities of the environment that support actions for an individual. What we perceive is mutually defined by the environment and our body and perceptual system. Our perception is attuned to both *exteroception* (the perception of the outer world) and *proprioception* (the perception of our own body). This means that we not only perceive the world, but also ourselves *in* the world, constantly picking up information about possibilities and constraints for action—with the body we possess, and in the environment we inhabit (Gibson 1979/1986). On a practical level, when working with accessibility for people with mobility disabilities, this means that the qualities of the landscape must be defined in relation to the user's abilities, skills, and bodily proportions. Many features of the environment can cause inaccessibility. These features can be natural, such as sloping terrain, tree stumps, and soft or sandy grounds. In addition, these can be design features such as handrails stopping too early on stairs, gates needing two hands to open, hedges with narrow openings, sudden steps on trails and crossings, or lack of maintenance leaving stacks of wet leaves on the ground. All these features can cause inaccessibility, as they do not accommodate bodily functions such as low mobility, strength, and balance, as well as issues concerning the manoeuvrability of assistive devices, primarily wheelchairs, but also canes and walking frames. The latter points to the fact that assistive devices provide some of the most basic physical support for people with mobility impairments. Consequently, in describing affordances in natural environments, it can be necessary to understand the body and the assistive devices as an integrated unit.

13.2.2 Personal Intentions and Preferences

An affordance is not only a question of physical compatibility with characteristics of the environment; the perception of affordance is tied to our needs and personal intentions (Kyttä 2004; Menatti and Casado da Rocha 2016). Needs and intentions when visiting a natural environment almost always relate to something more than being able to physically navigate the landscape. Physical accessibility, in itself, is not the goal, but a prerequisite for enabling preferred activities and experiences in nature. This means that we must try to uncover the preferences, intentions, and emotions connected with activities in nature. Do we want to create a smooth path for moving fast so that visitors with a mobility disability can keep up with companions, or do we want a rougher path, affording closer contact with the natural terrain? On a physical level—moving on paths—the actions are almost the same, but on an emotional level, they can be very different.

In the Move Green project, we have focused on what defines a positive nature experience for the target group, in order to design affordances that meet both physical and emotional preferences. Since the research field on nature and human health targeting people with mobility disabilities is still in its infancy, it is difficult to make firm conclusions. We base the following preferences on a qualitative interview study consisting of six group interviews with 24 participants in total. The study identified four preferred experiences: 1. being in a pristine environment, 2. having close physical contact with nature, 3. having diverse sensory input, and 4. being able to choose companionship with other people or seclusion according to one's needs (Corazon et al. 2019). Unfortunately, our participants often pointed to the absence of these experiences rather than their presence. The first

three preferences relate to the relationship between the environment and the individual, and they can be investigated through the concept of affordances. However, the last preference, potential companionship, highlights an important facet of the nature experience; it is often a social endeavour. As one of our participants aptly described it: "You see many people there, but I and other persons with disabilities are prevented from going there because the path is too difficult" (Corazon et al. 2019, p. 8). This quote contains more than the apparent physical barrier preventing access to the environment and the preferred activity. There is also the feeling of exclusion from other people, from the social environment. Accessibility is not only concerned with the removal of physical barriers. It is also a question of feeling an integral, rather than a peripheral, participant in the setting at hand.

13.2.3 The Social Environment

The perception of affordances is embedded in a sociocultural context (Rietveld and Kiverstein 2014; Menatti and Casado da Rocha 2016; Heft 2018). Affordances can carry cultural and social meaning, and by social learning, we attune ourselves to the "proper" use of artefacts and environments around us (Heft 2007), picking up information that transcends purely physical possibilities and constraints for action. This means that even when we are alone, the perception of our surroundings can have a social aspect and, we will argue, an inherent assessment of the social position one is able to assume in that environment. This assessment is reinforced by the actions of people surrounding us, and when focusing on both physical and social inclusion, we see a strength in adding an explicit concept describing how environment and social behaviour interact. Following Heft, we can consider affordances as nested within behaviour settings, constituting roughly what is known as the "milieu" of the setting (Heft 2018, 2020). Behaviour settings theory was developed by the psychologist Roger Barker (1968) as a theory about social behaviour in groups, and for our purpose, the main structure of the setting and the concept of penetration are especially relevant. A behaviour setting consists of the physical characteristics of the environment, the milieu, and the standing pattern of behaviour associated with the specific setting (Heft 2018, 2020). This means that the possibilities and constraints for action are partly defined by the affordances in the setting, and partly by the inherent expectations of behaviour that are continuously being maintained by people in the setting when they act in ways expected. People can assume more central or peripheral roles in the setting, meaning that they have more or less influence over what happens in the setting, also known as the degree of penetration (Barker 1968).

13.3 The Tipping Point

Examining our interview study (Corazon et al. 2019) through the concept of behaviour setting and affordance theory, we find a "tipping point" where accessibility solutions change the character of the behaviour setting and create an almost parallel behaviour setting. Two things seem to occur: 1. If the design solutions are too clearly "marked" as accessible (e.g. bright signs denoting "handicap path"), the behaviour setting can lose its meaning as a natural environment. It stops affording naturalness and accessibility takes precedence over the nature experience, no longer matching the preference for experiencing a pristine environment; 2. If the actions needed to perform the activities in the behaviour setting are markedly different for people with mobility issues, such as the parallel path in our previous example, it becomes harder for people with mobility issues to assume an influential role in the setting. Despite being able to physically navigate the environment, they cannot participate fully in the behaviour setting, as the affordances of the environment only support physical, and not social, accessibility.

13.4 How to Design for Social Inclusion

The conceptual framework of affordances and behaviour settings can be integrated into an evidence-based design process. In the design of the Move Green Trail, we have applied the Evidence-Based Health Design in Landscape Architecture (EBHDL) process model (Stigsdotter and Sidenius 2020), see Fig. 13.2. The model is centred around human–nature relationships, corresponding well with the understanding of the human–environment relationship we present here, and it provides a systematic and transparent overview of the design process (Stigsdotter and Sidenius 2020; Gramkow et al. 2021).

The EBHDL model consists of four steps: "Evidence collection", "Programming", "Design", and "Evaluation".

In step 1, evidence relating to target group, health, environment, and use of nature is collected. Using affordance and behaviour setting theory as a theoretical framework can guide the type of questions asked and information gathered. Information can be gained in ways already used by landscape architects, such as scientific literature, interviews with the target group, behavioural mapping, and workshops with professionals. Applying a theoretical framework pinpoints the elements that need to be investigated, that is, how physical, social, and personal factors interact with the environment producing behaviour and experiences. We need to know who wants to visit the environment and why, and we need to understand what actions will support their needs and intentions. Through this process, our users' needs, abilities, and preferences emerge and we gain knowledge about what type of behavioural setting our design is supporting.

Step 2 has three parts: a. statement of the design aim; b. formulation of evidence-based design criteria; and c. description of design

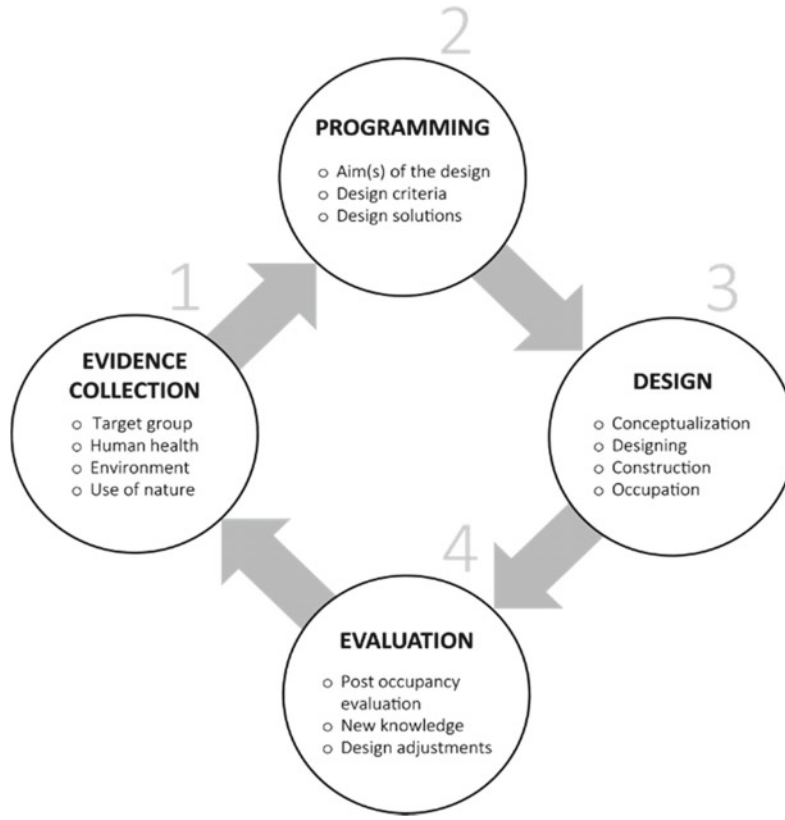

Fig. 13.2 The EBHDL model (reproduced from Stigsdotter and Sidenius 2020)

solutions. One of the important learning points from the Move Green project in step 1 has been that the design for physical accessibility must be integrated into the natural environment (Corazon et al. 2019; Gramkow et al. 2021). The accessible natural environment can never be natural in the sense of untouched or inartificial, as accessibility entails altering the landscape. However, we can aim to integrate solutions without compromising the perceived overall experience of naturalness. The design of the Move Green Trail has focused on designing affordances that allow for an experience of "pristineness", "close physical contact with nature", and "diverse sensory experiences", while preserving accessibility. This means choosing materials that blend into the landscape but are firm enough to support movement; letting the existing trees and bushes determine the route of the trail and keeping the trail level with the surrounding terrain (Gramkow et al. 2021). Mimicking for example a forest floor entails creating affordances that support both safe movement and exploration, a balance that is dependent on structures in the environment, bodily strength, manoeuverability of supportive devices, and experience, which means that for some individuals the affordances may be directly perceivable, but for others the affordance can appear "hidden" (Gaver 1991) and it may take support like signage or companionship to tune in to the action possibilities. Accommodating the need for social inclusion entails looking at the environment as a behaviour setting in which the affordances support social accessibility as a central feature. Simply put—there should be one design for use by all. If parallel solutions are created, we risk loosening the knots of the behaviour setting, or at the very least placing people with mobility disabilities on the fringe of the setting, removing possibilities for equal participation.

The third and fourth steps of the EBHDL will be implemented during the construction phase and beyond, as the Move Green Trail undergoes ongoing research and evaluation. The third step has four parts: a. conceptualization; b. design development; c. construction; and d. occupation. The fourth step, evaluation, has three parts: a. post-occupancy evaluation (POE); b. knowledge derived from the POE; and c. design adjustments. From a health design perspective, it is crucial to continually evaluate the effects of the design, both in relation to the physical structures and in relation to the potential effects on health experienced by the users (Stigsdotter and Sidenius 2020; Gramkow et al. 2021).

13.5 Conclusion

We constantly perceive information about possibilities and constraints for action with the body we have been given. Since assistive devices are basic support for many individuals with mobility disabilities, it can be necessary to understand the body and the assistive devices as one unit when designing accessible natural environments. According to affordance theory, affordances are perceived qualities of the environment that support actions for an individual. This means that the qualities of the natural environment must be defined in relation to the user's abilities, skills, and bodily proportions. However, making natural environments physically accessible for people with mobility disability does not automatically mean the visitor feels like an integral participant, which stresses the importance of social inclusiveness in accessibility solutions.

The person–environment relationship is embedded in a social and cultural context, which can be understood with the help of the behaviour setting theory. A behaviour setting consists of the affordances and the behaviour pattern associated with the specific setting, and our design affects both. Our key message is that some accessibility solutions differ so much from the natural environment that the naturalness is lost, leading to a tipping point where a parallel accessible behaviour setting occurs. When this happens, the accessible natural environment no longer offers nature experiences matching the visitors' preferences, hindering social inclusion and possible health benefits. If the landscape only allows for physical inclusion, it may not promote the health of visitors since it may lack the affordances to meet their emotional and social needs, given that

health is physically, mentally, and socially interrelated.

Hopefully, the theoretical framework and examples from the Move Green project can promote design solutions that create equal opportunities for nature experiences with a potential health-promoting effect, aligning the design process with the "Leave No One Behind" agenda.

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Becoming Inclusive

14

Graeme Bristol

Abstract

In his 'Letter from a Birmingham Jail', Martin Luther King pointed out: 'Injustice anywhere is a threat to justice everywhere. We are caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly, affects all indirectly'. We cannot address sustainability nor meet the 17 SDGs unless we recognise that 'network of mutuality'. As such, the concept of inclusivity is central to the success of the Sustainable Development Goals. This has been argued successfully in many UN documents, the OHCHR. It is also core to the implementation of Kofi Annan's UN reforms (A/51/950, 14JUL97) and, indeed, now plays a significant role in World Bank policies—a 'rights-based approach' to development. Inclusion is usually focused on overcoming discrimination—a direct connection to human rights (UDHR, Art. 7). As architects, that connection to rights can be seen indirectly in building codes relating to accessibility. However, there is more to inclusivity in design than compliance with accessibility codes. How does the profession navigate the implementation of a broader construct of inclusivity? How do we overcome 'othering' in the institutions and practice of architecture? I argue that the principles of human rights help to open that broader understanding of inclusivity. There are several areas where architecture and human rights overlap and where the profession might be more effective in supporting the 17 SDGs. I argue that there are at least six intersections: participatory rights, cultural rights, accessibility rights, housing rights, environmental rights, and workers' rights.

Keywords

Human rights · Architecture · United Nations · Rights-based · Inclusion

14.1 Introduction

Before I started architecture school, I read Ayn Rand's The Fountainhead (1994). It undoubtedly influenced my thinking as I entered my first year but not, I imagine, quite what Rand might have expected. I found myself siding with Ellsworth Toohey, the socialist architecture critic, rather than the 'hero', Howard Roark. After all, blowing up the housing project he had anonymously designed because it had been aesthetically compromised in his estimation seemed, shall we say,

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excessive on the part of the author to make a point about the principles and integrity of a particular individual, however, talented.

It raised several issues in my young mind about the purpose of architecture. One of those questions—one that hounded me through architecture school and beyond—is a question raised by the organizers of the UIA call for papers:

> What is an architect´s role, potential and responsibility, in creating environments that are either inclusive or exclusive?

In addressing that question, Howard Roark is hardly a useful role model. He was decidedly exclusive, more likely solipsistic. His example, though, raises some useful points about our understanding of the role of architecture in society. Ayn Rand, through Roark, suggests that the architect's social responsibility has a very low or no priority when in conflict with aesthetic principles. There can be no compromise between those principles and the need for housing people (much less the utter waste of resources). The 'heroic' principles must stand, and the building must be sacrificed. Certainly, this would fail to meet the Sustainable Development Goals (SDGs) and any other social or environmental standard or value.

It does, however, raise the point about the way architects view their value to a society and a culture. We like to think of architecture as an art and a science. We can return to the triad of Vitruvius ([1960])—firmitas, utilitas, and venustas, or as Wotton translated it: firmness, commodity, and delight. Its structural integrity, its utility, and its aesthetic pleasure. Its 'utility' moves architecture beyond the art ('delight') and science ('firmness') into the realm of its usefulness to users or, in a larger context, its value to a society. It is here we enter the messy realm of ethics, of responsibility (both personal and social), of the 'common good'. It is in this arena that our understanding of the relationship between architecture and inclusion becomes important.

In granting the profession a monopoly over a certain area of knowledge and skill, society expects something more of a profession than it does of other human activity. There is an additional level of responsibility a professional must exhibit—not just of skill and knowledge, but in a responsibility to the 'common good'. Unfortunately, that term is very broad and highly ambiguous. Who defines it and how is it defined? Most of these questions are open-ended and subject to change. This is the arena of ethics. Why should architecture not just passively address inclusion but actively pursue it?

In his 'Letter from a Birmingham Jail',[1] Martin Luther King pointed out: 'Injustice anywhere is a threat to justice everywhere. We are caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly, affects all indirectly.'

This is not a stance Howard Roark/Ayn Rand could abide. In acting as a responsible professional, though, it is one we must embrace. One of the means by which that 'network of mutuality' is expressed is in our common understanding of human rights and the drafting of the Universal Declaration of Human Rights (UDHR)[2] by the UN after the Second World War.

The theme of the UIA World Congress in Copenhagen in 2023 concerns the SDGs, and the actions architecture can take to support those goals. I want to argue here that the profession's approach to inclusion is critical to our support of the SDGs and, critical to inclusion, are the principles of human rights.

When addressing the Sustainable Development Goals, then, I see several necessary connections which must be described—the connection between SDGs and inclusion, between SDGs and human rights, between SDGs and architecture, and the relationship between architecture and human rights. These relationships are, for our profession, a significant part of the network of mutuality and so a significant tool in making our contribution to meeting the SDGs effective.

14.1.1 SDGs, Inclusion, and Human Rights

In its '17 Goals to Transform Our World', the UN outlines 17 SDGs.[3]

1. Ending poverty
2. Ending hunger
3. Ensuring healthy lives
4. Ensuring quality primary and secondary education for all
5. Gender equality
6. Access to clean water and sanitation
7. Access to affordable clean energy
8. Decent work
9. Inclusive/sustainable industrialization and infrastructure
10. Reduce inequality
11. Inclusive, safe cities
12. Responsible production and consumption
13. Urgent action to combat climate change
14. Ocean conservation
15. Land conservation
16. Promote just, peaceful, and inclusive societies
17. Partnerships.

Because I am arguing here about how it is that the architectural profession becomes more inclusive, I am first interested in how the UN sees inclusivity in the context of the SDGs and then how the UIA organizers have viewed the term in the context of their overall theme.

14.1.1.1 The UN, the SDGs and Inclusivity

In their online document '17 Goals to Transform Our World', variations on 'inclusive' are mentioned in 8 of the 17 goals (4, 5, 8, 9, 10, 11, 16, and 17) but not defined. In their overview document 'Transforming our world: the 2030 Agenda for Sustainable Development',[4] it is mentioned 40 times but not defined. However, another UN document, 'Realizing the SDGs for All: Ensuring Inclusiveness and Equality for Every Person, Everywhere'[5] the concept of inclusion receives a more thorough treatment by expanding on the 2030 Agenda pledge 'that no one will be left behind'. Clearly, this occurs at the local level as well as the global, within communities as well as between countries.

If we are to ensure inclusiveness, we must understand the root causes of exclusion in society. Of course, the causes are overlapping and multitudinous. As 'Realizing the SDGs' points out:

> . . . without addressing the root causes of exclusion and poverty, guaranteeing food and nutrition security, ensuring access to quality and equitable education and lifelong learning, universal health coverage, as well as fighting climate change by protecting the environment, its goods and resources, no inclusiveness, equality or empowerment will ever be possible.

Further, the document makes clear that the 17 goals are 'universal, integrated and interrelated'. The UN views human rights in much the same way—universal, interdependent, and indivisible.[6] As such we cannot talk about a 'hierarchy' of the SDGs or of the Universal Declaration of Human Rights (UDHR).[7]

While this is not a paper intended to cover the root causes of exclusion and poverty, it is important to note here the centrality of the promise to 'leave no one behind'—a commitment by the UN member states to 'end discrimination and exclusion, and reduce the inequalities and vulnerabilities that leave people behind and undermine the potential of individuals and of humanity as a whole'.[8] Ending discrimination is central to the concept of inclusion and central to the UDHR (see Art. 2 and 7).

14.1.1.2 The UIA and Inclusivity

In its description for Panel 5 'Design for Inclusivity',[9] the UIA adds to the SDG's definition of inclusivity. It outlines eight areas of concern to the practice of architecture: gender, race, ability, neurodiversity, age, poverty, the non-human, and intersectionality. Now, the first six of this list are focused on ending discrimination in each of those categories. The last on the list, 'intersectionality' relates well to the interdependence of the goals, and it reinforces the understanding that we are not one-dimensional creatures. All these areas of concern are related to one another, and we all are included in them in one way or another.

The one addition that the UIA makes here about inclusion is the 'non-human'. While the 17 SDGs reference the non-human, they do so within the context of their value to humans. For example, Goals 14 and 15 refer to the conservation of the sea and the land—'conserve and sustainably USE the ocean...' The UIA's addition here speaks more directly to the value of the natural environment in itself:

> . . . an awareness to the needs of non-human actors not only on the level of the discipline´s critical role in urban ecology, but also by including non-human´s subjectivities in the built environment[10]

We must, then, raise the issue not just of our (human) rights to a clean and sustainable environment but the rights OF the environment itself[11]—a prospect of which the profession must be more aware. The rights of nature[12] or 'wild law[13]' must be unpacked further and considered as an additional responsibility of the profession. This is hardly a new responsibility. We have been talking about these issues since the publication of Our Common Future[14] in 1987. However, we have been almost entirely focused on technical solutions to problems of energy efficiency in buildings, the reduction of GHGs in materials and production, and so on. These are not to be considered secondary.[15] They are important but not to the point of ignoring the social impact of SDGs and architecture's responsibility towards those impacts. Inclusion is a critical part of our professional responsibilities.

14.1.1.3 SDGs and Architecture

Inclusion is usually focused on overcoming discrimination—a direct connection to human rights (UDHR, Art. 2 and 7). A typical response of the profession has been to suggest that dealing with such issues as discrimination and exclusion are the responsibility of the State, not the architectural profession. This response was highlighted in the 2014 response of Zaha Hadid to the deaths of workers on the site of her Al Wakrah stadium in Qatar. This was, for her, not an issue with which architects have any duty.

> I have nothing to do with the workers, she reportedly said. I think that's an issue the government – if there's a problem – should pick up. Hopefully, these things will be resolved.[16]

This is, in a way, an understandable response. The State does have that responsibility to its citizens. That does not mean, however, that a professional has no power to act, even in States where regulations are lax. Of course, those regulations must be improved but that does not absolve a professional of responsibility. We become professionals, recognized by the State as such, to take on responsibilities beyond those of the ordinary citizen. Our legal monopoly over that set of skills comes with the price of additional responsibilities to our fellow citizens, whether we are working in the US, the UK, or Qatar. We must address our social responsibilities along with our technical responsibilities. Understanding our social responsibilities is a more difficult and ambiguous task than are our technical responses to the issues of SDGs. We will tend to look at those 17 goals and see ourselves fitting in only on a technical level. We will tend to look first at Goals 6 and 7 (clean water, clean energy) or 11 (safe cities) than we are to look at Goals 1 and 2 (ending poverty, ending hunger) or Goal 4 (quality education). Like Hadid, we might be prone to say that the latter are problems that must be dealt with by the State. The skill set of architects does not include solutions to the eradication of hunger or poverty. However, if we accept the fact that they are all interdependent and interrelated, we must be aware of the impact of potential solutions in one area might have on the problems in another area. It is no longer possible to put specific solutions in a silo as if solving one problem does not have the potential of creating another.

We need to be able to see specific solutions through a more inclusive, interdependent lens to be able to reduce unintended negative effects. I believe that inclusive lens is a rights-based approach (RBA) to development.

As architects, that connection to rights can be seen indirectly in building codes[17] relating to

accessibility. However, there is more to inclusivity in design than compliance with accessibility codes. How does the profession navigate the implementation of a broader construct of inclusivity? How do we overcome 'othering[18]' in the institutions and practice of architecture? And, more directly, how do the SDGs relate to human rights?

14.1.1.4 Sustainability and Human Rights

We cannot address sustainability nor meet the 17 SDGs unless we recognise that 'network of mutuality'. The concept of inclusivity is central to the success of the Sustainable Development Goals. This has been argued successfully in many UN documents, particularly the OHCHR.[19] It is also core to the implementation of Kofi Annan's UN reforms (A/51/950, 14JUL97[20]) and, indeed, now plays a significant role in World Bank policies—a 'rights-based approach[21]' to development.

14.1.1.5 A Rights-Based Approach to Development

In the 1997 UN reforms,[22] the UN Secretary-General, Kofi Annan, intended to mainstream human rights into the fabric of all UN agencies. The principles by which this was to be implemented were outlined in the 'The Human Rights Based Approach to Development Cooperation Towards a Common Understanding Among UN Agencies'[23]: 'universality and inalienability; indivisibility; inter-dependence and inter-relatedness; non-discrimination and equality; participation and inclusion; accountability and the rule of law'. As with all other UN agencies, the UN Sustainable Development Group is committed to these principles.[24] This is now true of most multilateral agencies and international NGOs. Other civil society organizations (CSOs) are integrating with national and international funding agencies like UNDP and the World Bank by adopting the RBA. In addressing the SDGs, the UIA should be doing the same.

14.2 Architecture and Human Rights

I argue that the principles of human rights help to open that broader understanding of inclusivity. I also suggest that, as a CSO, the UIA should be aligned with the UN on a rights-based approach to development as it already is with UNESCO and architectural education.

But how is that implemented? Again, as mentioned above, the first response we are likely to have to the 17 SDGs is that we, as a profession, have little to do with the eradication of hunger and poverty. A common response to being presented with the words 'architecture and human rights' is to imagine that our profession has little to do with Amnesty International, political persecution or torture. Having come to such an erroneous conclusion, the profession can safely dismiss the prospect of any connection between architecture and human rights.[25]

However, in my own work over the last 30 years, I see many connections and I believe a better understanding of the interface between the profession and human rights puts us in a much better position to respond effectively not just to the SDGs but to all our design efforts with clients and communities.

There are several areas where architecture and human rights overlap and where the profession might be more effective in supporting the 17 SDGs. I argue that there are at least six intersections: participatory rights, cultural rights, accessibility rights, housing rights, environmental rights, and workers' rights.

14.3 Participatory Rights

Following from Sherry Arnstein's seminal article, The Ladder of Citizen Participation (1968),[26] a critical aspect of the relationship between the practice of architecture and human rights is that citizens have the right to participate in the decisions about their own built environment. It was

recognized as a right at the first UN Habitat conference in Vancouver in 1976[27] and further argued in a paper for the 2021 UIA Congress in Rio.[28] It is also critical to any democracy, yet another form of inclusion. There are many methods which promote effective participation and, as Arnstein points out in her article, many means by which planners, politicians, and the development sector seek to subvert participation —what Arnstein refers to as 'tokenism'.

14.4 Cultural Rights

Much of a society's culture is rendered invisible by our singular focus on what might be called 'official culture'. Much of that official culture is represented by the built environment. One has only to look at the UNESCO World Heritage List. Nearly 78% of the total 1134 sites on the list are buildings or cities—the work of architects. The first criterion for such a designation is that they 'represent a masterpiece of human creative genius'.[29] This is an important activity of UNESCO and one that is supported by the architectural profession through ICOMOS[30] (International Council on Monuments and Sites).

Hasan Fathy, the Egyptian architect, pointed out quite clearly in his book Architecture for the Poor[31] that there is also a vernacular culture well worth protecting or reviving.

Indeed, this too is about inclusion and about the right to culture—a culture defined not just by experts but by the community itself. This commitment to a culture of a place was evident after the 2004 tsunami in Thailand and in the Pom Mahakan community[32] in Bangkok. It has also been made evident in Tottenham, with resistance to development by the Latin diaspora,[33] and in Vancouver by the resident Chinese community[34] there. In both examples, the communities won their argument against the developers, the planners, and city hall.

14.5 Rights of Access

When we think about inclusion and rights of access, the first thought to rise in the minds of architects is likely to be the addition of design for disabilities in building codes. While this has not been viewed as a human rights issue in the design professions generally, it certainly is. This was made clear in the case of Avalon Chrystie Place,[35] a condominium project in New York City. The developer and architects had followed the requirements of the NYC building codes but had failed to address the human rights legislation concerning discrimination against people with disabilities. It was a costly oversight precipitated by the belief that compliance with the building code was enough. Ignorance of governing human rights legislation in the Fair Housing Act proved to be costly.

However, in terms of rights of access, I believe there is much more to that right than regulations governing discrimination concerning disabilities. The right of access should also consider the 'right to the city'.[36] This includes access not only to political participation (Art. 8) but also the right to information (Art. 6)[37] and the right to infrastructure services such as water, sewer, public transport (Art. 12, 13). As a profession, we should be aware of these developments, their relation to inclusion and their impact on our participation in the SDGs.

14.6 Housing Rights

This was a starting point for me in exploring the relationship between architecture and human rights. I was an architecture student during the UN Habitat conference in 1976 and was able to spend time at the Habitat Forum. I learned more there, I would say, than I did in much of my formal architectural education. This was so, in part, because I had no exposure to these ideas in

architecture school. I learned something about the Universal Declaration of Human Rights (UDHR) and, in particular, Art. 25 and the right to housing. That led to a long-term investigation[38] about the connections there might be between what I was learning in school and how it is that the profession responds to that right. I was learning something about housing in architecture school, but I was learning nothing about the relationship between the design of housing and the right to housing. I learned about that connection from people like John F.C. Turner at the UN Habitat Forum.[39]

With the growth of tent cities and slum communities not only in developing cities around the world but also in most cities in the developed world, the profession is going to have to face our obligations to respond to the right to housing in more effective ways than we do at present.[40] This, of course, related directly to the SDG Goal #1, the eradication of poverty and leaving no one behind.

14.7 Environmental Rights

Since the publication of Our Common Future (1987), the profession took on a number of issues of the environmental impact of our work. Some architects—then at the fringes of the profession—started taking on that responsibility much earlier with the first Earth Day[41] (1970) and the Stockholm conference[42] on the environment in 1972.[43] Much of this work, though, is limited in terms of environmental rights.

There are two growing areas of environmental rights which the profession must consider—environmental justice[44] and the rights OF the environment.[45]

The first relates to inclusion and current discrimination in access to a clean environment. The second relates to the rights of nature itself to exist—the non-human form of inclusion referred to in the UIA call for papers.[46]

14.8 Workers' Rights

As mentioned in 2.3 above, Zaha Hadid denied any responsibility for the workers on the site for which she was the prime consultant. We must do better. In most developed countries, there are regulations in place to protect workers on the site. This is hardly the case in the rest of the world despite ILO agreements.[47] This, though, is not just about conditions for workers on the site. It is about the conditions for their families and their children[48]—many of whom live and play on construction sites. We have a responsibility to ensure the safety not just of workers on site but their families living on such sites or in nearby camps. This, too, relates to inclusion.

14.9 Conclusion

There are two main points I wanted to argue here:

- There is an important relationship between our understanding of 'inclusion' and human rights.
- For the profession to effectively address inclusion in the SDGs, we must, like the UN itself, put this in the context of a rights-based approach.

I would say, further, that we must start integrating the RBA into the curriculum of architecture schools and into the continuing professional development of working professionals. The UIA's new Work Programme, 'Community Architecture and Human Rights[49]' is certainly a place to start that process.

Notes

1. https://www.africa.upenn.edu/Articles_Gen/Letter_Birmingham.html (accessed 22SEP22).
2. https://www.un.org/en/about-us/udhr/drafters-of-the-declaration (accessed 05JAN23).
3. https://www.un.org/en/exhibits/page/sdgs-17-goals-transform-world (accessed 03JAN23).

4. https://sdgs.un.org/2030agenda (accessed 22 SEP22).
5. https://sustainabledevelopment.un.org/content/documents/23216Together_2030__Position_Paper__HLPF_2019.pdf (accessed 22 SEP22).
6. See https://legal.un.org/avl/ha/udhr/udhr.html (accessed 22SEP22).
7. See https://www.un.org/en/about-us/universal-declaration-of-human-rights (accessed 01 OCT22).
8. https://unsdg.un.org/2030-agenda/universal-values/leave-no-one-behind (accessed 01 OCT22).
9. https://uia2023cph.org/science-track/science-panels/design-for-inclusivity/ (accessed 01 OCT22).
10. https://uia2023cph.org/science-track/science-panels/design-for-inclusivity/ (accessed 25 SEP22).
11. Heidegger makes an important contribution to this argument in his essay "The Question Concerning Technology" in making the point about our perception of nature as 'standing-reserve'. When we use the term 'resources' to refer to nature, we 'enframe' our understanding of nature as 'standing-reserve'. Nature is reified as commodity. As such, it is without rights independent of their use to humans.
12. See, for example, https://celdf.org/rights-of-nature/ (accessed 01OCT22) Also, BOYD, David (2017) *The Rights of Nature.*
13. See, for example, https://www.wildlaw.org/about (accessed 01OCT22) Also, CULLINAN, Cormac (2011) *Wild Law.*
14. See https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (accessed 01OCT22).
15. For more on the relationship between technology and SDGs see also https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/NAD_EBG/54b3b39e25b84f96aeada52180215ade/b8ce50e79b574690886602169f4f479b.pdf (accessed 04OCT22).
16. https://www.arabianbusiness.com/industries/construction/it-s-not-my-duty-push-qatar-labour-rights-says-zaha-hadid-541578#.Uyqss4UVeT8 (accessed 04OCT22).
17. https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/accessibility (accessed 01 OCT22).
18. See, for example, https://www.theguardian.com/inequality/2017/nov/08/us-vs-them-the-sinister-techniques-of-othering-and-how-to-avoid-them (accessed 22SEP22).
19. https://www.ohchr.org/en/sdgs/about-2030-agenda-sustainable-development (accessed 22SEP22).
20. https://archive.globalpolicy.org/images/pdfs/renewing_the_united_nations.pdf (accessed 22SEP22).
21. https://unsdg.un.org/2030-agenda/universal-values/human-rights-based-approach (accessed 22SEP22).
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23. Available online at https://unsdg.un.org/sites/default/files/6959-The_Human_Rights_Based_Approach_to_Development_Cooperation_Towards_a_Common_Understanding_among_UN.pdf (accessed 01OCT22).
24. See https://unsdg.un.org/2030-agenda/universal-values/human-rights-based-approach (accessed 01OCT22).
25. It should be noted here that the American Institute of Architects has now included in its Code of Ethics the recognition of human rights – see Ethical Standard ES 1.4 in the 2020 Code of Ethics and Professional Conduct, https://content.aia.org/sites/default/files/2020-12/2020_Code_of_Ethics.pdf
The UIA has yet to include a similar statement in its Accord on 'Recommended International Standards of Professionalism in Architectural Practice'.
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No. 4, July 1969, pp. 216–224. No. 4, July 1969, pp. 216–224. Available online https://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation_en.pdf

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28. Bristol, Graeme (2021). 'Participation is a Right'. International Proceedings of the 27th World Congress of Architects. https://www.acsa-arch.org/chapter/participation-is-a-right/
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34. https://vancouversun.com/opinion/op-ed/opinion-105-keefer-is-a-bigger-conversation-about-culture-in-vancouver
35. See https://www.justice.gov/archive/usao/nys/pressreleases/October10/avalonsettlementpr.pdf
36. The World Charter for the Right to the City (https://www.uclg-cisdp.org/sites/default/files/documents/files/2021-06/WorldCharterRighttoCity.pdf).
37. The Urban Resource Centre in Karachi has been focused on the provision of important urban development information to vulnerable communities since its inception in 1989. See https://urckarachi.org/introduction/ (accessed 14JAN23).
38. See Bristol, Graeme (1994) MASA thesis "Architecture and shelter: the roles and responsibilities of architects in meeting basic needs" (https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/831/items/1.0086675).
39. In particular his books Freedom to Build (https://www.scribd.com/document/357582616/Freedom-to-Build-John-Turner) and Housing by People (https://library.uniteddiversity.coop/Ecological_Building/Housing_By_People-Towards_Autonomy_in_Building_Environments.pdf).
40. See also Bristol, Graeme (2007) "Cambodia: The Struggle for Tenure" (https://issuu.com/glb049/docs/casestudies/1) and "Strategies for survival: Security of tenure in Bangkok" (2007) Case Studies in *Enhancing Urban Safety and Security: UN-Habitat Global Report on Human Settlements* 2007. Also, https://www.bangkokpost.com/thailand/general/917553/architecture-expert-lauds-mahakan-fort-community
41. https://www.earthday.org/history/
42. https://www.un.org/en/conferences/environment/stockholm1972
43. See https://www.un.org/en/conferences/environment/stockholm1972
44. See, for example, https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-justice. Also see the work of Robert Bullard (https://drrobertbullard.com/).
45. We can expect much more legislation concerning the rights of nature. For example, the rights of rivers (e.g., - https://apnews.com/article/religion-sacred-rivers-new-zealand-86d34a78f5fc662ccd554dd7f578d217). This can be traced back to the minority opinion in Sierra Club v Morton (https://caselaw.findlaw.com/us-supreme-court/405/727.html) of 1972 and the Christopher Stone article "Should Trees have Standing: Towards Legal Rights for Natural Objects" (https://iseethics.files.wordpress.com/2013/02/stone-christopher-d-should-trees-have-standing.pdf).
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48. See 'Bamboo School' under https://architecture-humanrights.org/projects/, particularly 'Report to Funders'.
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Exploring Disability as a Creative and Critical Challenge to Design Norms

15

Jos Boys and Masashi Kajita

Abstract

Through a shared dialogue the co-authors of this paper aim to rethink disability as a creative generator for architectural designers rather than as a 'problem', and as a challenge to norms about which bodies matter and which don't in the design of the built environment. Using a process of iterative questions and answers, through written and online conferencing formats, we developed a set of key themes that can inform future work in this field. These are: the importance of centring creativity, both in terms of disability as a concept, and in relation to diverse disabled people as creative experts in negotiating built environments not designed for them; the potential value of focusing in on everyday social, spatial and material practices so as expand access and inclusion through an emphasis on enabling 'small pleasures'; re-thinking the frameworks and methods we can use for mapping and analysing diverse bodies in space; connecting disability and inclusion to low-tech, sustainable and adaptable improvements of built space, including the design of inclusive services; and exploring how learning and practicing inclusivity is not only about teaching design principles and guidance, but also about changing current educational and professional modes of practice.

15.1 Introduction

This article was co-written through a process of sharing initial questions for each other by email, followed by an online recorded dialogue at the beginning of November 2022, and then a shared re-ordering of material around key emergent themes over time. Our conversation has grown out of a long-term informal shared interest in rethinking access and the built environment through the lens of disability as a creative generator rather than as a 'problem' for designers. Thanks to funding from the Bevica Foundation it is now possible to develop this approach more formally, through research, teaching and other collaborations over the next three years. This discussion, then, has been an opportunity to share, clarify and communicate our position(s) as a starting point for ongoing disability, access and inclusion activities. Our aim here is to produce a collaborative argumentative essay, as an initial manifesto for next stage developments, and to engage wider stakeholders and audiences in co-exploring how this work should be taken forward.

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15.1.1 Disability and Creativity

Author 1: Something we both centre in thinking about and researching disability, access and inclusion is how to go beyond it just being an 'add-on' at the end of architectural design processes—as merely a functional, technical and legal problem that restricts 'normal' creative processes. Rather, we both start from seeing disability as a creative generator for design and as a challenge to normative design practices. Can you talk about what this means to you?

Author 2: I am interested in seeing disability less 'conventionally' because at the intersections of architecture and disability there are so many negative connotations. It is very often about the problems for disabled people, about physical barriers and how to remove them. Removing barriers is important—however, despite all the hard work here, it seems a very slow process. What, then, is preventing things from changing? This made me search for potential conceptual frameworks and models that enable a deeper questioning of what built environment professionals 'normally' do. Using tools such as Iwarsson's Housing Enabler Model (Iwarsson 1999) or Froyen's Users-Built Environments Model (Froyen et al. 2009) for example, allows us to study person-environment relations by observing, describing, and analysing the accessibility and usability of contextual spatial situations. And yet, they still focus on limited aspects of human diversity and are framed around a 'disabling mechanism'—reproducing normative assumptions about disability in a negative way.

So, it is important to shift the focus more to enabling dimensions or 'small pleasures', emphasising more nuanced understandings of disability and centring creativity. This has become a foundation for teaching inclusion at the Royal Danish Academy—architecture, design and conservation in Copenhagen. This is why you and The DisOrdinary Architecture Project were invited to come to the Academy in 2018, as part of our 'Different Bodies' 2-week workshop for 142 new master students at the Institute of Architecture and Design. At this workshop, the students were challenged to create collective experiences that celebrate different bodies and their manifold interactions with material and immaterial environments, facilitated by disabled artists from your platform[i] (Fig. 15.1).

1: Doing this workshop with Royal Danish Academy students was a great collaboration for The DisOrdinary Architecture Project. Our mission is to explore new models of practice for the

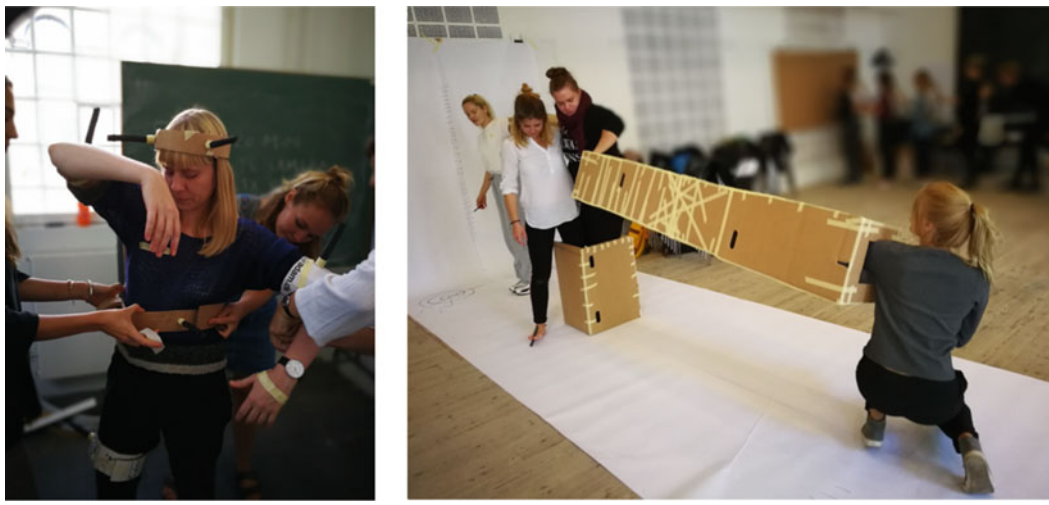

Fig. 15.1 Examples of student work in progress at DisOrdinary Architecture Project workshop for the Danish Royal Academy of Design Copenhagen, September 2018. Alterator activity, facilitated by disabled artist David Dixon. Photos: David Dixon

built environment, led by the creativity and experiences of disabled artists. I have been particularly influenced by disability studies scholarship, activism and creative arts practice, much of which critiques commonplace architectural assumptions about accessibility in the built environment (See for example Titchkosky 2011; Boys 2014; Hamraie 2017; Boys 2017; Williamson 2019; Gissen 2023). For me a key point is that access and inclusion is always relational, that is, it depends on the situation—whose body and mind is engaging in what spatial and social encounter. There is no 'one size fits all' solution. As Alison Kafer shows, disability never occurs in isolation, it is always already part of how a society labels diverse bodies (Kafer 2013). Another seminal disability studies scholar, Rosemarie Garland-Thomson, uses ideas of 'fitting' and 'mis-fitting' to examine how we interact differentially with objects, spaces and encounters; dependent on whether we fit or not (Garland-Thomson 2011).

These have been important conceptual frameworks that underpin our approach. Rather than offering access 'solutions', DisOrdinary focuses on promoting the value of our neuro- and bio-diversity as a creative generator for designers; and as an approach that challenges existing design norms. The idea is that focusing in on moments almost everyone has felt of misfitting in different situations and places, can open up awareness of how particular spaces work to 'disable' some and 'enable' others; as well as offering creative design opportunities.

15.2 On Everyday Experiential Pleasures

1: This connects directly to your interests in 'enabling dimensions' and 'small pleasures' of disability. Can you explain a bit more about what you mean by everyday small pleasures?

2: This relates to Alison and Peter Smithson's sketch series 'Small Pleasures of Life' which explores a subjective, episodic perception of specific qualities of everyday living (Smithson and Smithson 1994). The drawings illuminate functional themes, but at the same time stimulate the senses of pleasure and leave room to imagine the moments of happiness that exist in everyday life. These lovely sketch drawings, introduced to me when I was an undergraduate student, inspired me when I was considering how we should move away from focusing on "how architecture excludes" and get closer to discuss "how architecture can include".

If you are not steady on your feet, you keep your eyes down as you walk. You pay attention to the ground at every moment as cobblestones, broken paving slabs and uneven level changes require your attention and concentration. In so doing, you do not look up to see trees and stars. Space can be closed down, and in those moments of the closed spatiality, you might not be aware of the moment of happiness that you could have just experienced because you have to negotiate functional barriers. So badly designed material environments can restrict our field of spatial engagements and transform the spatiality of our everyday practice such as walking.

In contrast, tactile markings on the floor may increase the mobility of those who have visual impairments. The distant barking of dogs, kids chattering, or a sudden whiff of flower can indicate where you are and offer orientation. Sounds and smells can give shape or direction to spaces. The texture of materials might carry your thoughts away. The warmth around a fireplace or the rough textures of bricks might bring memories back stretching the space beyond merely functional considerations. I think that good design can support opening up the spatiality of individuals—increasing opportunities, motivating pleasure, and bringing us closer to a world that allows us all with different bodily abilities and preferences to coexist.

1: And I would add that a disabled person must take notice of the ugliest and most unsatisfactory elements of built space; whilst a non-disabled person may never notice the quality of texture or materiality of floor surfaces, may miss some small moments of beauty here as well as the difficulties. Chris Downey, an architect in the States who went blind, talks about how using a white cane increases his enjoyment of the material world and enables him to notice sensory and

textual qualities that he ignored as a sighted person (Downey 2013). Similarly, Raquel Meseguer, one of the disabled artists who has worked with DisOrdinary Architecture, makes creative performances—such as 'A Crash Course in Cloud-Spotting'—that explore what happens when you see built space from a different angle. Through the experience of chronic illness and the need to lie down and rest in public places she wants to share the creative potential of different ways of being in the world (Meseguer 2022). So, starting from diverse embodied experiences—from 'non-normals' rather than 'standard' users—has the potential to open up some really interesting creative alternatives. Crucially, though, non-disabled people will only gain these insights if they learn directly from creative disabled people.

15.3 Changing Design Practices

1: So, how can we design differently with and for disabled people? What current educational and professional practices need to change in architecture and related disciplines? How can we share and extend creative and critical ways of intersecting disability and architecture?

2: At the Academy we are beginning to explore the possibilities of combining two different approaches that engage with human bodies and experiences very differently (Kajita et al. 2020). The first is rule-based (context-independent knowledge), the other is user-based (context-dependent knowledge). These approaches have their own pros and cons. Rules and guidelines operate necessarily from top-down. It is a way of attempting to resolve the problem of how to meet the hugely diverse needs, preferences and desires of humanity. Rules and guidelines aim to enforce at least some basic standards and provide the essential point of reference for architects by setting a minimum level, such as the minimum 'clear width' of shared access routes. And yet, this top-down approach reduces bodies to average dimensions and ideal proportions, and simplifies the complexity of bodily interactions with objects, buildings, and their surrounding environments. This often leads design solutions to be more generic and standardized; like a separate ramp access for wheelchair users that leads toward a special entrance.

In contrast, the people-centered approach operates as bottom-up, being characterised by the variety of embodied and highly subjective understandings of architectural experiences. Although this might lead us towards design solutions that are completely specific to one individual—another tension between creating one-offs or generic designs that are meant to suit everyone (2006)—the in-depth engagement with individual bodily experiences provides valuable insights to architects. These two approaches of the top-down and bottom-up may seem to be incompatible but can be used concurrently. The diagram in Fig. 15.2 shows then as poles on a continuum.

Current architectural education and practice around access and inclusion tends to emphasise the former, top-down approach that puts the prescriptive before the creative, and leads us towards solution-focused designs rather than inventive and resourceful ones. So, we need to increase learning around context-dependent knowledge—better understanding the complex and nuanced relational encounters disability scholars Kafer and Garland-Thomson, mentioned above, explore.

At the Academy, we value context-dependent knowledge. Danish scholar Kirkeby emphasises the importance of context-dependent knowledge in opposition to a general scientific ideal of context-independent knowledge (On Disability as an Unstable Category in Davis 2023). This is a type of knowledge that we learn through our experience and through acts of designing as reflective practice - what Schön calls 'reflection-in-action' (Kirkeby 2015). Since we started working in 2016 to increase our research and teaching activities on inclusion, with the support of the Bevica Foundation, we emphasise the importance of 'reflection-in-action' and promote 'learning-while-designing' (Schön 1983). This situatedness during the learning process encourages us to gain more detailed perspectives on the challenges and opportunities that exist in our different embodied lives; as well as intersecting

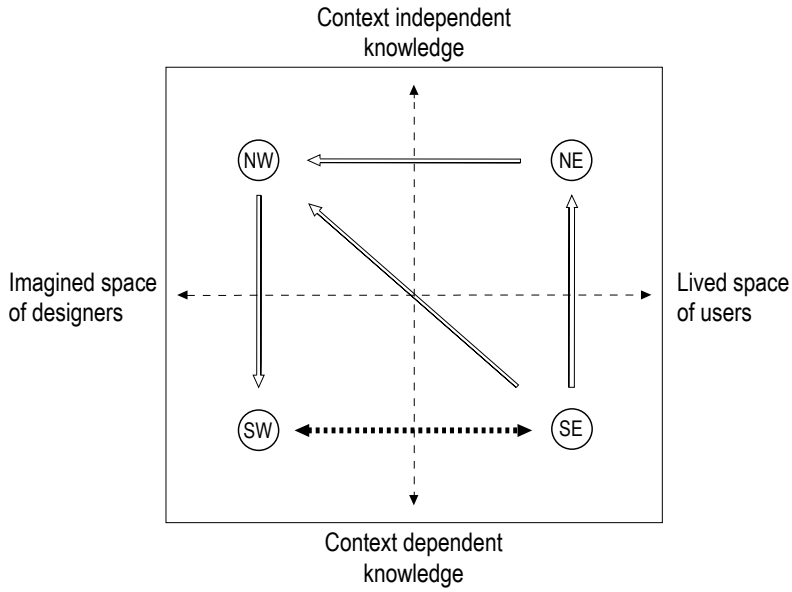

Fig. 15.2 A plane of knowledge for inclusion that architects make use of while building works are carried out. South-east quadrant (SE) is an area where individual users' embodied experiences are situated. North-east quadrant (NE) is an area where users' experiences are translated into resources such as a data sets that quantify human experience. In the design process, designers operate in both fields of North-west quadrant (NW) and south-west quadrant (SW). NW is an area where available knowledge of users is organized into the form of rules and guidelines. SW is the primal area where design methods and design thinking are employed in the creative process of architects. Diagram by author 2

our own experiences and creativity with the experiences and creativity of diverse others. The diagram above expresses this as a horizontal design process working across a vertical context-dependent to -independent axis. I suggest that to gain, mobilise and share knowledge on inclusion during the design process we need to constantly move through this 'plane of knowledge for inclusion' (Cross 2006).

1: I would add two points. First, there has been some important work in disability studies that critiques the tendency for top-down rule governed approaches in built environment design, by showing how it has a complicated and contested history rather than being merely functional, factual and ahistorical 'guidance' that just needs applying to every situation. The work of Aimi Hamraie, for example, explores how we have ended up with particular building codes around accessibility, how these grew from disability activism in the States, UK and elsewhere, but at the same time developed into results that distorted disability campaigning in many ways (Hamraie 2017). So, now we have something that appears to be objective, but actually just normalizes who 'fits'—who belongs, who is welcomed into—particular built spaces. This is not to say that code-based approaches are inherently wrong, but that we need always to notice underlying social and political processes.

Second, this means thinking harder about how relying on top-down and generic guidance can make disabled people's rights invisible. Mechanically using access regulations enables the avoidance of serious engagement with the Convention on Human Rights for People with Disabilities or relevant Sustainable Development Goals, for example. Because, accessibility guidance is assumed functional, neutral ahistorical and asocial 'information', architects do not have to actively think about discrimination or exclusion in their design work. As an architectural student or practitioner, you are often after instant access solutions—a quick fix—because the

design process is already so complex, with so many demands made on it. It is also objectively true that there is usually little time for research or reflection. That is why the concept of reflection in action you have outlined is so vital. Because once you've got a setup where you've got specific building codes that have to be met, then it becomes just about meeting those, about being compliant, which in turn can block opportunities for reflection on discriminatory effects or more creative design interventions. I really like the way you talk about the two different approaches of top-down generic, and bottom-up contextual —for me, this is not about finding a compromise or balance between them (which is also what we are taught to do as 'neutral' design professionals) but to draw out the tensions, contradictions and gaps as a way of opening up critical and creative spaces for action. Of course, a further complication is that there are lots of other actors involved in the production, management and use of buildings and spaces. So—to reimagine disability and architecture, we also need to unpack wider processes and practices. Do you know any examples of rethinking top-down approaches centred on regulation?

2: An interesting example is in Italy. Each city has its own building regulations there, so it's pretty difficult to generalize, but in Milan and Como at least, there is a clause that provides design flexibility. This is through the statement that design solutions must be oriented towards improvement. And in some cases interventions that are not included in, or do not comply with, building regulations can be allowed, if the architect can provide documentation that the proposed design is more accessible. This enables dialogues with and beyond planners, and creates the potential for innovative solutions that can be more oriented to context-dependent experiences.

1: If we're going to find constructive ways through this gap between having generic rules and the huge variety of different ways of being in the world, we need also to look at wider policy and processes, and how these also perpetuate the invisibility and marginalization of disabled and other under-represented people. Your example from Italy seems a very practical way of enabling change at a policy level. An example from America, where they also have very different building codes for different States, is Joel Sander's work on moving towards gender neutral toilets. Their campaigning group actually has a lawyer in their team. This is because in order to put in new kinds of toilets. they've fought—successfully—to change the International Plumbing Code (IPC) which previously stated that "separate facilities had to be provided for each sex." (Sanders and Stryker 2016; Sanders 2017).

I am also very interested in disability self-organising for co-developing small scale access adaptations to the built environment, often called 'life-hacks' (Hamraie and Fritsch 2019)—of which probably the most famous is the original curb cuts for wheelchair users. These became law only after campaigning wheelchair users literally took hammers to kerbs, and mixed and poured their own concrete slopes (for examples see Williamson 2012). So, changes to regulation don't just happen at policy level, but are often the result of grassroots action: again something that we don't learn about at architecture school or in practice.

15.4 Adaptability, Reuse and Human Flourishing

1: I wanted to come back to our discussion about small pleasures and context-dependent knowledge. Beyond the immediate experiences of built space, I think this also relates to wider and growing concerns about the climate emergency and sustainability, and about how to imagine alternative forms of architecture centred on care, repair and adaptability; reuse rather than new build, small scale contextual interventions rather than grand statements. Disability activism and and scholarship is increasingly linking this to ideas about enable both human and non-human flourishing (Hamraie and Fritsch 2019) by centring interdependence rather than independence and recognizing shared vulnerabilities rather than assuming self-sufficiency and individualism. The Disability Visibility Project in the States for

example, has a campaigning slogan that 'Access is Love' (Disability Visibility Project 2023, Piepzna-Samarasinha 2018) to highlight accessibility as not just a functional 'solution' but as an emergent movement towards collective care. So how can we repair the fabric—not only spatial and material but also the social fabric?

2: If we look at contexts carefully, we should be able to identify opportunities to improve our environments through small interventions, without radically changing everything. We might even increase accessibility and find pleasures here and there, if we carefully observe and analyse spatial situations. This requires increasing our understanding of spatial–temporal actions and participations in the context of everyday networks—both human and non-human, or material and immaterial. Then what we need might be just small adjustments and maintenance. Like at a project for a town square in Bordeaux by Lacaton and Vassal, where they proposed only some maintenance works, including more frequent cleaning of the square (Lacaton and Vassal 1996). This came from their careful observation of local residents and an acknowledgement that the square is already beautiful and functional. This is still design, because it recognizes what the local people already bring, and supports that.

1: A similar example is the Ed Roberts Center at the University of California, Berkeley. It was built in the nineteen nineties, as an accessible building dedicated to disability rights and universal access. But as Kim Kullman shows in his more recent research (2019), the original project centred on people with mobility impairments—very much because that was a group of people who were really restricted by the physical environment, were often being kept in institutions, and were struggling to have access to higher education. This was the initial locus of activism. But over time, more disabled people were coming into the university, often with invisible impairments such as neurodivergence and environmental sensitivities. And the building was not accessible for these emerging groups. What Kullman suggests is that these groups saw disability in a different way to the earlier generation. Rather than aligning with disability 'categories' they thought about both alignments and differences in access needs across diverse people. That meant finding ways around care, maintenance and adaptability to make the building go on working for multiple users with different and even conflicting requirements. It turns out that one key in all of this was the caretakers. The Ed Roberts Center employs learning disabled people as caretakers, who reorganize furniture in rooms, add or remove partitions, keep an eye on what cleaning chemicals are being used, and who customize services and facilities to meet the needs of particular events and people. Again, I would argue that this is design. But it feels like a difficult thing for architectural education and the profession (or clients) to take on. How do we teach that? How could we enable design processes that integrate long term maintenance and care packages with capital costs?

15.5 Disability and Changing Architectural Practices

1: These are difficult but also very interesting questions. This leads to the final topic of our discussion—what should happen next?

2: In an academic institution like the Academy, we work with students who in future will become architects, landscape architects, planners or operate in other related disciplines. This is our biggest advantage. We can start from very beginning of their careers to ask questions. This includes questioning what we 'normally' do as architect, landscape architect or planner. We want to critically and creatively challenge the norms that exist around our disciplines. Through these critical and creative engagements, we have a better chance to move a little further forward, to find different and richer understandings of human bodies and minds in all their neuro- and biodiversity. The approach The DisOrdinary Architecture Project takes offers one way. Its disabled artists and architects can show us how difference, sensitivity and vulnerability can lead us to design environments with more potential for small pleasures for everyone. For me, finding

creative and alternative insights everywhere offers a path walking towards truly accessible and inclusive spaces.

1: Starting from the enabling dimensions of disability, its immediate pleasures and learning about context-based knowledge feels such a productive way forward. Shifting student, educator and practitioner mindsets towards seeing disability as a creative generator has to start from paying attention to the everyday—not just in terms of detailed sensory experiences, but as a bodily and a political act in the widest sense, and as acts of care (Boys 2023). As Katherine Rundell puts it, this is taking notice in the same way that being attentive to a guest means not just looking at them but understanding their needs and providing for them (Rundell 2022). It's about moving away from merely functional accessibility to access in support of human flourishing.

And as a final 'what's next' gap to be filled, I think we need alternative kinds of data, beyond conventional access guidance. What kinds of information and resources do we need that can fill that gap between existing rule governed generic solutions and the context- dependent, seemingly unmanageable diversity of individual ways of being in the world? There are already examples—such as crowdsourcing diverse disabled and other marginalized groups experiences of their existing built environments as a way of building up a body of complex, layered but still useful knowledge (Critical Design Lab 2023). Or building studies that draw out good examples of access, from the point of view of disabled people, and that acknowledges differences in what works and doesn't work for different people. I know you have been exploring this, by developing a graph database that connects statements posted by disabled people on various web-based platforms with accessibility requirements in the Danish Building Regulations (Kajita and Ballegaard 2022).[1] Crucially we need data that offers a more nuanced, complicated and even conflicting understandings of people's diverse experiences. As you have said, this is very time consuming. So, we shall be innovative in how to accumulate and share our knowledge.

Note

1. The developed database (www.uservoices.dk) relates statements posted by disabled people with sentences from paragraphs of BR18 through specific architectural features of room, element, and object. Using the architectural features as point of reference, the database highlights some of the most common building situations encountered by disabled people, but also allows anyone interested to explore their relationship to the real lives of disabled users and the statutory requirements.

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Charter Towards an Accessible Municipality

16

Marjolijn Clijsters and Wendy Metten

Abstract

We launched a charter as a means of inviting municipalities to adopt a structured approach in order to achieve a more inclusive and accessible community. An accessible municipality is a municipality where everyone has equal and independent access to the buildings, public space, services and communication. Everyone can live, learn, work, carry out daily activities, move around and relax in a comfortable, high-quality way and up to an old age. Also people with a visible or invisible disability. We developed a framework for an integral and integrated local municipal accessibility policy in close cooperation with disability experts by experience, aldermen and employees of municipalities. We resolutely opt for a structural approach from the start of each collaboration, with the principles of Universal Design in mind. We implement a holistic vision on accessibility in municipalities. We transcend the ad hoc approach and apply accessibility in all its facets. It is a quality condition and a permanent focus.

Keywords

Accessibility · Municipalities · Inclusion · Integral approach · Holistic

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16.1 Introduction

16.1.1 Who is Inter?

Inter is the expertise center for accessibility and universal design in Flanders, Belgium. Our goal is to create an inclusive society, for everybody to enjoy, in all circumstances and independently. Our baseline is #IedereenOveral, which means #EverybodyEverywhere.

We assist governments, companies, and organisations in Flanders with their accessibility policy and we connect governments, professionals, and users. With our multidisciplinary team we work on policy recommendations, we issue labels, we set up awareness campaigns, and we screen buildings and infrastructure (public infrastructure, tourism, and recreation, housing, care, heritage, mobility, streets and squares, sports, culture…) and offer advice. We also make events accessible, such as festivals, cultural performances, sports competitions, fairs, conferences … in cooperation with volunteers.

16.1.2 Municipalities, Key Partners Towards Accessibility

An accessible municipality is a municipality where **everyone has equal and independent access** to **buildings**, **public spaces**, **services** and **communication**. Everyone can live, learn, work, carry out daily activities, move around, and relax in a

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comfortable, high-quality way, and up to old age. Also those residents with a visible or invisible disability.

As a municipal council, you have a lot of influence on the lives of your residents: their well-being, freedom of movement, mobility, and so on. The policy level is close to the citizen. There are a lot of own infrastructures, services, and activities. A municipality checks the regulations on accessibility when granting environmental permits, determines spatial planning, and plays a role in provision of transport. In short, municipalities hold many keys to working on accessibility.

An integral policy is a local accessibility policy that encompasses everything. It concerns objectives for the physical environment such as buildings, squares, streets, or parks, as well as for service and communication in all its forms. In all policy areas.

The way in which an accessibility policy is being developed seems to vary widely. From an ad hoc and short-term approach to a more integrated policy based on a long-term vision, developed in participation with inhabitants. The implemented policy often depends on the involvement of individual actors: a motivated official, a convincing policy-maker, or a strong chairman of an advisory board can make a big difference.

We mapped out in detail who and what helps to improve integral accessibility in a municipality. Good cooperation between aldermen, civil servants, companies and organisations, services, and residents is of the utmost importance.

In order to allow every resident to participate equally in daily life, a municipality works on:

- sustainable development of patrimony, the transport offer, and the public environment in their municipality
- a communication policy based on accessibility
- accessible services and events
- an inclusive offer in caring neighbourhoods

While working on accessibility, it's important to keep in mind three basic principles:

1. Integral accessibility
2. The chain of accessibility
3. Universal Design as a design principle

16.1.3 Integral Accessibility

We use the term "integral accessibility" very consciously. Accessibility includes more than getting in and out anywhere. To use an environment, you must also understand it. There are also less visible thresholds. These often have to do with the accessibility of communication. Everyone stumbles from time to time on a lack of accessible communication. Think about finding the right doctor in a hospital, filling out your tax return digitally, getting the right paperwork from a counter clerk, or taking public transportation in an unfamiliar city. If a municipality wants to support society as much as possible, it should also bring these invisible thresholds to attention and eliminate them.

Adequate attention to physical accessibility and the accessibility of communication ensures that everyone has access to public services and that services can be used independently, unobtrusively, and equally.

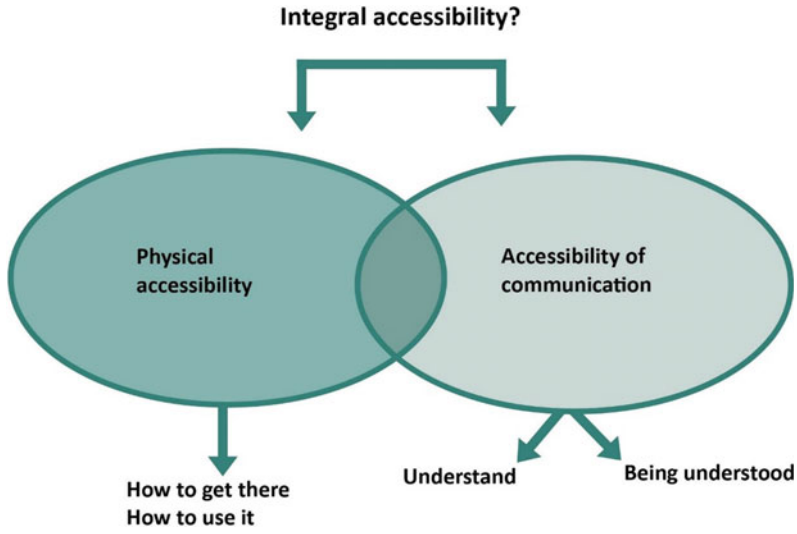
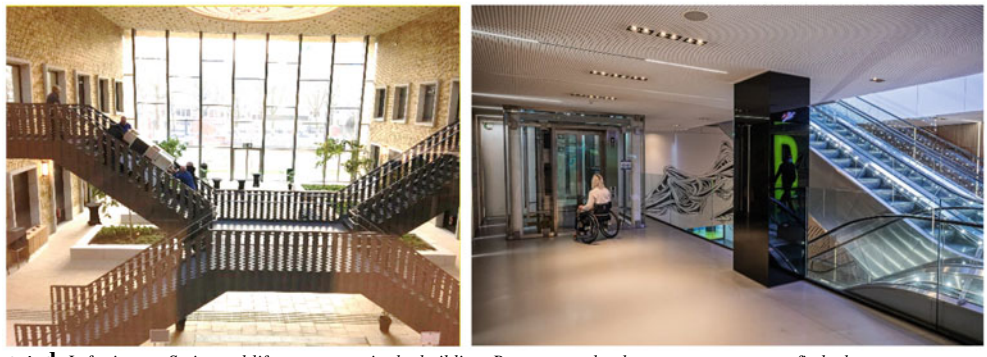


Fig. 16.1 Visualisation of integral accessibility

a + b *Both churches had an accessibility problem that is solved: a ramp and stairs to enter versus an entrance path with slight inclination*



c + d *Left picture: Stairs and lift are present in the building. But apparently, they are not so easy to find when you see movers dragging through the stairs. Versus right picture: a space where elevator and stairs are next to each other.*

Fig. 16.1 **a+b** Both churches had an accessibility problem that is solved: a ramp and stairs to enter versus an entrance path with slight inclination **c+d** Left picture: Stairs and lift are present in the building. But apparently, they are not so easy to find when you see movers dragging through the stairs. Versus right picture: a space where elevator and stairs are next to each other

16.1.4 The Chain of Accessibility

You cannot achieve integral accessibility by working on just one part. This applies to policies as well as activities or buildings. Each part forms a "link" in a larger whole. In a building, this includes both structural elements and finishing elements. Coherence determines the quality. We express this as the "chain of accessibility".

Is one part not accessible? Then the chain is broken. This might mean that some residents cannot use an activity or service, a building or communication, etc.

16.1.5 Universal Design as a Design Principle

Universal Design (UD) or "designing for everyone" is a method in which you approach accessibility issues from the needs of every possible user. You choose solutions that can be used by a very large group of diverse users. As a result, there is less need for separate adjustments or services for certain target groups. In a building that is accessible to everyone, a wheelchair user should not enter through a separate, accessible rear entrance.

Complying with legislation and criteria leads to accessibility. But that does not automatically result in welcoming, intuitive, and ergonomic buildings to which all people have equal access. For example, an accessible building can have a separate access for wheelchair users, a combination of a ramp and stairs to access the building orstairs and a platform lift to go to the sports facilities, … The building is accessible, but not necessarily in an attractive or in the best and logical way.

Universal Design is inclusive design. It is a nice, esthetical solution that blends in in the environment and raises the comfort of all.

If you start from a UD strategy, your ease of use does not depend on the physical capabilities, age or gender, origin, culture, language or learning style of one person. Universal Design solutions are easy to use for everyone and also have aesthetic qualities. You avoid separate adjustments or facilities as much as possible. If they are needed, you provide them in a beautiful and integrated way.

For instance, an entrance path with a slight inclination so that everyone can take the same route and entrance to a building in an intuitive way. Or a simple and clear wayfinding system with landmarks, structure and rhythmic in a building … Inclusive design requires a holistic approach. Not only the built environment, but also the communication and services must be inclusive and start from Universal design. In our approach with municipalities, we focus on all those aspects.

> Carlos Arroyo, architect: "Beyond the required accessibility, our concept strives for Universal Design. Our buildings should be fully accessible, and also naturally accessible, without "special" additions. That is why the textured lines on the floor are also directions for the sighted - rather than an added cryptic pattern. Or the info desks are designed to allow wheelchairs to approach as closely as possible. Textures and soundscapes are also very important in the building. Wheels are at home all through the building, and that includes bicycles!"

Fig. 16.2 OostCampus, the administrative and service center of the municipality of Oostkamp (Belgium)

Anyone who designs according to the principles of Universal Design does not start from a "standard" user or the "average" person.

The Universal Design approach is not just for objects or buildings. You can also use these principles in management, communication, education, and so on.

16.2 Method

During 10 focus groups organised in 2017, we polled civil servants, aldermen, and members of advisory councils with the question: "How can we best support your municipality to become more accessible for everyone? A secondary question that was asked was whether they wanted Inter to develop a label for an accessible municipality. We determined together that making a municipality accessible and inclusive doesn't happen overnight. And that municipalities need guidance and expect support from Inter in the long process towards an accessible municipality.

We combined this answer with the finding that local accessibility policies for infrastructure, public space, communication, and services are mostly characterised by a problem-solving and ad hoc approach, goodwill, or accidental involvement. Also, there is a lack of participation of inhabitants with disabilities and the elderly.

In close cooperation with disability experts by experience, aldermen, and civil servants of five pilot municipalities we first defined what an accessible municipality is and we developed a framework for an integral and integrated local municipal accessibility policy.

This five pilot municipalities—Asse, Beringen, Kortrijk, Maldegem, and Sint-Niklaas—worked with us to map out all the important factors and stakeholders in this process. We arranged them in a frame of reference, inspired by the "EFQM excellence model". This is a quality model for organizations of the European Foundation for Quality Management. It visualizes the relationship between the actions and results of an organization.

Subsequently, Inter developed a methodology for self-evaluation, determination of ambition, and development of a policy and action plans based on the frame of reference.

Municipalities that signed the charter "Towards an accessible municipality" started this quality process in 2018 with guidance from Inter.

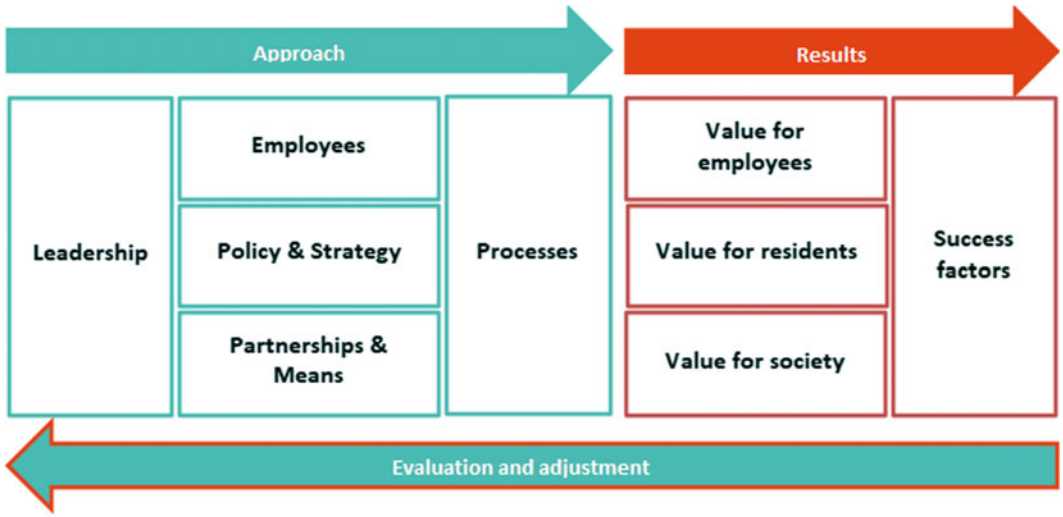
First, we take a deeper look into the framework. Then we explain the role of the framework in shaping the charter into a customized plan for municipalities to work on accessibility.

16.3 "Towards an Accessible Municipality"—Framework for an Integral and Integrated Municipal Policy

It is a challenge for a municipality to discover which factors it needs to change in order to achieve a high-quality result.

The framework contains all factors that contribute to a strong accessibility policy. The factors from the frame of reference influence each other.

It consists of nine blocks. The left side contains five blocks containing the factors related to the "Approach". The approach tells us what the municipality is doing to work on accessibility and how it is doing it. It provides a detailed overview of who and what is helping to improve integrated accessibility in the municipality and which processes are needed. The right side contains four blocks containing the "Results". The results show what the municipality has achieved and what are important success factors and indicators. Success factors are necessary conditions to achieve a good result. Indicators help you measure the result.



16.3.1 Approach

The "approach" side of the reference frame contains factors of:

Leadership: The leadership indicates who bears ultimate responsibility for the integral accessibility of the municipality. From this level, the accessibility policy is managed and efficient and effective policy choices are made. The leaders motivate, support, and provide the necessary tools and resources.

> "We want everyone to feel welcome in Maldegem, where they can learn and receive education, do sports, play and work. We want all amenities close-by to be available to everyone. It is important that young and old can continue to live in the center. We want to radiate that Maldegem is alive and a community for everyone. That is why we have the ambition to be an exemplary municipality in terms of accessibility." Vision, Maldegem (community in Flanders, Belgium)

Employees: The first challenge is to motivate everyone who can contribute to better accessibility. There are many parties involved and a lot of action is required by the employees in the field. Each employee bears responsibility for accessibility. It is necessary, however, that several people take on a coordinating role within their own service. These key figures pay extra attention to the accessibility theme and discuss accessibility issues with other services or the management team (MAT). In addition, members of advice groups are in this framework considered employees. They experience the importance of good accessibility every day. Based on this knowledge, they make an essential contribution to the accessibility policy.

> Hanne Van Beneden, Elderly and Accessibility, directorate Welfare City of Kortrijk: "The city council gave me a coordination assignment regarding accessibility. Together with a point of contact within each service, we try to follow up and facilitate accessibility advice from experts such as the SAPH (Urban Advisory Council for Persons with Disabilities) and Inter. We graft the concrete working method onto the specific working processes of the services themselves."

Policy and strategy: Working on a more accessible municipality, includes making clear policy and strategic choices to realize this; determining objectives and including accessibility in the various plans. Always starting from the needs and requirements of inhabitants with a disability, the elderly, combined with the ambition level of the municipality.

> Marijke Orins, Head of Civil Affairs, Reception and Society, Zwevegem: "All employees contributed to an inspiration memorandum for the multi-year planning 2020-2025. We passed them on to the political parties. We used the SDGs as a guideline. In the inspiration memorandum, we explicitly included the charter and the commitment "Towards an accessible municipality" in collaboration with Inter."

Partnerships and means: The partners of a municipality all fall outside the administration, but work closely with the municipality. They also contribute to better accessibility. And it is important to raise awareness among them. Is a municipality entering into a formal collaboration with a partner? Then it should set clear accessibility conditions.

Financial resources are necessary when certain actions to realize or improve accessibility cost money. These means must be provided in the financial plan of the municipality at the beginning of each legislature.

Processes: To become an accessible municipality, there are many processes to consider. All relevant to implement a structural, sustainable accessibility policy.

16.3.2 Detected Factors

Leadership

1. There is a political commitment to work on accessibility. Accessibility is included as a theme in the board agreement.
2. The board of alderman and the OCMW1 board develop a vision on accessibility and UD in their municipality.
3. The level of ambition and the commitment of the municipality regarding UD and accessibility has been determined and confirmed by the council of the municipality.

4. The mayor supports accessibility policy and monitors and supports the view on accessibility.
5. There is an alderman who leads on accessibility. Each alderman is monitoring accessibility within his policy areas.
6. The management team and the secretary take up a coordinating role and ensure the proper implementation of the accessibility policy.
7. The heads of department of the various policy areas are committed to converting the vision of the board into practice.
8. The municipality sets an example role as a builder, initiator and employer.

Employees

1. There are "champions" or a coordinating official for the follow-up of the accessibility policy. Accessibility is integrated into their function and job description.
2. There is knowledge and motivation regarding accessibility and UD among civil servants (Urban planning, architects, technical services, senior consultant, communication officer, etc).
3. There are experience experts and advisory councils who contribute to the accessibility policy.

Policy and Strategy

1. Integral accessibility (physical accessibility and accessibility of communication) is a multi-department theme within an integrated policy.
2. Strategic goals are determined and included in the multi-annual plan.
3. There is an accessibility plan, a policy plan for older people with a clear link to the multi-annual plan.
4. The principles of UD are integrated in the (master) plans and there is a proactive accessibility policy.
5. Advisory councils are consulted during policy planning.
6. There is a local translation of anti-discrimination legislation and the UN Convention for People with Disabilities.

Partnerships and Means

1. Accessibility is integrated into the municipality policy and financial management cycle (BBC).
2. Partners of a municipality include:
   - Inter for external accessibility expertise
   - The provincial government
   - Public–Private Cooperation, Autonomous Municipalities
   - Intermunicipal companies, utilities, intercommunals
   - Social housing companies
   - Private teams (local economy, parking company, etc.)
   - Mobility teams (Bus- and Train Companies, Flemish Department) …
   - Partners in care
   - Partners in education
   - Association for Flemish Cities and Municipalities
   - Flemish senior council
   - Press and media.

Processes

1. Accessibility analysis
2. Participation of residents
3. Interaction between the board and the advisory councils/experience experts
4. Disability needs research
5. Organization of training
6. Organization of sensitization actions
7. Integration of UD & accessibility in formulation and development of the multiannual plan, master plans, mobility plans, residential (care) areas, communication plans
8. Implementing policy plans through the relevant policy areas
9. Accessibility and UD in vision
10. Route "to an accessible municipality"
11. Accessibility and UD in procedures, regulations, licenses, and cooperation agreements
12. Guarantee and supervision of accessibility at startup, execution, and completion of projects
13. Supervision and enforcement, for example, control regulation accessibility of public buildings, public roads and public domain

14. Mutual communication on accessibility between services and policy areas
15. Organization of accessible events
16. Supply of accessible services
17. Accessible communication with the citizens
18. Correct communication about accessibility
19. Treatment of notifications and complaints about accessibility
20. Enabling advisory accessibility and UD in consultative bodies, for example municipal mobility committee.

16.3.3 Results

The results show what the municipality has achieved and what are important success factors and indicators.

Value for Employees

Staff members feel involved in the theme and are recognized in their roles. They developed an "accessibility reflex" and feel supported (internal and external) and competent.

Value for Residents

Advisory councils and residents feel involved in the policy. They receive input and feedback and see results. Residents experience good accessibility to infrastructure and services.

Value for Society

More Universal Design, accessible to all.

Everyone can participate in society in an equivalent and independent manner.

Important Success Factors and Indicators

Success factors are necessary conditions to achieve a good result. Indicators help municipalities to measure the result.

1. A legislature-wide long-term vision on accessibility and Universal Design
2. Motivation and commitment to all participants involved (internal + third parties)
3. A targeted, coordinated, and integrated policy
4. Accessibility policy embedded in the organizational structure of the municipality
5. UD (Universal Design) is known as a design principle
6. Monitoring the "chain of accessibility"
7. Coherent and unambiguous frameworks
8. Quality approach and guidance (covenant with Inter, guidance in the 'Towards an accessible municipality')
9. The efforts yield results
10. Availability of efficient support models
11. Objective/reliable information about accessibility for users
12. Integrated vision of accessibility at higher policy levels (eg no conflicting regulation, contradictory regulations, accessibility is included in BBC guidelines)
13. Realizing an accessible city or town is a positive story.

We first look at the approach, the role of those in charge, and the processes that contribute to better accessibility. This process begins with self-evaluation in an open constructive dialogue between aldermen, experts by experience, accessibility experts from Inter, and civil servants.

During the evaluation, each item in the framework is given a score for the present situation and a growth score they want to achieve. An action plan contains all efforts that are needed to achieve these goals. It is best to start from baseline measurement. Based on this, municipalities define objectives and work points and plan actions.

These can differ greatly from municipality to municipality. They depend, among other things, on the size of the municipality, whether it is mainly urban or rural, on the organization of the municipality, on the expectations of residents, on the available resources, and so on. That is why the frame of reference does provide a general direction, but no specific work points or actions at a practical level. Municipalities work this out tailored to their organisation, with the guidance of Inter if they wish. They get a lot of practical examples as inspiration.

16.4 The Charter "Towards an Accessible Municipality"

Municipalities that develop a policy based on the framework for an integral and integrated municipal policy sign a charter "Towards an accessible community" and start a quality process.

They commit themselves to appointing a coordinating official, work together with inhabitants with a disability and organize at least 3 meetings for evaluation, determination of ambition, and drawing up an action plan. Inter supervises these sessions and supports the municipality further in writing and the rollout of the action plans.

The process starts with an evaluation exercise about the accessibility policy in the municipality. In the dialogue between aldermen, experts by experience, accessibility experts, and employees each factor in the framework gets a score from one to five, in consensus. There is a guideline that contains a clear definition for every score of every factor to avoid arbitrariness.

The aim is to map the current policy, but it is also an incentive to establish new objectives and actions for the future and to strengthen the accessibility policy. For example, each municipality will map out a growth trajectory according to its size.

During the second session, the participant defines targets by recording growth scores. The third session is meant for a description of key actions:

1. Position-statement: structured discussions to identify areas where integration for accessibility is not occurring
2. Decide on priorities for action, based on assessments of high to low impact
3. Prepare one to five year action plans for improved integration of accessibility where priorities are determined by opportunities for "quick wins" and longer-term investments that deliver more fundamental change.
4. Appoint Project teams who will manage the action plans.

The aim of the route is to provide input for a new multi-year plan and action plans, to develop an integral and integrated accessibility policy and at last a sustainable embedding of accessibility and Universal Design in the city's daily policy and management, operation, service provision, and communication.

The process guarantees a total approach with active involvement of all actors, close cooperation between different policy areas, and a catalyst between disability experts by experience, aldermen, and employees. The results and action plans can be incorporated into the global strategy of the municipalities.

Municipalities themselves determine in consultation with aldermen, experts by experience, accessibility experts, and employees on which themes they focus. They are responsible for progress in their accessibility policies.

The charter is a supporting instrument and not a control instrument.

16.4.1 Content of the Charter

We resolutely opt for a **structural approach**. We do this by thinking carefully about accessibility for everyone at the start of each project. Accessibility is consciously, thoughtfully, and permanently embedded in the day-to-day policy and management, operations, services, and communication of the municipality. We take into account the principles of Universal Design. In this way, we strive for beautiful, sustainable, and high-quality results.

Participation of the residents of the municipality is an important condition for achieving an integrated accessibility policy. Experts by experience and advisory councils know the needs and priorities in terms of accessibility and are actively involved in accessibility policy. We strive for user participation in every project, from the very start.

The municipality is building **a network of partners** (mobility actors, utility companies,

housing companies, local economy…) that can strengthen the municipal accessibility policy.

The municipal council works together with Inter, which developed the quality system. To do so, Inter provides instruments, resources, training, advice, and guidance in making our infrastructure, services, and events accessible and guides us in the process "towards an accessible municipality".

The process starts with a thorough self-evaluation of our accessibility policy, based on the framework. After this, the municipality will determine what efforts are needed to strengthen its accessibility policy and define short- and long-term goals and actions. It is committed to communicating regularly with the residents of the city/town about the progress towards "an accessible municipality".

16.4.2 Universal Design as a Guideline

In the past, accessibility usually meant specific solutions for specific target groups. Often with limited results and sometimes stigmatising – like a back entrance for a wheelchair user. As we said before, Inter works according to the principles of Universal Design. And here is why.

From the beginning

A much smarter approach? Creating an environment that does not restrict anyone. You do this by (re)organising that environment from the outset in such a way that it is easily accessible to everyone. Universal Design is a design approach that turns the principles of integral and inclusive accessibility into reality for everyone. Step-by-step and all from a macro scale. This different way of thinking also has a strong effect down to the level of detail.

Nice and easy

From the first sketch, Universal Design focuses on the following question: "How do we make a product, an image, a website, a building, or a public space both functional and attractive for a diverse group of users?".

Universal Design is a contemporary and promising answer to current social accessibility requirements. The goal of Universal Design? Smart design. This combines an attractive design with practical use for everyone. It makes Universal Design cost-efficient and aesthetically pleasing.

User-oriented

Attention to accessibility and an eye for detail are necessary for a good quality of use for everyone.

The principles of Universal Design thus go much further than basic solutions. We apply them from design to implementation, from use to management, and from building to services.

"Good designs create possibilities and support the user, bad designs hinder and exclude people."

Universal Design—Seven basic principles to guide you

Seven basic principles guarantee the quality of use of the environment, building, product, or information for everyone.

Design principles Universal Design	
Principles 1–7	
1. Usable for everyone The design is suitable for everyone—regardless of its possibilities and limitations **2. Flexible** The design is open to all kinds of preferences and possibilities **3. Simple and intuitive** The design is easy to understand, independent of experience, (language) knowledge, or the degree of concentration of the user **4. Perceptible information** Communication with the user is efficient. The environmental conditions or his sensory or mental capacities are irrelevant	**5. Tolerance for error** The dangers and unwanted results of wrong and unconscious actions are limited **6. Low effort** Everyone uses the design with minimal effort and in an efficient and comfortable way **7. Appropriate dimensions and space for use** The design provides appropriate dimensions and space for reaching, entering, grasping, or use. These are independent of the individuality of the user

16.5 Results

Most of the municipalities that signed the charter appointed a coordinating official and started the quality process that is part of the charter. 32 municipalities already signed the charter.

The charter states that the municipal council recognises that accessibility plays a decisive role in giving every resident and visitor equal opportunities to participate in social life, regardless of their abilities, age, or cultural background. The municipality contributes to the implementation of the UN convention on the rights of persons with disabilities, which Belgium ratified in 2009. The UN convention advocates that persons with disabilities can participate fully and equally in society.

Inter wrote a handbook explaining the policy, and the frame of reference, illustrated with examples from communities. The handbook can be ordered via https://inter.vlaanderen/charter. It was offered free of charge during a conference and several training sessions for communities.

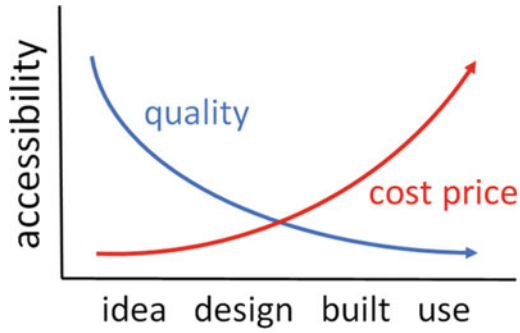
In the implementation plan a municipality will set actions for different topics they want to implement within a certain period of time. Or, it may contain principles that they intend to always apply from now on; e.g. getting building applications checked on accessibility by Inter, setting the accessibility label as an ambition for their own buildings, always taking digital accessibility into account for municipal websites and other digital tools...

To make it concrete, here are some specific examples of realizations due to the charter. More specific 2 examples of an event and a building.

- Ghent light festival: https://persruimte.stad.gent/203902-lichtfestival-krijgt-label-toegankelijk-event-van-inter-vlaanderen Lichtfestival krijgt label 'toegankelijk event' van Inter Vlaanderen | Stad Gent (Persruimte) ((for English subtitles, please click Settings and Ondertiteling and choose English.)
- Bruges Meeting & Convention Centre (BMCC): https://toerismevlaanderen.be/nl/bmcc-het-eerste-m-label-vlaanderen-beleef BMCC nu al in 360° dank zij de vr-tool | BMCC (bmccbruges.com).

Inter has several tools for municipalities to work on accessibility. We have also developed a label strategy with: labels on accessibility for events, meetings, office buildings, sports infrastructure … The labels set a high ambition and reward the efforts on accessibility. These contain coherent and unambiguous frames of reference that lead to quality supervision and guidance. The criteria for the labels are also integrated in GRO, a sustainability instrument of the Flemish Government.

These examples show that if you take Universal Design into account from the start of your project, the whole project will cost less, since there's no need for alterations in the future.



16.6 Innovation

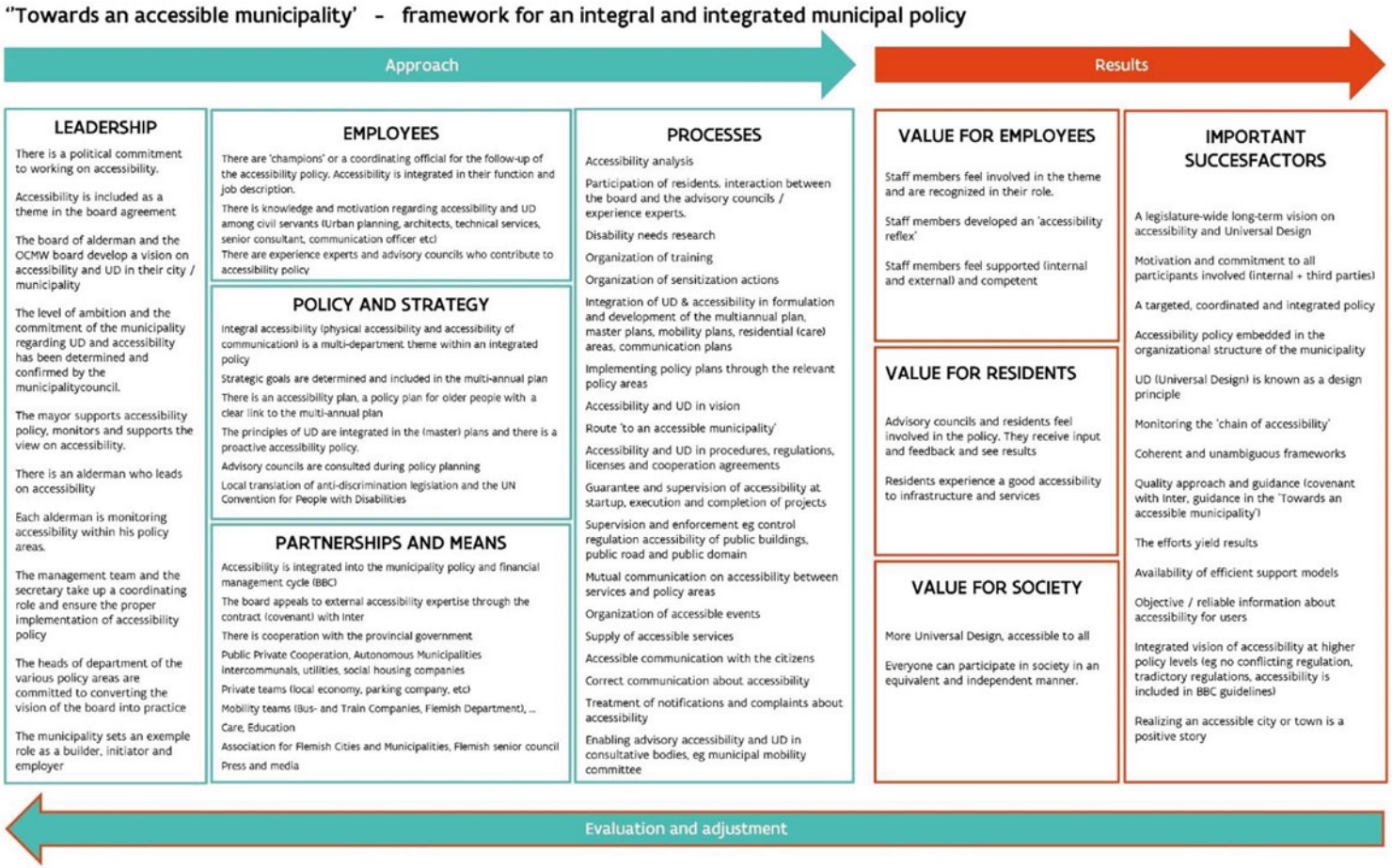
What is innovative about this approach and what is the impact? Usually, disability experts by experience in local communities are only involved in stand-alone projects and/or in a later phase. That is a shame because a lot of relevant input is missed. We conduct a close collaboration between aldermen, experts by experience, accessibility experts, and employees in designing the policy framework. They work together and learn from each other.

Accessibility gains importance in governance agreements, strategic policy plans, processes, and procedures. There is more attention to accessible communication and services. There is a raised awareness that accessibility is more than just accessible infrastructure. More actors feel involved and the support base is stronger.

16.7 Conclusion

With this framework and charter, Inter implements a holistic vision of accessibility in municipalities. We transcend the ad hoc approach and apply accessibility in all its facets into the organisation. It is a quality condition and a permanent focus.

Attachment 1: framework for an integral and integrated municipal policy


"Towards an accessible municipality' - framework for an integral and integrated municipal policy
Approach
Results
LEADERSHIP
There is a political commitment to working on accessibility.
Accessibility is included as a theme in the board agreement
The board of alderman and the OCMW board develop a vision on accessibility and UD in their city / municipality
The level of ambition and the commitment of the municipality regarding UD and accessibility has been determined and confirmed by the municipalitycouncil.
The mayor supports accessibility policy, monitors and supports the view on accessibility.
There is an alderman who leads on accessibility
Each alderman is monitoring accessibility within his policy areas.
The management team and the secretary take up a coordinating role and ensure the proper implementation of accessibility policy
The heads of department of the various policy areas are committed to converting the vision of the board into practice
The municipality sets an exemple role as a builder, initiator and employer
EMPLOYEES
There are 'champions' or a coordinating official for the follow-up of the accessibility policy. Accessibility is integrated in their function and job description.
There is knowledge and motivation regarding accessibility and UD among civil servants (Urban planning, architects, technical services, senior consultant, communication officer etc)
There are experience experts and advisory councils who contribute to accessibility policy
POLICY AND STRATEGY
Integral accessibility (physical accessibility and accessibility of communication) is a multi-department theme within an integrated policy
Strategic goals are determined and included in the multi-annual plan
There is an accessibility plan, a policy plan for older people with a clear link to the multi-annual plan
The principles of UD are integrated in the (master) plans and there is a proactive accessibility policy.
Advisory councils are consulted during policy planning
Local translation of anti-discrimination legislation and the UN Convention for People with Disabilities
PARTNERSHIPS AND MEANS
Accessibility is integrated into the municipality policy and financial management cycle (BBC)
The board appeals to external accessibility expertise through the contract (covenant) with Inter
There is cooperation with the provincial government
Public Private Cooperation, Autonomous Municipalities intercommunals, utilities, social housing companies
Private teams (local economy, parking company, etc)
Mobility teams (Bus- and Train Companies, Flemish Department), ...
Care, Education
Association for Flemish Cities and Municipalities, Flemish senior council
Press and media
PROCESSES
Accessibility analysis
Participation of residents, interaction between the board and the advisory councils / experience experts.
Disability needs research
Organization of training
Organization of sensitization actions
Integration of UD & accessibility in formulation and development of the multiannual plan, master plans, mobility plans, residential (care) areas, communication plans
Implementing policy plans through the relevant policy areas
Accessibility and UD in vision
Route 'to an accessible municipality'
Accessibility and UD in procedures, regulations, licenses and cooperation agreements
Guarantee and supervision of accessibility at startup, execution and completion of projects
Supervision and enforcement eg control regulation accessibility of public buildings, public road and public domain
Mutual communication on accessibility between services and policy areas
Organization of accessible events
Supply of accessible services
Accessible communication with the citizens
Correct communication about accessibility
Treatment of notifications and complaints about accessibility
Enabling advisory accessibility and UD in consultative bodies, eg municipal mobility committee
VALUE FOR EMPLOYEES
Staff members feel involved in the theme and are recognized in their role.
Staff members developed an 'accessibility reflex'
Staff members feel supported (internal and external) and competent
VALUE FOR RESIDENTS
Advisory councils and residents feel involved in the policy. They receive input and feedback and see results
Residents experience a good accessibility to infrastructure and services
VALUE FOR SOCIETY
More Universal Design, accessible to all
Everyone can participate in society in an equivalent and independent manner.
IMPORTANT SUCCESFACTORS
A legislature-wide long-term vision on accessibility and Universal Design
Motivation and commitment to all participants involved (internal + third parties)
A targeted, coordinated and integrated policy
Accessibility policy embedded in the organizational structure of the municipality
UD (Universal Design) is known as a design principle
Monitoring the 'chain of accessibility'
Coherent and unambiguous frameworks
Quality approach and guidance (covenant with Inter, guidance in the 'Towards an accessible municipality')
The efforts yield results
Availability of efficient support models
Objective / reliable information about accessibility for users
Integrated vision of accessibility at higher policy levels (eg no conflicting regulation, tradictory regulations, accessibility is included in BBC guidelines)
Realizing an accessible city or town is a positive story
Evaluation and adjustment

Urban Form as a Driver for Inclusivity in Public Open Spaces: A Case from Glasgow

17

Preeti Pansare and Ashraf M. Salama

Abstract

This paper argues for inclusivity as a critical factor for designing and examining public open spaces (POS). Understanding inclusivity in urban environments has been limited to physical accessibility for many decades. The United Nations report (UN2030) emphasizes eradicating social exclusion and making societies more cohesive through social integration and social inclusion. This study considers inclusivity as a value attached to public open space (POS). An inclusive public open space is one where the needs of every single individual are recognized and respected affording them a positive experience regardless of their background. Nonetheless, no comprehensive understanding of how urban form affects inclusivity has been undertaken for POS beyond accessibility. Using a selection of public open spaces in Glasgow, Scotland, a walking tour assessment procedure is utilized as an observation tool to quantify a set of indicators associated with urban form and inclusivity. A further Likert Scale is implemented to examine the reciprocal relationship between the user and the space, the activities, and the sense of positive experience. The paper draws conclusions on the possibility of developing an index that examines human behavior in relation to urban form while embedding inclusivity as a key parameter for research and design.

Keywords

Inclusivity · Convivial space · Safe open space · Accessible · Livability

17.1 Introduction: The Case for Inclusivity in the Urban Realm

A city is a space that is always in a state of change due to the flux in activities and population, in response to larger socio-economic forces. Globalization has led to massive migration of people over the last few decades. Migration and the growing diversity of urban populations have brought about new experiences of space and contact, resulting in cosmopolitanism, creolization, and conviviality, but also riddled with new patterns of inequality, segregation, and prejudice (Ye 2019). Migration has eventually led to diverse cultures interacting and being together in new environments. These changes in places of residence and moving away to a new place

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trigger certain behaviors that lead to the development of newer constructs of self-belonging and identity. Thus, it becomes important to study the inclusivity of public spaces for making the city livable and hence improving the quality of life (Helliwell et al. 2020). The notion of inclusivity is underscored in Goal 11 of the UN Sustainable Development Goals which states "*Make cities and human settlements inclusive, safe resilient and sustainable*" (UN 2016).

The UN places emphasis on social inclusion as a key driver of inclusive development. Social inclusion is defined as the process of improving the terms of participation in society for people, who are disadvantaged based on age, sex, disability, race, ethnicity, origin, religion, or economic or other status, through enhanced opportunities, access to resources, voice, and respect for rights (UN 2016). Thus, social inclusion is both a process and a goal (UN 2016). Jacobs (1961) observes that "*the ability of a city to foster the diversity of users and uses in everyday streets is a driver for its ability to sustain well-located parks that can give back grace and delight to their neighborhoods instead of vacuity*" (Jacobs 1961). The importance of diversity is also recognized by Stanley et al. (2012), who stress that social heterogeneity and the fluid nature of diversity are important factors for understanding the social and cultural identities of neighborhoods (Stanley et al. 2012). Social sustainability requires the presence of formal and informal processes; systems; structures; and relationships to actively support the capacity of current and future generations to create healthy and livable communities (WACOSS 2002).

The city is widely studied in physical and visual terms, but not for social cohesiveness achieved through social inclusion. Place identity (Lynch 1960; Whyte 1980) is widely studied, but expression of identity in public spaces has been overlooked. One of the notable exceptions was Harvey, who gave a detailed account of the hierarchies present in the world, highlighting the idea of exclusion leading to the need for cosmopolitanism (Harvey 2000). His observations are valid until today, since policies have failed to account for the unevenness in geographic development, leading to further divide between classes. Likewise, several studies are conducted on the image of the place and the city, but social inclusion of the users for a more socially cohesive place has been oversimplified. Urban identity is defined as the image of the environment in Lynch's theory, which considers identity as a subjective component in completing the image of a place.

Public open spaces are often studied and measured for quality of space, aesthetic appearance of space and physical accessibility. There is sufficient body of knowledge that discusses the positive physical and mental health outcomes associated with the access to parks and natural settings (Sugiyama et al. 2008). There are also several indices used to assess the livability, happiness, health and well-being, and quality of life in cities, but not much has been done with the idea of inclusivity in urban public spaces. This overview places emphasis on those writings and practices that delineate the multi-dimensional aspect of urban space diversity and the notion of inclusion. Typically, inclusion has always been perceived through the lens of physical accessibility. Public open spaces are the spine that connects different parts of the city. The need to make them socially sustainable has become as important as economic and environmental sustainability. In diverse spaces, social inclusion becomes the overarching theme to make the urban public space more sustainable. Moreover, inclusivity–lack of discrimination based on gender, ethnicity, or other attributes—has always been studied more in buildings or enclosed environments such as schools or office environments but not at the scale of urban public open spaces. Therefore, it can be corroborated that no comprehensive understanding of how urban form affects inclusivity has been undertaken for public space beyond accessibility.

This paper establishes and tests the rationale that inclusivity needs to go beyond accessibility and that it is affected by the built form. The built form and the user interactions with it and amongst themselves are important factors for understanding social inclusion (Carr et al. 1992; Gehl et al. 2006). Thus, the paper interrogates the

relationship between urban form and inclusivity in urban public open spaces utilizing a case from Glasgow. It goes beyond just exploring the space for health and well-being of the users but explores the idea of an inclusive public space as a space, where the needs of every single individual are recognized and respected affording them a positive experience regardless of their background, age, or gender.

17.2 Materials and Methods

17.2.1 A Theoretical Framework for Examining Inclusivity in the Urban Realm

The idea of inclusivity has evolved from a focus on physical accessibility to collaborative design and universal design between the 1950s and the 1970s. The late 20th century witnessed a paradigm shift to a more service orientated design, which resulted in a focus on human centered design aimed at making products and spaces more human centered. Despite these advances, ghettos continued to persist in inner cities and continue to exist today, along with the development of a permanent suburban middle class (Hall 2014). The planning and design of public spaces typically follow three tenets: (a) everyone has rights of access; (b) encounters between individual users are unplanned and unexceptional; and (c) their behavior towards each other is subject to rules none other than those of common norms of social civility (Chua and Edwards 1992).

The idea of inclusivity in public spaces as considered in this study goes beyond the preceding basic tenets. For inclusion to work at the level of the user, the user needs to acquire a sense of belonging towards the public open space. A strong sense of belonging would be a driver for a sense of community amongst the users. Based on an extensive review of theories in this field, the concepts associated with inclusivity are identity, place identity, appropriation, accessibility, flexibility of activities, and recognition of user diversity. As Ron Griffiths notes, an important part of the experience of exclusion is a weakened or non-existent sense of identity and pride. A key step in integrating excluded populations into the social mainstream, therefore, is to assist them to find their voice, to validate their histories and traditions, to establish a collective identity, to give expression to their experiences and aspirations, and to build self-confidence (Griffiths et al. 1999).

As noted by Whyte, public open space provides a stimulus which supports interactions between complete strangers (Whyte, 1980). Jan Gehl has also observed that the urban form surrounding any public space influences the behavior of its inhabitants (Gehl et al. 2006). The diversity amongst people occupying the space, shapes the variety of ways in which it is experienced, understood, and perceived. Amin (2008) argues that the quality of the space would determine the way in which an urban street or a square is used (Amin 2008). This study hypothesizes that the diversity in urban form leads to diversity in the use of space and an increase in the perceived inclusivity for visitors to the space.

To examine the relationship between urban form and inclusivity, the whole site needs to be analyzed according to a multi-layered approach. The analysis would include both quantitative and qualitative methods and aims at interpreting the relationship of perception of safety, temporality, the urban form, and inclusivity. Thus, an important quality of public space is visual and physical permeability, that is the ability to move through an environment and see the routes available to them (Carmona et al. 2011). The work of Krier suggests that the richness of the urban domain is enhanced by adjacent facades that are architecturally subdivided (Krier 1992). This is further emphasized by other scholars who argue for understanding the relationship between urban landscape and social life for a better understanding of the usability of urban space (Lynch 1960; Jacobs 1961; Whyte 1980; Gehl 1987; Rapoport 1990).

The production of space, following Henri Lefebvre's theory, can be utilized as the basis of a framework for analyzing the factors that impact inclusivity. According to Lefebvre, the

production of space takes place in a triad consisting of conceived, perceived and lived space (Salama & Wiedmann 2013). In this study, the lived space and the perceived space are broken into components of physical and functional domains. The lived space is produced by the individual identification of individuals with space and expressed by their use and behavior, leading to further identification of various attributes of inclusivity including perception of and behavior within the space. The examination of the body of knowledge across multiple disciplines enabled the development of a framework consisting of the four domains—physical, functional, behavioral, and perceptual—to examine the relationship between attributes of urban form and the different components of inclusivity (Fig. 17.1). Each of the four domains have nine components that would be measured on a Likert scale, which can be outlined as follows:

Physical attributes: This set of attributes would capture the boundary conditions and the physical configuration of the urban public open space (UPOS). The different factors considered in this domain are the morphology of form, formal quality, social spaces, accessibility, spatial configuration, permeability, legibility, temporality, and diversity of landscape elements.

Functional attributes: This set includes factors relevant to the variety of uses in the UPOS. The nine factors considered as functional attributes are affordance for social interaction, walkability, social space mobility, accessibility, robustness and adaptability, proximity and continuity, the richness of visual experience, affordance for activities, and ecological quality.

Behavioral attributes: This set of attributes considers factors related to the sense of interaction and idea of expression. The factors considered as behavioral attributes are diversity, diversity of activities, diversity for expression, identity, interpersonal relationships, fairness and administration, place attachment, sense of community, and human scale.

Perceptual attributes: These attributes would describe the user's perspective on the space. The factors considered as perceptual attributes include safety and security, cultural diversity, cultural marker, cultural memory, proxemics, attractiveness, comfort, distinction and recognition, and density of users within the POS.

17.2.2 The Case of Glasgow City Center

The sites for the study were selected from Glasgow due to its rich and diverse local history, shaped by shipbuilding, railways, landscaped gardens, allotments, archaeology, architecture, and diverse population. Between the 1880s and 1950s, Glasgow was one of the most densely populated cities in the world, where immigrants flocked to the city from across the world. During the 19th century, the city was known as the 'Second city of the British empire' (McKean et al. 1989). This period was characterized by magnificent Victorian buildings and urban spaces, which continue to shape the character of modern Glasgow (Salama et al. 2017). Conversely, during the 1930s, the prosperity of the city declined dramatically as a result of the portrayal of the city as an unsafe city spanning decades, with rumors of razor gangs' itinerant through the streets (Stewart 1997). Today Glasgow continues to be the largest city in Scotland. In recent years it has initiated to its new role as a postindustrial European city and has become a vibrant hub for trade, education, culture, and arts (Fig. 17.2). Despite urban sprawl, social segregation, and car dependency (Frey 1999) the city displays a great deal of spatial and formal consistency, which makes it a thought-provoking place for urban exploration (Salama et al. 2017). The sites chosen for the study were in proximity to each other, and in the Glasgow city center.

This ensured that the urban form across the sites is comparable, and yet distinct enough for each site to maintain its identity. First site was George square, which was originally designed as a residential private central civic space and opened to the public in 1876. The second site for the study was the royal exchange square, which served as a meeting place for merchants and other businessmen to gather and deal in commodity trade. This was also the site for the city's first telephone exchange. The site has undergone many changes and was finally converted to house the Gallery of Modern Art (GOMA). Enjoying

Fig. 17.1 Domains and attributes for assessing inclusivity

Fig. 17.2 Evolution of Glasgow city center

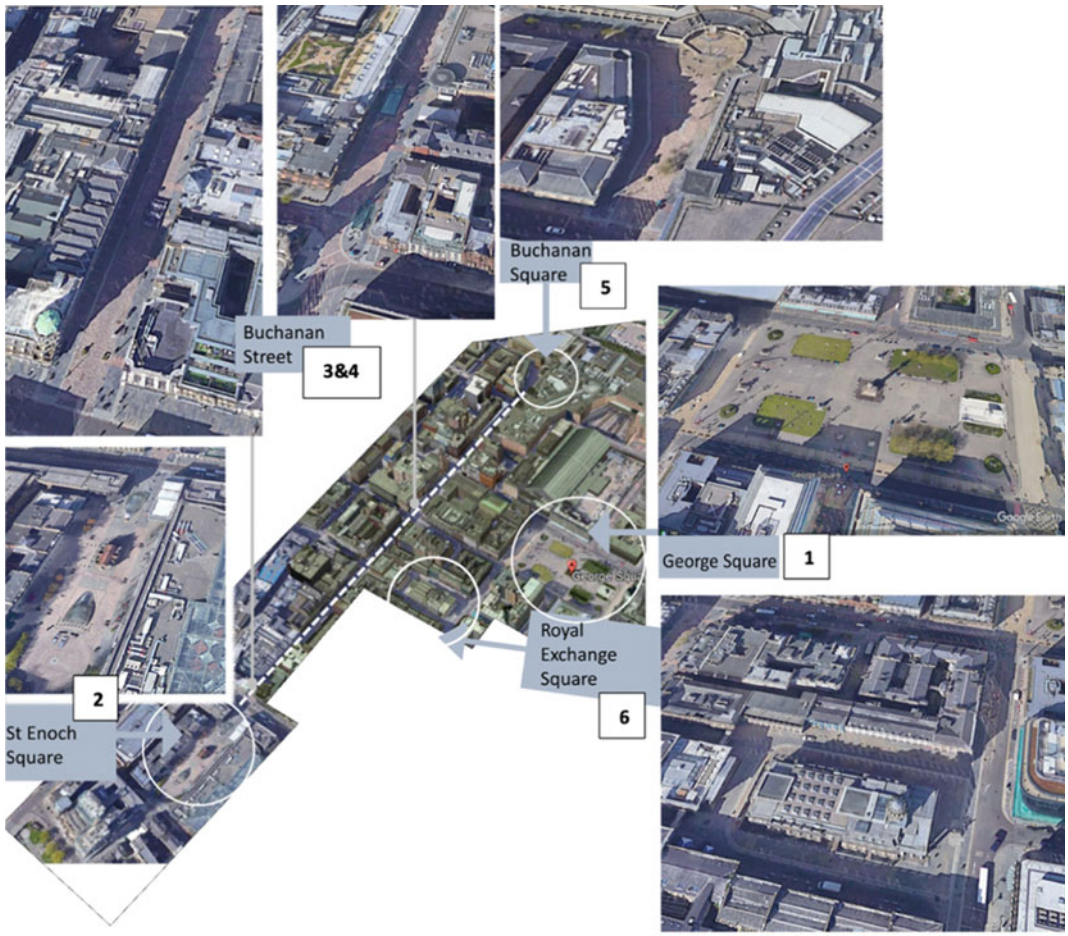

Fig. 17.3 Selected sites for assessment in Glasgow city center

unique history and development across the past century, the remaining sites were St. Enoch square and Buchanan gallery square with the spine connecting the two (Fig. 17.3).

17.3 Research Tools

17.3.1 Site Selection

The six sites chosen to exhibit certain similarities in the built form but are diverse in terms of the land use despite their physical proximity while all share a similar yet diverse base of population (users). As a result, the observed differences in inclusivity across the sites are more likely to be caused by differences in urban form as opposed to differences in socio-economic indicators across the user base.

17.3.2 Mechanism for Assessing the Site

A key element of the study is to instigate a mechanism that involves the creation and use of a toolkit to examine the domains that would help in defining and analyzing inclusivity in urban public open spaces (UPOS). The toolkit would be used to assess the urban public space in four layers of investigation, namely walking tour assessment, behavioral mapping, photomapping

tool, and urban observation. The toolkit draws upon Kevin Lynch's interviewing and mapping method to understand the user's perception of space through their usage patterns (Lynch and Hack 1971; Sanoff 1991). This method would be utilized in the assessment of the physical, functional, perceptual, and behavioral domains through observational tools (Table 17.1). The data collated through behavioral mapping would be used for the development of space profiles (Lynch 1960; Whyte 1988).

The walking tour assessment would look at patterns generated because of the physical and functional activities around the boundaries and within the UPOS (Urban public open space). The walking tour assessment procedure would also observe the connection between the temporal changes and the urban form (Salama and Azzali 2015). Lynch and Alexander employ this approach in their seminal works to capture an individual's perception of urban forms in the environment (Lynch 1960; Alexander et al. 1977).

The photo mapping tool would be used to assess the perception of the space and its experiential quality as reported by its users. This would help to negotiate around the researcher bias during the pure observation and mapping phase. In investigating other societies, several studies established that photography is helpful for overcoming habitual seeing and limited memory and perspective.

Whyte looked at the relationship between people's behavior within a space and the design features of the space (Whyte 1988). This method is further extended to use the urban intervention

Table 17.1 Tools—operational and assessment dimensions of the six sites

Tools	Operational dimensions	Assessment dimensions
Behavioral mapping	Conducted before the walking tour assessment; designed to capture vibrancy of stationary, mobile, and temporal activities taking place; used to tabulate the different profiles of users and their behavior within the sites	• Observing users and the range of activities • Development of space profiles
Walking tour	Conducted by the researcher during the weekday, weekend and on days of fair and inclement weather; outcomes were recorded at four times during the day and the activities of the users within the urban public space and the surrounding urban form	• Recognition of patterns • Observation of the relationship between temporality and urban form
Photomapping	Considered eliciting user preferences at selected sites through the user's lens, to augment the data collected by researchers visiting the same sites. This visual perception tool will be based on a detailed framework designed to help the observer observe the site carefully and diligently. The observer would be given a detailed framework to take photographs on their phone	• Users' perception of space • Users' experience in space Responding to the following questions: → *What do people do in the POS, at the boundaries and on the streets? How many connections are available for movement through the space? How much time do people spend in the POS? How is the boundary interacting with the POS?*
Observing urban interventions	All the 6 sites situated in the city center area are inundated by vehicular and pedestrian traffic. Observation mechanism is designed to gather information related to the urban street furniture and landscape elements that facilitate the movement which would be ascertained, and their placement analyzed to examine their impact in making the UPOS more accessible safe, comfortable, and scenic	• Analyzing street furniture and landscape elements including placement and users' engagement

observation tool that would be used to gather information related to the urban street furniture and landscape elements.

17.3.3 Data Analysis

The objective of examining the relationship between urban form and inclusivity is achieved by conducting a factor wise investigation that considers the relationship between elements of urban form and components of inclusivity which stem from the walking tour assessment conducted by the researchers. In essence, the operationalized objectives of the study are (a) to examine the relationship between attributes of urban form and components of inclusivity by pooling data across the six sites and (b) to compare the elements of urban form and perceived inclusivity across the sites. The steps involved in the overall data analysis process can be outlined as follows:

1. Extraction of urban form attributes from walking tour assessment.
2. Labelling of photographs from users photomapping responses to denote attributes of urban form.
3. Tabulation of data from behavior mapping exercise.
4. Collation of labeled data across walking tour assessment and photomapping responses.
5. Computation of aggregated data.

It is noted, however, that the analysis presented here is focused on Walking tour, observing urban Interventions and does not reflect the comprehensive data sets gathered through the other two tools utilized for assessment.

The walking tour assessment conducted by the researcher captured the attributes of urban form across the selected sites. The resulting observations are recorded in fact sheets, with one fact sheet representing each walking tour session. The next step involved converting the raw data using a 5-step Likert scale, which was followed by the creation of variables corresponding to urban form indicators by studying the distribution of the Likert scale data across the six sites. The final output of this step is a structured data set populated with data corresponding to urban form indicators for all sites. This process involved two key steps: (a) creation of a score card for each site by aggregating the scores for individual attributes, and (b) Computation of Pearson's correlation coefficient to examine the relationship between urban form attributes and components of inclusivity.

17.3.4 Preliminary Key Findings

Key spatial features resulting from ***observing urban interventions*** include three elements that can be identified as follows (Fig. 17.4):

Barricades: Across the six sites, there are sufficient well-designed light masts and bollards for the purpose of security. The metal bollards are placed in front of the entrance and exit of the subway station and at the interchange between the pedestrian and vehicular road along Buchanan Street. There are certain bollards which could be moved to ground level allowing access to pedestrian areas for loading/unloading and emergency vehicles. The other bollards are made of marble and used as seating space, as they are similar to big white concrete seats provided. There are square and rectangular planters which serve the dual purpose of barricading and providing aesthetic value to the space.

Facilities: There are wooden as well as marble/stone-like seats provided in most of the sites. However, most of the seating is appropriate for individuals or small groups. There is no provision for larger groups to come together and spend time in the UPOS. Most of the seats appear to be in excellent physical condition. The seats inside George square seem to be movable, thus allowing some benches to be shifted under tree canopies for groups to sit together. There are maps vertically designed to allow more than 3 people to observe the 'you are here map' without interrupting each other's personal space. The map size appears to be of adequate size and is legible and easy to read. The other facilities present on the site are cycle stands and garbage bins.

Elements		
1	Signal	Security
2	Light Masts	Security
3	Survilleance Cameras	Security
4	Solid Barricades	Security
5	Rope Barricades	Security
6	Cyclindrical Metal Bollards	Security
7	Pedestrian Kerb Crossing	Security
8	Garabge Bins	Facilities
9	Cycle Stand	Facilities
10	Long Box Planters	Aesthetics
11	Big Square Planters	Aesthetics
12	Circular Planter Bollards	Aesthetics
13	Trees	Aesthetics
14	Lawn Patches	Aesthetics
15	Benches	Seating
16	Concrete Bollard Seating	Seating
17	Stone Single Bollard Seating	Seating
18	Floor Sign Boards	Temprorary Signs and Others
19	Hanging Sign Boards	Temprorary Signs and Others
20	Temprarory Tents	Temprorary Signs and Others
21	Temproaraty Exhibition Boards	Temprorary Signs and Others
22	Temporary Rope Barricades	Temprorary Signs and Others

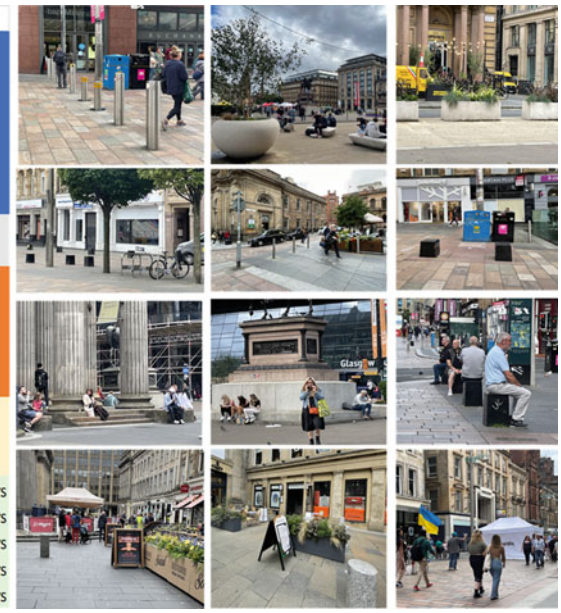

Fig. 17.4 Types of urban interventions at identified sites, Glasgow

Temporary Elements: There are temporary barricades that allow for temporal activities to take place on all sites. Temporary tents and signage for social and cultural activities are also visible on all sites.

The score card: synthesizes the observations from the walking tour assessment across the six sites and has a score ranging from 1 to 5. Score of 4 and above is good, 3–4 is moderate and below 3 is poor. An outline of the findings underlying the four domains is included below:

Physical attributes: St. Enoch square, and the three Buchanan sites score moderate on the physical aspects of the urban form attributes (Table 17.2). George square received the highest rating, while Royal exchange square scored the lowest. George square is better accessible in comparison to St. Enoch square and scores the highest on the Formal quality and Morphology of form. St. Enoch is connected by a subway but there seems to be a lack of maintenance of the surface areas thus making them less accessible. None of the places offer protection from inclement weather, other than going indoors. Royal exchange square has a big portico in the front, which acts as a weather protection area and space for getting together. George square and St. Enoch square score the highest on temporality, which is an affordance for expression. None of the sites receive a high score on the provision of social spaces. Barring Buchanan galleries, none of the sites receive a high score of legibility. George square, being a historic site scores the highest on the diversity of landscape elements.

Functional attributes: George square and the three Buchanan sites receive a high score of functional attributes, while St. Enoch square and Royal Exchange square receive a moderate score (Table 17.3). All the sites receive a high score on accessibility, proximity and continuity and robustness and adaptability. Except for Royal Exchange square, all the sites also receive a high score on social space mobility. Royal Exchange square scores poorly on multiple attributes such as affordance for social interaction, walkability, social space mobility, affordance for activities and ecological quality. Other than St. Enoch square all sites receive a high score on the richness of visual experience. George square receives a high score on all the functional attributes except ecological quality, where the site receives a moderate score.

Table 17.2 Score card for the physical component of the urban form attributes

Domain	Urban Form Attributes	George Square	Enoch Square	Buchanan street 1	Buchanan street 2	Buchanan Galleries	Royal Exchange Square
Physical	Morphology of form	4.2	4.2	3.7	3.7	3.7	4.2
Physical	Formal Quality	4.6	3.4	3.4	3.2	1.8	3
Physical	Social spaces	3.6	3.6	2.7	3.0	2.8	3.0
Physical	Accessibility	4.4	2.5	4.3	4.1	4.1	2.8
Physical	Spatial Configuration	4.0	4.6	3.9	3.9	3.9	4.3
Physical	Permeability	4.3	3.0	4.3	4.3	4.3	3.0
Physical	Legibility	3.0	3.3	3.8	3.0	4.0	2.0
Physical	Temporality	5.0	5.0	3.0	3.0	3.0	3.0
Physical	Diversity of landscape elements	4.0	3.0	2.8	2.8	2.0	1.5
Physical		4.1	3.6	3.5	3.4	3.3	3.0

Table 17.3 Score card for the functional component of the urban form attributes

Domain	Urban Form Attributes	George Square	Enoch Square	Buchanan street 1	Buchanan street 2	Buchanan Galleries	Royal Exchange Square
Functional	Affordance for Social Interaction	4.7	3.0	3.7	3.7	3.0	3.0
Functional	Walkabilty	4.6	3.6	5.0	5.0	5.0	2.4
Functional	Social space mobility	5.0	5.0	4.0	4.0	4.8	2.0
Functional	Accessibilty	5.0	5.0	5.0	5.0	5.0	5.0
Functional	Robustness and adapatability	4.0	4.0	5.0	5.0	5.0	4.0
Functional	Proximity and continuity	5.0	5.0	5.0	5.0	5.0	5.0
Functional	Richness of visual experience	5.0	3.0	4.0	4.0	4.0	4.5
Functional	Affordance for activities	5.0	3.0	4.0	4.0	4.0	1.0
Functional	Ecological Quality	3.8	3.7	4.3	4.3	3.8	3.0
Functional		4.7	3.9	4.4	4.4	4.4	3.3

Behavioral attributes: All the sites except the Royal exchange square, receive a high score on diversity and diversity of activities (Table 17.4). However, George square and St. Enoch Square score poorly on the diversity of expression. The three Buchanan sites score the highest on this attribute followed by royal exchange square. Royal exchange square affords a space for individual expression probably due to the lower density of users. George square sees less self-expression but sees far more social and cultural activities and provides affordance to create and foster interpersonal relationships. The walking tour assessment tool is unable to assess fairness and administration and sense of community, hence these scores are not considered when computing the aggregate score for behavioral domain.

Table 17.4 Score card for the behavioral component of the urban form attributes

Domain	Components of inclusivity	George Square	Enoch Square	Buchanan street 1	Buchanan street 2	Buchanan Galleries	Royal Exchange Square
Behavioural	Diversity	5.0	5.0	5.0	5.0	5.0	3.3
Behavioural	Diversity of Activities	5.0	5.0	5.0	5.0	5.0	3.8
Behavioural	Diversity for expression	3.0	3.0	5.0	5.0	5.0	4.0
Behavioural	Identity	5.0	3.5	5.0	5.0	4.0	5.0
Behavioural	Interpersonal Relationships	5.0	3.0	3.0	3.0	3.0	3.0
Behavioural	Fairness & Administration						
Behavioural	Place Attachment	5.0	4.0	2.0	3.0	2.5	4.0
Behavioural	Sense of Community						
Behavioural	Human scale	5.0	3.7	4.3	4.3	4.3	4.0
Behavioural		4.36	3.60	4.05	4.05	3.98	3.58

Perceptual attributes: All the sites receive a high score of distinction and recognition. All sites except St. Enoch square receive a high score on user density, and all the sites except Royal Exchange square receive a high score on proxemics (Table 17.5). A different picture can be seen on attractiveness, where George square and Buchanan Street receive a high score, St. Enoch and Royal Exchange square receive a moderate score while Buchanan Galleries receives a low score. None of the sites barring George square receive a high score on cultural memory of comfort. However, George square and St. Enoch square score poorly on cultural markers due to the absence of public art and the lack of affordances for the users to add their own cultural markers. None of the sites receive a high score for safety and security. While George square receives a moderate score, all the other sites receive a low score. Only George square receives

Table 17.5 Score card for the perceptual component of the urban form attributes

Domain	Components of inclusivity	George Square	Enoch Square	Buchanan street 1	Buchanan street 2	Buchanan Galleries	Royal Exchange Square
Perceptual	Safety and Security	3.7	2.5	2.3	2.3	2.7	2.7
Perceptual	Cultural Diversity	5.0	3.0	4.0	4.0	3.0	2.0
Perceptual	Cultural Marker	2.3	3.3	4.0	4.0	4.0	4.0
Perceptual	Cultural memory	5.0	3.0	3.0	3.0	2.5	1.0
Perceptual	Proxemics	4.0	4.0	5.0	5.0	5.0	3.5
Perceptual	Attractivness	4.8	3.0	4.3	4.3	2.6	3.4
Perceptual	Comfort	4.0	2.3	3.0	3.0	3.5	2.0
Perceptual	Distinction and Recognition	5.0	5.0	5.0	5.0	5.0	5.0
Perceptual	Density of user	4.0	3.8	4.2	4.2	4.2	4.0
Perceptual		4.2	3.3	3.9	3.9	3.6	3.1

Table 17.6 Aggregate score card for urban form attributes and components of inclusivity

Aggregate Domain Scores	George Square	Enoch Square	Buchanan street 1	Buchanan street 2	Buchanan Galleries	Royal Exchange Square
Urban form attributes	4.7	3.9	4.4	4.4	4.4	3.3
Components of inclusivity	4.6	3.5	4.1	4.1	3.9	3.5

a high aggregate score on the Perceptual domain, Royal Exchange square receives a low score while all the other sites receive a moderate score.

Aggregate score card across the six sites in Glasgow city center: A high score on urban form attributes seems to be a necessary condition for achieving a high score on inclusivity (Table 17.6). However, as witnessed at Buchanan galleries, a high score on urban form attributes is not sufficient to achieve a high score on inclusivity. A moderate score on urban form attributes might be the factor driving the moderate score on inclusivity in St. Enoch square and Royal exchange square. None of the sites that have a low score on urban form attributes or inclusivity, hence the study cannot claim a conclusive finding on the drivers for low inclusivity. The results presented in this paper are based on data collected through a single method which is a walking tour assessment and considers only six sites. Therefore, the preceding findings can be made more robust by carrying out a multi-layered analysis as described in the methodology, yet across a larger number of sites.

Correlation between urban form attributes and components of inclusivity: The above table (Table 17.7) summarizes the observed correlations between attributes of urban form and components of inclusivity as computed using Pearson's correlation coefficient. While these results would be made more robust through a study of a larger number of sites, some interesting patterns are already emerging. 'Identity' only has a positive correlation with the 'richness of visual experience'. 'Robustness & adaptability' is the only urban form attribute that is positively correlated with 'cultural marker' and 'diversity for expression'. Both these elements of urban form have a negative correlation with many urban form attributes. From these observations, one could hypothesize that an increase in the physical and functional elements provided for in

Table 17.7 Correlation between urban form attributes and components of inclusivity

Attribute	Morphology of form	Formal Quality	Social spaces	Accessibility	Spatial Configuration	Permeability	Legibility	Temporality	Diversity of landscape elements	Affordance for Social Interaction	Walkability	Social space mobility	Robustness and adapatability	Richness of visual experience	Affordance for activites	Ecological Quality
Diversity	-0.4	0.1	0.2	0.5	-0.4	0.6	0.8	0.3	0.7	0.4	0.9	0.9	0.4	-0.3	0.9	0.8
Diversity of Activities	-0.4	0.1	0.2	0.5	-0.4	0.6	0.8	0.3	0.7	0.4	0.9	0.9	0.4	-0.3	0.9	0.8
Diversity for expression	-0.9	-0.6	-0.9	0.5	-0.7	0.5	0.4	-0.9	-0.5	-0.3	0.5	-0.2	0.9	0.0	0.1	0.5
Identity	-0.1	0.4	-0.3	0.5	-0.5	0.4	-0.4	-0.4	0.1	0.6	0.1	-0.5	0.1	0.8	0.1	0.2
Interpersonal Relationships	0.4	0.7	0.6	0.4	-0.1	0.3	-0.1	0.6	0.8	0.9	0.2	0.4	-0.4	0.7	0.5	0.0
Place Attachment	0.9	0.6	0.9	-0.3	0.5	-0.4	-0.6	0.8	0.4	0.4	-0.5	0.0	-0.9	0.3	-0.1	-0.5
Human scale	-0.1	0.4	0.1	0.9	-0.7	0.8	0.1	0.1	0.6	0.9	0.5	0.3	0.1	0.8	0.7	0.4
Safety and Security	0.5	0.6	0.6	0.3	0.0	0.2	-0.2	0.6	0.6	0.7	0.0	0.3	-0.5	0.7	0.4	-0.2
Cultural Diversity	-0.2	0.7	0.3	0.7	-0.5	0.7	0.3	0.4	0.9	0.9	0.7	0.6	0.2	0.4	0.9	0.7
Cultural Marker	-0.6	-0.8	-0.9	-0.1	-0.2	-0.1	0.1	-0.9	-0.8	-0.7	-0.6	-0.5	0.6	-0.4	-0.5	0.1
Cultural memory	0.1	0.7	0.6	0.5	-0.2	0.6	0.4	0.7	1.0	0.8	0.6	0.8	-0.1	0.2	0.9	0.5
Proxemics	-1.0	-0.4	-0.6	0.7	-0.8	0.8	0.8	-0.5	0.0	0.0	0.9	0.4	1.0	-0.2	0.6	0.9
Attractivness	0.0	0.8	0.2	0.6	-0.4	0.5	-0.2	0.2	0.7	0.9	0.3	0.0	0.0	0.6	0.5	0.5
Comfort	-0.3	0.2	0.1	0.9	-0.7	0.9	0.5	0.2	0.6	0.7	0.8	0.6	0.3	0.5	0.9	0.5
Density of user	-0.9	-0.4	-0.8	0.8	-0.9	0.8	0.4	-0.8	-0.2	0.1	0.7	-0.1	0.9	0.3	0.4	0.6

the UPOS would leave the space less open for adding cultural markers and individual expression.

17.4 Discussion and Conclusion

Glasgow city center, known as the merchant city, has evolved since 1780s. Over this period all the six sites considered for the study have also evolved in use, as well as in urban form. George square has transformed from being a residential central garden space to a flourishing public square lined by public buildings along the boundary. St Enoch Square has transformed from being a sacred ground to a car park and finally to a node, that now functions more like a transitional space. The Royal exchange square has not undergone a drastic change in urban form, but its use has changed. The land use along the boundaries has evolved into more social spaces. In Buchanan Street and St Enoch square, the evolution of spatial activities has resulted in new architectural interventions. In comparison with all the other sites, Buchanan Gallery square is comparatively new and constructed over an earlier railway station. The observations from the Walking Tour Assessment clearly demonstrate that diversity in the economic and land use patterns, in a space drives the diversity of its inhabitants. Thus, urban form drives density, which in turn, might be a pre-condition for diversity.

The nodes, that is George square, St Enoch square and Buchanan gallery square all have active boundaries with visibly different spatial use. The space comes alive, depending upon the affordance the boundaries render for interaction. The more rigid and non-legible the boundary, the less the UPOS becomes a destination. This is seen in St Enoch square, Royal exchange square and Buchanan gallery square. The boundaries in George square and along the Buchanan Street act as a point of engagement for the users. These active boundaries give the UPOS a place identity and foster the creation of memories leading to place attachment. The boundaries of the UPOS provide social spaces for people to come together or be by themselves. This is in line with Alexander's observation that activity at the edges is a key driver of activity in the UPOS (Alexander et al. 1977).

Right of access is not the only criterion for inclusion, the affordance for unplanned and unexceptional encounters is also extremely important. Buchanan street and George square afford the space for unexpected encounters as well as an affordance for expression. Royal exchange square because of its central urban form provides spaces for individuals as well as groups for congregation and expression without hindering the flow along its boundaries.

The urban form being rigid with cultural markers leads to a good place identity. But this may lead to lower affordance for adding new markers in the contemporary world. Consequently, the space would become less inclusive for changing modes of expression or addition or cultural markers.

Urban form should provide comfort, safety, and affordance for expression as seen in George square and Buchanan galleries. This in turn would make the space more inclusive and socially sustainable. An inclusive space should provide A. optimum space for interpersonal communication. B. Maximum individual freedom. C. optimum aesthetic stimulus. D. Maximum choices offered by the urban form for users to be either single or be present in crowds for any activities. E. Maximum flexibility of space. F. Maximum efficiency of space for diverse crowds. (Lynch et al. 1995).

The visual environment should be meaningful to the observer. (Lynch et al. 1995) But the environment should also provide space for user interaction. This paper has demonstrated a correlation between the urban form and the abstract idea of inclusivity. However, this is only the first step in this line of research. The analysis could be made more robust by conducting a systematic assessment coupled with users' perception of spaces to obtain a more holistic view. Future work could also consider more tools to understand perception through the use of tools such as attitudinal survey. The objective of a multilayered investigation would be to get a holistic

view of all the factors affecting inclusivity, in addition to urban form factors. This line of examination can be concluded by creating a holistic list of indicators to assess inclusivity in urban public open spaces.

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Accessibility in Public Open Spaces for People with Disability: A Case of Patan, Nepal

18

Sebi Nakarmi and Sudha Shrestha

Abstract

Nowadays, there is rising attention on local, national, and international levels, toward accessibility for everybody to partake in social and communal life. Studies have found that when certain groups of people or individuals are excluded from built environment, discrimination takes place and opportunities for social integration are lost. As a result, accessibility in built environments is crucial for a variety of reasons. The objectives of the study are to examine the current status of public open spaces in the urban context of Nepal, through detailed observations of accessible provisions in the study area. The areas selected for empirical study are the historical urban core of Patan Durbar Square and its peripheral open spaces such as Jawalakhel, Pulchowk, and Lagankhel. The research employs access audits to analyze the conformity of the design with the accessibility guidelines provided by the UN Design Manual. The study's findings suggest that the majority of the public open spaces in Patan do not meet the accessibility requirements to satisfactory extents. The access audit indicates that accessibility is not well-integrated into older public open spaces whereas newer constructions have incorporated accessibility into their designs to some degree. The performance elements fell between 83.72 and 53.49% short of guideline requirements. Based on these findings, the local administration and the community need to work toward providing more public infrastructures which are suitable for people with disabilities. This study could be a road map for managers, planners, architects, and engineers for the design of safe and inclusive public open spaces.

Keywords

Disability · Accessibility · Universal design · Public open space · Urban design · Social inclusion

18.1 Introduction

Mobility should be a feature of man-made habitat because it is an aspect of fundamental rule of law and liberty. Mobility is described as "a dominant organizing force in architectural design" by renowned urban planner Edmund Bacon. "From this perspective, if the city is accessible to everyone, mobility must be provided." In an accessible setting, wheelchair users, visually impaired people, or old aged people are not

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considered disabled; however, if accessibility is not offered, even an able-bodied person may become disabled. The situation is described as follows: "They are disabled because the building's architect failed to foresee their needs or did not care about them" (Evcil 2012).

Today, not every person can enter a building or an office successfully. Even for a group of people—children, the elderly, women, and people with disabilities like those who use wheelchairs, shopping carts, or child buggies, etc.—finding a place in a developed environment is occasionally still an incomprehensible problem. The United Nations' policy that "No piece of the developed condition ought to be defined in a way that rejects certain groups of individuals based on their incapacity or frailty" is logically inconsistent with the situation in question. Two terms —"openness" and "portability," which need to be taken into consideration—are conveyed to us by the standard for outlining and organizing the developed condition. Here, the word "accessible" refers to the goal of empowerment (Blackman et al. 2003).

The concept of universal accessibility refers to access, both structural and attitudinal, through the removal of barriers and the creation of environments that are practical for all potential users. Universal accessibility is essential to inclusion because it gives everyone a sense of autonomy, competence, and independence that enables them to use all areas of a space and actively engage with friends and family. Thinking about barrier-free and universal design principles is the most impressive and significant way to create livable urban environments. The establishment of suitable physical and spatial contexts, services, and facilities for the benefit of all societal segments, including the disabled, is a requirement for community development. The use of public spaces by certain demographics of citizens, such as the elderly, pregnant women, and people with disabilities, may be hampered by physical barriers. Designing for people with disabilities is essential because they frequently face unique and obvious access issues in urban areas. The needs of people with disabilities must be taken into account, and barriers that prevent them from enjoying time in urban public spaces must be removed. It is believed that by implementing UD standards, people with disabilities could obtain their rights to a city that is more hospitable and comfortable for them, reducing their dependence on others (Esfandfard et al. 2020).

One of the declarations that requires consideration of people with disabilities in every plan is the Sustainable Development Goals (SDGs). The target in Point 11.7 of the SDGs program on Sustainable Cities and Communities states that by 2030, provision of worldwide access to secure, inclusionary, and accessible public spaces, particularly for females and children, the elderly, and PwDs, should be made available (Syaodih and Aprilesti 2020). Currently, one of the issues in our cities is the lack of appropriate urban public spaces for people with physical disabilities. If the areas of our residence, the amenities we utilize, and our localities are made to be inclusive as well as accessible, the built environment can help create a society that is more equal, inclusive, and cohesive (Syaodih and Aprilesti 2020).

18.2 Objectives

The purpose of this study is to assess the current status of built environment in the urban context of Patan, Nepal. It aims at evaluating accessibility features in public open spaces in the study area. The case studies are based upon detailed observations of accessible provisions, carried out in new and old public open spaces. To accomplish the purpose of this study, the following research question is analyzed. What is the level of compliance to guidelines in the existing condition of public open spaces?

Since there is no prior research studying the condition of accessibility in the public open

spaces of Nepal, this study is essential for providing guidance and soliciting support for the efforts being made to adopt universal accessibility features in the areas of policies and practices. Authorities, planners, and designers working on the design of the public built environment of developing countries like Nepal can use the study's findings, along with the body of literature and regulations, as a guide when creating training sessions, seminars, and workshops with a specific goal in mind. The results of this study may help establish and normalize the trend toward accessible design, which will eventually result in a beneficial outcome on both national as well as international levels. In the end, this study will help the city progressively transform into a more inclusive community.

18.3 Methodology

This study is grounded in applied theory and quantitative methods in the form of access audits to evaluate the current state of the built environment in public open spaces and the application of accessibility features in accordance with best practices in the study area. Sawyer and Bright (Sawyer and Bright 2003) state that the purpose of an access audit is to "establish how effectively a certain setting functions in regards to accessibility and convenience of use by a diverse group of potential consumers, including individuals with impairments, as well as to propose access improvements." The gaps between the guidelines and implementation are revealed by the access audit. In order to analyze the accessibility of the built environment, the UN Design Manual (UNESCWA 2004) is utilized to check urban design application in four different public open spaces. This manual was chosen because it has a target audience that includes people with all kinds of disabilities including orthopaedic and visual impairments and because the majority of the advised actions have been tried out in developed nations. This method emphasizes reality and existence, so the philosophical paradigm is classified as post-positivism.

18.4 Scope and Limitations

The current study has a few limitations that should be mentioned. Due to the broad subject, it has been restricted to two categories of disabilities: Orthopaedic impairment and visual impairment. Selective public open spaces have been studied while taking time constraints into account because access audit is a labor-intensive approach.

18.4.1 Research Setting

The third-most populous city in Nepal, Lalitpur, must increase accessibility and facilities to accommodate the requirements of PwDs who want to participate fully in society. The Central Bureau of Statistics of Nepal estimates that 513,321 people in Nepal are classified as PwDs, 4934 of whom reside in Lalitpur. While 818 people have low vision or are blind, there are 1669 (or 3.57 per 1000) people who are physically disabled (1.75 per 1000). From the research setting, which is the historical core of Patan, a total of 4 prominent public open spaces at Mangalbazar, Jawalakhel, Pulchowk, and Lagankhel have been selected through category-based sampling (Fig. 18.1).

18.5 Literature Review

18.5.1 What is Accessibility?

In a nutshell, accessibility means having access to everything. Accessibility refers to an overarching concept for all elements that have an impact on how people interact with their environment, according to a technical definition. A well-planned urban environment is thought to be liveable and easily accessible for everyone. Today, creating liveable cities is a hot topic for many urban planners. There is general agreement that accessibility and people's mobility are important elements in designing liveable cities. In light of this, one of the useful interactions in a

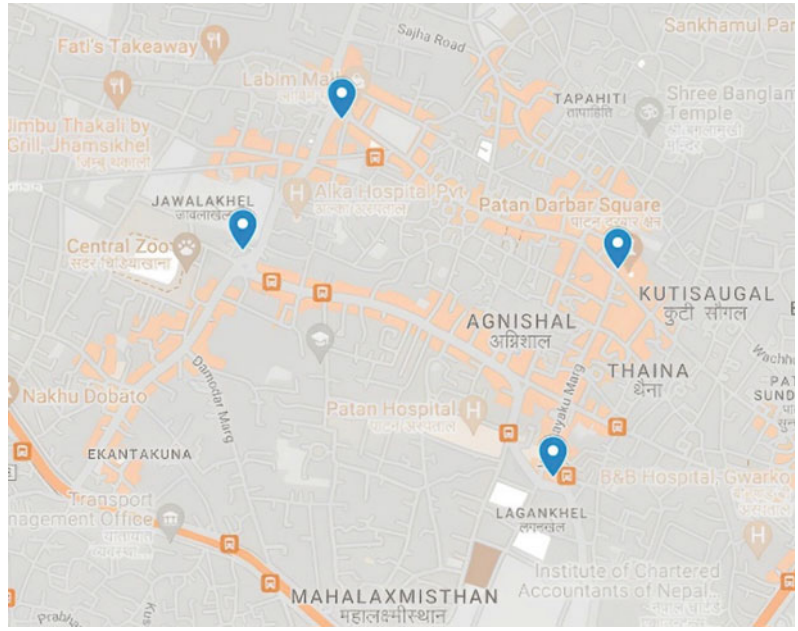

Fig. 18.1 The historic core of Patan (Google My Maps, 2022)

public area is accessibility. According to social theorists, accessibility is a fundamental social right. In the United Nations Conventions, where equal opportunities for all are promoted in every spatial structure for public use, accessibility is also a core value of urban design. Because of the previously stated justification, accessibility is necessary irrespective of one's capability, age, or position in society, in order for everyone to take benefit of the built environments (Evcil 2012). Since moving around a city safely, independently, and conveniently is essential to urban living, everyone must be able to do so. According to this definition, a disability is any limitation or inability to perform a task that can be remedied by a suitable design. To accomplish this, it is believed that designers will apply their knowledge of various user needs more effectively in the real world (Evcil 2012).

18.5.2 Accessible Design

Design that complies with established applicable regulations for use by PwDs is known as accessible design. It can isolate PwDs from the vast majority of consumers and make them feel like an outsider because it is frequently accomplished by offering distinct specifications for "special" user groups. When introduced as an afterthought to new building or even existing designs, accessible design solutions can be pricy and stigmatizing. Accessible features that are later added show that the designers did not take PwDs into account up until the law was enforced upon its implementation (M.S. 2010).

Although universal design incorporates accessibility from the start of the design process, it is less obvious because it is always accessible. Modifications to a conventional design are known as adaptable design features, and they serve to make the form useful for a person as required (Center for Accessible Housing 1991). Similar to accessible designs, adaptable design elements can occasionally appear gimmicky, stigmatizing, and expensive (M.S. 2010). Although adaptable strategies are occasionally used in universal design to achieve customization, it is best when all options are equally available (Fig. 18.2).

Transgenerational design, also known as lifespan design, takes aging into account when

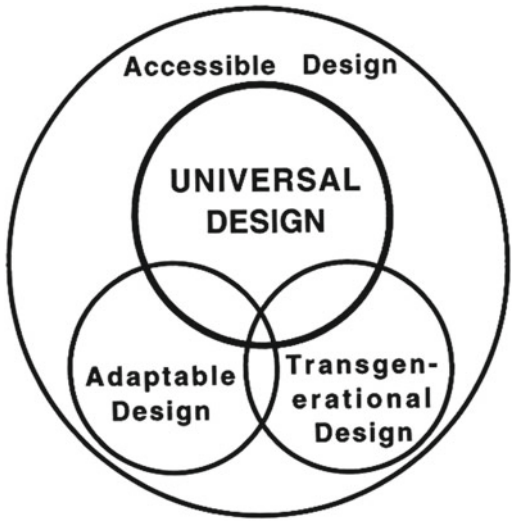

Fig. 18.2 Relationship between accessible, adaptable, transgenerational, and universal design (M.S. 2010)

creating products. Transgenerational design may not always take into account the full spectrum of potential impairments or other usability-affecting factors, such as differences between men and women, cultural differences, and literacy level, because it does not particularly address genetic ailments or changes that may occur as a consequence of an injury or disease. While some aspects of universal design are cross-generational, the strategy includes disabilities other than those that are age-related (M.S. 2010).

Therefore, universal design is accessible and sometimes adaptable across generations. The diagram shows how accessible design is divided into three categories: Universal design, adaptable design, and transgenerational design. A design might fall into two of these categories at times, and some designs fit into all three (M.S. 2010). Not every accessible design is universal. Some users are excluded by designs that are "accessible" but not "universal". Of the three accessible design approaches, universal design addresses all forms of human variation and integrates accessibility into design solutions, making it the most inclusive and least stigmatizing (M.S. 2010).

18.5.3 The Principles of Universal Design

Ronald Mace, an architect, industrial designer, and wheelchair user, developed the initial universal design concept. To help direct the design process of environments, goods, and communications, Ronald served as the leader of a team that included architects, engineers, product designers, and environmental design researchers in 1997. They created the seven universal design principles (M.S. 2010). The guiding ideas are listed in Fig. 18.3 in brief.

18.6 Data Analysis and Findings

Its checklist consists of four groups, namely

- Obstructions and signage,
- Street furniture,
- Pathways, curbs, ramps, pedestrian crossings,
- Parking.

PRINCIPLE ONE: Equitable Use
The design is useful and marketable to people with diverse abilities.

PRINCIPLE TWO: Flexibility in Use
The design accommodates a wide range of individual preferences and abilities.

PRINCIPLE THREE: Simple and Intuitive Use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

PRINCIPLE FOUR: Perceptible Information
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

PRINCIPLE FIVE: Tolerance for Error
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

PRINCIPLE SIX: Low Physical Effort
The design can be used efficiently and comfortably and with a minimum of fatigue.

PRINCIPLE SEVEN: Size and Space for Approach and Use
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

Fig. 18.3 The Principles of universal design (M.S. 2010)

These four components were evaluated independently based on 43 distinct elements. Details of the evaluation criteria are provided in Table 18.5.

The research was carried out on March–April 2022 by the author. Descriptive statistics scores were utilized to gauge how closely the urban design accessibility checklist was being followed. 43 items in each facility were assessed for accessibility based on the requirements for the respective checklist items. An item that was utilized but was not designed properly was referred to as "partially accessible." The aggregate percentile and level of compliance for all checklist items were computed for each public open space. To calculate the percentage of accessibility compliance, the sum of acquired points was divided by the total number of items (Tables 18.1 and 18.2).

$$\textbf{Formula for Calculation of Compliance score} = \frac{\begin{array}{c}(\text{Not available} \times 0) + (\text{Not Accessible} \times 0) + \\ (\text{Partially Accessible} \times 0.5) + \\ (\text{Accessible} \times 0.75) + (\text{Fully Accessible} \times 1)\end{array}}{\text{Total number of items}} \times 100\%$$

Table 18.1 Level of compliance

Level of compliance	Points granted
Fully accessible	1
Accessible	0.75
Partially accessible	0.5
Not accessible	0
Not available	0

Table 18.2 5-point scale

• Not Available (–)
• Not Accessible (NA)
• Partially Accessible (PA)
• Accessible (A)
• Fully Accessible (FA)

18.6.1 Mangalbazar

The Mangalbazar and Durbar Square area of Patan is among the busiest pedestrian regions that connects Langankhel bus park to the Palace complex. The area is one of the most significant junctions in the city. Here, vehicular traffic and pedestrians share the same space as there has been as of yet no arrangement for pedestrians. Mangalbazar (the region around Durbar Square) is a top-notch public space that ensures both accessibility and activity. However, the spatial requirement falls short for the minority group of PWD population, particularly for wheelchair users and people who are visually impaired. The main issues with ensuring the PWDs' presence and involvement in local activities are discussed below (Fig. 18.4).

18.7 Approaching the Infrastructure

One of the most important requirements for any space, whether indoors or out, is accessibility. Accessibility to the space as well as accessibility within the space are crucial for ensuring the use of public open spaces. Both of these facts are denied in Patan Durbar Square area to guarantee that PwDs can approach the area (Figs. 18.5 and 18.6).

Fig. 18.4 Aerial map of Mangalbazar (Google My Maps, 2022)

Fig. 18.5 Approaching the Infrastructure

Fig. 18.6 The only ramp available at the entry of the square is frequently dug up for pipeline or roadwork

18.7.1 Obstructions

- The surface around the barrier lacks tactile cautionary markers.
- Ragged Surface.
- Absence of Signage.
- Garbage Bins-in the middle of the pathway.
- No contrasting durable color marking strips on fixed poles to warn pedestrians with limited vision.
- Lack of warning signs around obstructions.

18.7.2 Street Furniture

- Areas for resting must be available at periodic distances between a hundred and two hundred meters.
- The surface of the pathway does not vary texture in a way that would enable blind individuals to locate public services (Figs. 18.7 and 18.8).

18.7.3 Pathways

- Frequently varying surface level.
- Curbs with potholes and irregular surfaces.
- Disruptions in the pathway that are uncomfortable or hazardous.
- Inadequate width.
- Gratings, manholes, and drains placed in the middle of the pedestrian pathway.
- No guards or barriers available for elevation variations between the path and the adjoining surface above 13 mm.

Fig. 18.7 Street furniture

Fig. 18.8 Street furniture

- Surface quality: The paving and pathways are mostly of brick soling surface or rubble concrete surface. Sometimes the surface is fragmented, cracked, and uneven, which is challenging for the easy and smooth movement of the wheelchair users.
- Lack of appropriate and distinguishable paths.
- Roadblocks on the paths preventing entry.
- Rugged and unsteady paths around the infrastructure.
- Inadequate signage.
- Unusable curb ramps (Fig. 18.9).

18.7.4 Ramps/Curb Ramps

- Inadequate ramps.
- Vehicle parking and other barriers are blocking access to the ramp.
- Ramp slope does not match criteria.

Fig. 18.9 Inaccessible steps without ramps

- The majority of locations lack handrails. Existing handrails do not match criteria.
- Ramp width not up to code.

18.7.5 Parking

- Unmanaged and poor parking facilities.
- Lack of accessible signage.
- No parking spaces designated for PwDs.

18.7.6 Signage

- No Braille indicators are present.
- Most places lack auditory and visual labeling and indicators (Fig. 18.10).

18.7.7 Sanitary Facilities

- Adequate ramps and handrail inside the toilet.
- No handrail on the ramp leading to the toilet.
- Presence of accessibility signage.

18.8 Lagankhel

Lagankhel bus park and its surrounding streets are among one of the busiest vehicular and pedestrian areas in Lalitpur. This area is a high-level public realm. The major problems associated with ensuring the PWDs' presence and participation in activities within the area are discussed below (Fig. 18.11).

Fig. 18.10 Pathways in dire need of maintenance

Fig. 18.11 Accessible public toilet

18.8.1 Approaching the Infrastructure

- No footpaths in certain parts of the access road.
- Absence of tactile marking on the surface of the paths.
- The footpath lacks curb ramps.

18.8.2 Obstructions

- Ragged Surface.
- Absence of Signage.
- Travel path with several obstructions and protruding objects.
- Lack of tactile or visual cautionary indicators surrounding the obstacle (Figs. 18.12 and 18.13).

Fig. 18.12 Aerial map of Lagankhel (Google My Maps, 2022)

Fig. 18.13 Lack of maintenance in pedestrian walkways

18.8.3 Street Furniture

- No access for PWD in the central park.

18.8.4 Pathways

- Frequent changes in elevation of surfaces.
- No guards or barriers available for changes in elevation of above 13 mm between path and the adjoining surfaces.
- Presence of holes and obstructions.
- Troublesome or hazardous disruptions in travel path.
- Gratings, manholes, and drains placed in the middle of the pedestrian pathway.
- Surface quality: The paving and pathways are mostly of brick soling surface or rubble concrete surface. Sometimes the surface is fragmented, cracked, and uneven, which is challenging for the easy and smooth movement of the wheelchair users.
- No proper signage.

18.8.5 Ramps/Curb ramps

- Inadequate ramps.
- Ramp slope does not match criteria.
- The majority of locations lack handrails.
- Ramp width not up to code (Figs. 18.14, 18.15, 18.16 and 18.17).

18.8.6 Parking

- Lack of accessible signage.
- Parking on the streets.
- No parking spaces designated for PwDs.
- Unmanaged and poor parking facilities (Fig. 18.18).

18.8.7 Signage

- Complete absence of any kind of signage.

Fig. 18.14 No guides on crosswalks

18.8.8 Sanitary Facility

- The public toilet does not offer accessibility to PWDs.
- No signage.
- Overcrowded (Fig. 18.19).

18.9 Jawalakhel

In the last decade, with its abundance of retail malls, apparel stores, cafes, restaurants, educational institutions, banks, and other contemporary facilities, Jawalakhel has become one of the most popular areas in the Lalitpur district. The open space at Jawalakhel ensures both accessibility and activities. The existing scenario associated with ensuring the PWDs' presence and participation in activities within the area are discussed below (Figs. 18.20 and 18.21).

18.9.1 Approaching the Infrastructure

- Edges of the sidewalks have curb ramps.
- Access to the infrastructure through side walks.

Fig. 18.15 Footpaths encroached by street vendors

Fig. 18.16 Inaccessible entrance to public open space

Fig. 18.17 Inaccessible curb ramps

Fig. 18.18 No designated space for parking

Fig. 18.19 Inaccessible public toilet

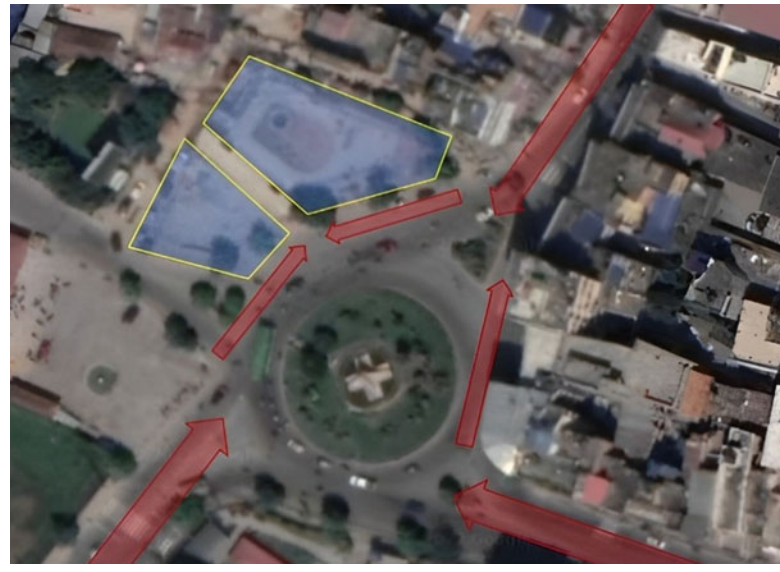

Fig. 18.20 Aerial map of Jawalakhel park (Google My Maps, 2022)

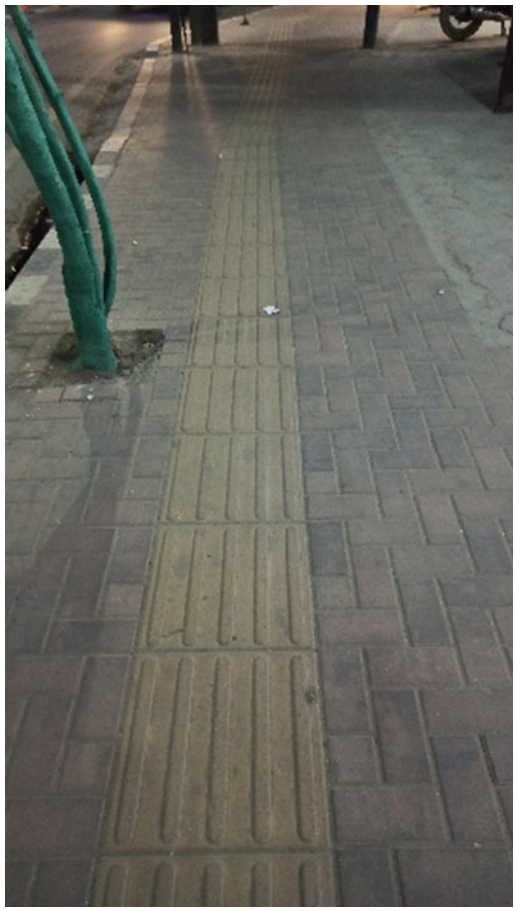

Fig. 18.21 Tactile paving

- Bright tactile tiles on the sidewalks.
- No tactile guide in crosswalk.

18.9.2 Obstructions

- Damage on the surface of footpath in a few places.
- Curb Ramps not designed adequately.

18.9.3 Street Furniture

- Adequate.
- Space for wheelchair (Figs. 18.22 and 18.23).

18.9.4 Pathways

- Sufficient width.
- Abrupt changes in level with improper curb ramps in a few places.
- Gratings, manholes, and drains placed in the middle of the pedestrian pathway.
- No guards or barriers available for changes in level of more than 13 mm between the pathway and the surrounding surface.
- Surface quality: The paving and pathways are mostly of tile surface. In some places, the surface is fragmented, cracked, and uneven,

Fig. 18.22 Inaccessible platform

Fig. 18.23 Seating area

which is challenging for the easy and smooth movement of the wheelchair users.
- Absence of traffic signal at the crosswalk.
- Curb ramps path not fully usable.
- Appropriately demarcated pathways.
- Tactile tiles not continuous through the pathways.
- No tactile markings inside the public open spaces.

18.9.5 Ramp and Curb ramp

- Curb ramps available are not well designed.

18.9.6 Parking

- Well-defined parking facilities.
- Lack of accessible signage.
- No parking spaces designated for PwDs.

18.9.7 Signage

- No Braille indicators are present.
- Most places lack auditory and visual labeling and indicators.

18.9.8 Sanitary Facility

- No provision of public toilets.

18.10 Pulchowk

Similar to Jawalakhel, Pulchowk has also experienced drastic changes in its urban form with the development of new businesses and institutions around the area. This has resulted in the park becoming a central point of many activities. The recently constructed open space is shown in (Fig. 18.24).

18.10.1 Approaching the Infrastructure

- Access to the infrastructure through sidewalks.
- Bright tactile tiles on the sidewalks.
- Edges of the sidewalks lack curb ramps.
- Absence of handrails (Figs. 18.25, 18.26 and 18.27).

18.10.2 Obstructions

- Even surface of footpath.
- Placement of park furniture causing obstructions in pathways.

18.10.3 Street Furniture

- Adequate
- Space for wheelchair.

Fig. 18.24 Aerial map of park at Pulchowk (Google My Maps, 2022)

Fig. 18.25 Abrupt changes in level at the entrance

18.10.4 Pathways

- Insufficient width of pathway in the park.
- Use of steps preferred over ramps at entrances and changes in level.
- The paving and pathways are mostly of even tile surface.
- No tactile markings inside the public open spaces.

18.10.5 Ramp and Curb ramp

- Curb ramps available are not well designed.

18.10.6 Parking

- Well-defined parking facilities.
- Lack of accessible signage.
- No parking spaces designated for PwDs (Fig. 18.28).

Fig. 18.26 Bright tactile tiles on the sidewalks

Fig. 18.27 Absence of handrails

Fig. 18.28 Absence of designated parking spots for PwDs

Fig. 18.29 Insufficient width of pathways

18.10.7 Signage

- No braille indicators are present.
- Most places lack auditory and visual labeling and indicators.

18.10.8 Sanitary Facility

- No provision of public toilets (Fig. 18.29).

18.11 Observation Results

The access audit demonstrates the compliance of various public infrastructures with the accessibility guidelines provided by the UN Design Manual. The study's findings suggest that the four public open spaces are not sufficiently accessible to individuals with disabilities because none of them achieved a hundred percent compliance with the standard specifications. The park at Pulchowk, with a cumulative accessibility percent of 59.88%, is the most compliant. But overall, the study revealed that the studied open spaces aren't sufficiently accessible (Overall conformity: Mangalbazar 33.72%, Lagankhel 16.27%, Jawalakhel 46.5%, and Pulchowk 59.88%; Table 18.3).

Indeed, the parks at Pulchowk and Jawalakhel are relatively newer spaces that were designed with accessibility in consideration to some extent. However, the level of compliance in these spaces is still inadequate since they fail to incorporate some of the basic elements that comprise full accessibility in a public space. Despite being major nodes of commerce, recreation, and transit in the city, Mangalbazar and Lagankhel areas have done poorly in the assessment. This deficiency could be attributed to the fact that these cases are relatively older constructions which lacks maintenance and upgrading. The lowest compliances were found at Lagankhel (16.28%) and Mangalbazar (33.72%). The majority of the components in these two facilities are incorrectly designed and constructed resulting in issues such as crowding, traffic congestion as well as lack of pedestrian pathways, infrastructures, and safety, which pose critical threats to all including people with disabilities.

Table 18.3 Compliance score chart: public open spaces

	– (0)	NA (0)	PA (0.5)	A (0.75)	FA (1)	Compliance score
Mangalbazar	12	13	4	6	8	**33.72**
Lagankhel	9	24	5	2	3	**16.28**
Jawalakhel	6	14	5	2	16	**46.51**
Pulchowk	3	9	9	3	19	**59.88**

Table 18.4 Location details of sampling areas

Name/location	Present condition	Surrounding functions	Problems faced by PWDs
Patan Durbar Square, Mangalbazar (Old City Core)	• Crowding • Traffic Congestion • Vitality • No footpath	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• Obstruction and Signage • Access to street furniture • Pathways • Ramps, Curbs, Crosswalks • Parking • Vendors
Langankhel Park	• Crowding • Traffic Congestion • Vitality (daytime) • Footpath not continuous	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• Obstruction and Signage • Access to street furniture • Pathways • Ramps, Curbs, Crosswalks • Parking • Public Toilet • Vendors
Jawalakhel Park	• No signs and markers for the visually impaired inside the park	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• Signage • Ramp for platform • Public Toilet
Pulchowk Park	• No signs and markers for the visually impaired inside the park • Obstructions in pathways	• Shopping • Recreation • Leisure • Major Street Junction • Stops (Microbus, Minibus, Tempos) • Commerce	• Signage • Insufficient slope of ramp • Absence of handrails • Public Toilet • Insufficient width of pathways

18.12 Discussion

As case study locations, four prominent public open spaces that represent Patan have been chosen. They are a reflection of urban development characteristics and the state of the built environment in developing economies. According to the access audit findings, the majority of Patan's public open spaces are inaccessible due to the following reasons (see Table 18.5).

- Obstructions in Pathways.
- Non-compliant or lack of restrooms.
- Inadequate signage.
- Absence of accessible furniture, curb ramps, and pedestrian crossings.

The majority of the compliant items, based on field observations, are related to wheelchair users. The available guide strips are insufficient. They incorporate negligible percentage of tactile paving and color contrasts into their design.

Table 18.5 Access audit

S.N	Technical guidelines	Accessibility compliance			
		Mangalbazar	Lagankhel	Jawalakhel	Pulchowk
1	**Obstructions**				
	Clear unobstructed path—0.90 m	PA	PA	FA	A
	Obstructions on the pathway surface	NA	NA	FA	A
	Overhanging obstructions	FA	FA	FA	FA
	Fixed poles	A	A	FA	FA
	Roadworks	A	–	FA	FA
	Bicycle stands	–	–	–	FA
	Garbage bins	FA	–	–	FA
2	**Signage**				
	International symbol of accessibility	NA	NA	NA	NA
	Direction signs	NA	NA	NA	NA
	Street names	NA	NA	NA	NA
	House numbers	NA	NA	NA	NA
	Maps and information panels	NA	NA	NA	NA
	Shape, Color, Surface, Lettering	NA	NA	NA	NA
3	**Furniture**				
	Location	A	NA	FA	FA
	Resting facilities	A	NA	FA	FA
4	**Pathways**				
	Guide strips	NA	NA	FA	FA
	Tactile marking	NA	NA	FA	FA
	Curbs (0.07–0.15)	PA	PA	FA	PA
	Width (0.9 m)	FA	PA	FA	FA
	Slope (1:20)	FA	NA	FA	PA
	Surface	NA	NA	A	FA
	Gratings, Manholes, Drainage	NA	NA	PA	FA
	Guards	–	NA	–	–
5	**Curb Ramps**				
	Width (0.90 m)	FA	NA	FA	PA
	Slope (1:12)	–	NA	FA	PA
	Guide strips	–	–	PA	FA
	Surface and color	PA	NA	PA	FA
6	**Pedestrian Crossings**				
	Guide strips	–	–	NA	NA
	Traffic signals	–	–	–	PA
	Traffic islands	–	PA	FA	FA
	Road hump	–	–	NA	–
	Surface	–	FA	FA	FA
	Drains and gratings	–	FA	PA	FA

(continued)

Table 18.5 (continued)

S.N	Technical guidelines	Accessibility compliance			
		Mangalbazar	Lagankhel	Jawalakhel	Pulchowk
7	**Parking**				
	Number (1:50)	NA	NA	NA	NA
	Location	A	A	A	A
	Dimensions (3.60 m)	–	–	–	–
	Drop-off areas (3.6 m + 1.2 m)	NA	NA	NA	FA
	Surface	A	PA	PA	FA
	Signs	–	–	–	NA
8	**Public Toilet**				
	Embossed signs	PA	NA	NA	PA
	Space	FA	NA	NA	PA
	Height Closet 45–50 cm	FA	NA	NA	PA
	Handrail	FA	NA	NA	PA

Additionally, there weren't enough accommodations for blind people, which may have been due to the designers' ignorance of these different kinds of disabilities. This might be due to a lack of prohibition and enforcement during the monitoring process.

One of several issues in the city is parking. The city's most popular mode of transportation is driving, which results in heavy traffic congestion on a daily basis as a result of people using their motorcycles and cars. Unexpectedly few parking spots or accessible parking bays are designated for PwDs in public settings.

The accessibility audit reveals that inadequate attention is paid to fixing appropriate signage, managing infrastructures, and using color contrast, braille, audio, and graphic presentation. This frequently causes PWDs to be misled and to experience difficulties in navigating the spaces.

Due to their liability for all urban open environment designs under national acts, the duty of providing accessible surroundings falls to the municipal government. Another important consideration is the percentage of professionals (engineers, designers, builders, architects, etc.) in the municipal authorities who have undergone training in disability awareness.

People with disabilities have difficulties using pedestrian roads that do not meet the standards and have unsuitable surface textures. For those with disabilities, transition issues brought on by incorrect infrastructure element placement and a lack of ramp arrangements can be extremely problematic. Disorganized and rough paving, as well as infrastructure components that do not meet standards, are problematic for those with disabilities.

The descriptive analysis of the data demonstrates the extent of application and usability of accessible design by PwDs. To guarantee the inclusion of individuals with impairments in our community and to uphold our commitment to the UN that "Everyone has the right of equal access to public service in his country," it is imperative that we address all of these issues and find solutions to the issues of physical and social exclusion of disabled people in the built environment (Table 18.4).

18.12.1 Key Research Findings

1. Comfort and suitability factor of access to public open spaces and facilities is substantially inadequate for individuals with impairments (PwDs).
2. Standard conformity is apparent only in new establishments.

3. Patan's public open spaces lack the necessary amenities and accessibility for PwDs to feel comfortable.

18.13 Conclusion

Urban settlements' public spaces fall far short of the modern standards of more affluent cities, especially in developing economies. In urban areas, there aren't many disabled people who can move around independently. This clearly demonstrates how little disabled people participate in urban life and social interactions, and how limited their opportunities are to move independently.

The findings of this study indicate that these needs have not been satisfied, even though the Lalitpur Municipality's best efforts are to incorporate accessible design in pedestrian areas and recreation facilities. Neglecting participation of PwDs and insufficient knowledge regarding accessible provisions for PwDs are two of the explanations why those amenities are not used by PwDs, the aged, or are disregarded by able-bodied citizens.

People with disabilities face difficulties in daily mobility due to issues with accessibility in public spaces. Unreviewed and inadequate policy, regulation, and inadequate upkeep of communal infrastructures turn into reasons for the design failing to meet the needs of PwDs. Additionally, it is still unrecognized in developing nations how important it is to include disabled people in the planning and design stages of cities.

Activities in inaccessible settings present some difficulties and embarrassments for disabled people. But disabled people work to get past obstacles in the environment both physically and socially in order to engage in and participate in social activities. By demonstrating their abilities and capacities in public settings and society, people with disabilities and people without disabilities can both benefit (M.S. 2010). The right to use public spaces for disabled people falls under their civil liberties, not as a favor for their acceptance in our society. Urban designers and other professionals working in the built environment need to put in more effort and demonstrate more compassion in order to fully integrate wheelchair users and other people with disabilities into society. Public buildings must be designed to become as convenient as possible for disabled people in order for them to participate in society effectively. They shouldn't just be built to comply with legal and regulatory requirements. The case study shows that Patan needs a high degree of awareness regarding the "disability" issue from the general public, authorities, and built environment specialists.

In closing, it is normal for people to be born with disabilities or to develop disabilities later in life. But it is impermissible if built environment of the city is planned in a manner that prevents those with disabilities from using them. Relevant research on this subject emphasizes how the designs exacerbate the disabilities of people with disabilities. Making urban areas accessible to people with disabilities aims to enable their social inclusion, freedom of movement outside, integration into society, and most importantly, to boost confidence in themselves (Meshur 2013). The goal is to ensure that they have good mental and physical health, that they can participate in social activities, and that they can live in the same living conditions like other community members.

18.14 Recommendations

Interventions to remove social and environmental barriers are necessary to address the challenges and isolation faced by people with disabilities in Patan's public open spaces. In this case, it is important to ensure that there is a comprehensive legislative framework for disability-friendly environments and that urban design is efficient and inclusive. Further study is warranted to incorporate development of strategies to help correct the current situation of public open spaces in terms of accessibility and inclusive urban

design. Below are some general suggestions for the successful integration of disabled people into society, based on a review of the literature, and results of access audits of the case study areas.

- Wheelchair accessibility should be ensured by a proper slope and curb ramps. (Figs. 18.30, 18.31, 18.32 and 18.33).
- Appropriate handrails are needed for wheelchair users to move independently.
- Access to all activities for PWDs to participate actively or inactively.
- The availability of walkways to ensure a safe, stable, and welcoming atmosphere for PwDs. These areas should have uninterrupted movement flow, even surface materials, and unhindered circulation.
- Furnishings for resting and relaxing, including seating areas.
- Appropriate signage to aid PwDs in their orientation.

There is a high probability of objections arising with respect to these design suggestions since the Patan Durbar Square is an extensively sensitive area of enormous historic value. Nevertheless, we can always brainstorm about new and innovative ideas to offer alternative or more preferably, equal access to such places so that people with disabilities do not experience exclusion from participation in public events and activities. To provide accessibility to people with mobility impairments, ramps with stone or brick finishing that blends into the surrounding aesthetics are recommended in four different positions which will allow users to access different levels of the temple complex including the *dabali*

Fig. 18.30 Ramps at different positions in Patan Durbar square

Fig. 18.31 Ramp at position A

Fig. 18.32 Ramp at position C

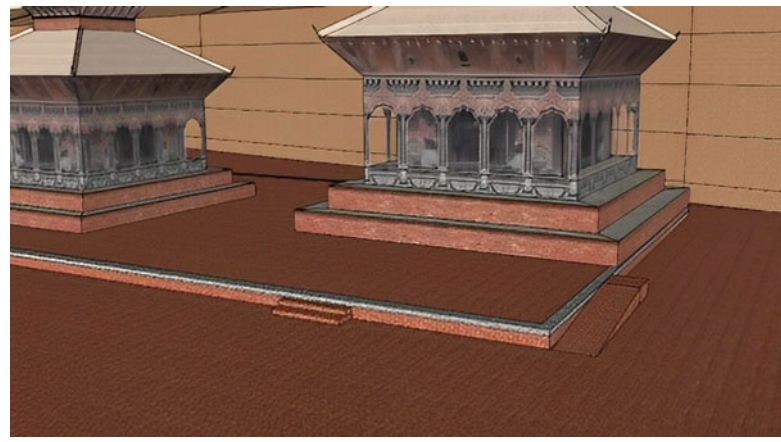

Fig. 18.33 Ramp at position B

where various social and cultural events take place frequently.

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How Do Architects Experience Collaborating with User/Experts? Learning from the Accessibility Advisory Council Leuven

19

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Abstract

Rights to accessibility are encoded in policies that govern architecture and other design domains. Studies show, however, that even well-considered legislative measures are insufficient to ensure inclusively designed environments. In this context the potential of user/expertise remains understudied. We therefore investigate how architects experience collaborating with user/experts, and how they understand and use their advice. We focus on collaboration with the Accessibility Advisory Council in Leuven, Belgium, which is largely composed of people with a mobility or sensory impairment and/or autism. Besides observing how architects discuss design projects with the Council, we interviewed architects and analyzed relevant (design) documents. Our analysis shows that architects experience the collaboration with user/experts as instructive, and their advice as complementary to accessibility legislation. User/experts are good at explaining what their needs are and why or how they matter; architects become convinced to apply their recommendations. They become convinced to take into account certain groups they have knowledge about (e.g. people in wheelchairs); for other groups they become convinced to do something, but have insufficient knowledge (e.g. blind people); yet other groups are largely unknown to them (e.g. people with autism or a hearing impairment). Collaborating with user/experts also affects how the architects understand inclusive design; they realize that its meaning is much broader than (wheelchair) accessibility. Moreover, beyond the projects discussed with the Council, they integrate user/expert advice also into other projects. Our study offers architects without experience with collaborating with user/experts a nuanced insight into its added value and its challenges.

Keywords

Collaboration · Inclusive design · User/experts

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19.1 Introduction

Inclusive design targets the largest possible group by taking into account the needs and requirements of various users during designing. Products and environments should be useable by all people, to the greatest extent possible (Connell et al. 1997).

In architectural practice, the adoption of inclusive design remains limited (Bordas Eddy 2017, Zallio and Clarkson 2021). In developed countries, Marta Bordas Eddy (2017) attributes this difficult uptake to four elements: (1) a fragmented field of knowledge with many differing and overlapping guidelines, which are reduced to and/or overemphasize wheelchair accessibility in legislative translations; (2) still only emerging attention for inclusive design in education and lacking knowledge among educators (WHO and World Bank 2011); (3) lacking economic incentives (except in Japan (Kose 2011)); and (4) misfit between knowledge representation and designers' needs (McGinley and Dong 2011). This leads to the vicious cycle of underrepresentation of persons with disability experience in society and consequently design processes. In developing economies, the uptake is even more in its infancy (Whybrow et al. 2010), as cultural differences make current guidelines not always compatible (Bordas Eddy 2017).

In Flanders (Belgium), architects tend to equate inclusive design with accessibility. It is associated with a particular target group (people with an impairment) and especially with the healthcare sector, making it less relevant for other 'normal' projects (Van der Linden et al. 2016). Besides considering inclusive design as ugly and complex, architects see practical barriers like lack of time, budget, and knowledge (Van der Linden et al. 2016). They may feel insecure about their own knowledge of inclusive design, and want to be sure no aspects of accessibility are overlooked (Wauters et al. 2014). Therefore they tend to rely on legislation, which proves difficult to integrate in their designs and, in Flanders, is limited to wheelchair accessibility.

The relationship between the human body and the built environment entails more than accessibility, however. Whereas legislation tends to reduce the human body to measurable aspects, architecture is experienced with the whole body and all senses (Pallasmaa 2005). Since architects are found to design mainly from their own experiences and have difficulty to empathize with future users (Imrie 2003), differences occur between architects' intentions and users' experiences (Heylighen et al. 2013).

One way of gaining understanding of different people's embodied experiences is by accepting their user/expertise as valuable information for design. Elaine Ostroff (1997) describes a user/expert as "anyone who has developed natural experience in dealing with the challenges of our built environment." User/experts are able to share perspectives and life experience to address design issues. Interactions with them offer architects memorable and intense experiences and their insights are useful during designing.

Involving user/experts is considered central to inclusive design (e.g. Ringaert 2001; Zallio and Clarkson 2021). In architectural education it is one of the most effective strategies for teaching inclusive design (e.g. Lifchez 1987; Welch and Jones 2002). In architectural practice, by contrast, its potential remains underexposed.

In Flanders in particular, user/expertise seems to find its way to architectural education (e.g. Vermeersch and Heylighen 2015; Ielegems et al. 2021), while professional architects remain skeptical about its value for practice (Heylighen et al. 2016). Architects also have different expectations about involving user/expertise in design: user/experts should give concrete answers to specific questions, check their design, and remove errors (Wauters et al. 2014). Research suggests that efforts are needed to convince architects of the added value of user/expertise (Heylighen et al. 2016).

The aim of our study is therefore to offer a nuanced picture of the collaboration between architects and user/experts. We focus on the Accessibility Advisory Council in Leuven (Belgium), which is composed of and chaired by

Table 19.1 Selected cases

Case	Architecture firm	Type project
't Lampeke	A33 architects	Community centre
STUK	Neutelings Riedijk	Arts center
Podiumkunstenzaal	Sergison Bates	Performing arts centre
Hertogensite	360 architects	Public space
Burenberg	BUUR (architect) & ION (project developer)	Public space

user/experts. We investigate how collaborating with the Council affects the design process of the architects involved, how they experience the collaboration, and how they understand and use the advice. Our study offers architects without experience of collaborating with user/experts a nuanced insight into its added value and challenges.

19.2 Methods and Material

19.2.1 Accessibility Advisory Council Leuven

Throughout Flanders urban Accessibility Advisory Councils involve user/experts. Their composition and functioning differ between cities. The Council of Leuven consists of user/experts (residents of Leuven with autism and/or a physical, sensory (vision, auditory) or intellectual impairment), family members and representatives of interest groups. It aims to make Leuven more accessible by giving concrete advice and improve communication between user/experts and mainly architects, city services, event organizers and the hospitality sector (Leuven Accessible 2021). While it has been around for 20 years, little is known about how architects experience collaborating with them. We focus on the Council of Leuven because of the diversity of user/experts and the way they work. The members meet once a month to discuss design projects. During the meetings architects and user/experts engage in a direct dialogue. The user/experts are no design professionals, their advice is based on lived experience.

19.2.2 Case Selection and Data Collection

The Council's chair provided an overview of the projects and associated architects/firms they collaborate(d) with. To allow studying how collaboration between user/experts and architects evolves, case selection focused on projects discussed with the Council more than once. Furthermore, diversity was sought in terms of scale and program. Eventually, five cases were examined in detail (Table 19.1), both public buildings and large sites or a combination of them.

Data collection involved interviewing architects who collaborated with the Council around the selected projects, and inventorying design documents produced by them plus meeting reports prepared by the Council. Several meetings were observed to collect additional data about communication, the course of a meeting, architects' experiences, and their and the user/experts' attitude. The chair shared meeting reports of the observed meetings a few weeks after the meeting. This allowed comparing reports of self-observed meetings and meetings of the selected cases.

The chair and interviewed architects signed an informed consent form, explaining in detail the study's purpose and approach and how data would be tracked and processed. None of them requested pseudonymization.

Interviews were semi-structured around open-ended questions, giving interviewees the opportunity to answer questions at their discretion or add relevant topics. Documents received from the architects were analyzed in advance to prepare the interview and ask specific questions.

These documents were used during the interview to explain the project and choices made. The interview guide contained four parts: general questions, design process before meeting with the Council, design process after meeting, and lessons learned from this collaboration. Interviews were audio-recorded and transcribed verbatim; during observations notes were made.

19.2.3 Data Analysis

The interviews, observations, and analysis took place in parallel. Analysis of the interview transcriptions, design documents, and observation notes roughly followed the Qualitative Analysis Guide of Leuven (Dierckx de Casterlé et al. 2012) and continued till saturation was reached. The guide's combination of traditional and creative analytical approaches proposes a compromise between inductive and theory-driven coding. We translated quotes to English.

19.3 Results

19.3.1 Evolution of Experience over Time

19.3.1.1 Architects' Expectations

The interviews and observations suggest that the Council is not yet well known by architecture firms. The observations made clear that the architects consulted it for the first time.

Usually the city services suggest to consult the Council about a design project and ask for targeted advice on accessibility. This often happens during the preliminary design phase, where important design options can still be changed. Some architects contact the Council themselves. For example, A33 architects wanted to obtain feedback in the preliminary design phase to avoid a refusal of the building permit application.

The interviewed architects seemed to have quite similar expectations. At first they had little information about how the Council functions, so they did not really know what to expect from the meeting. Wendy Vandenberk (360 architects) thought that the Council was similar to Inter, the Flemish center of expertise in accessibility: "Well yes, that was the first time for me and I didn't know well what to expect. I thought it was basically like Inter again. […] And I knew, however, that they were people who had specific experience with certain impairments. But I didn't know […] that there were really different people at the table with an impairment."

Carl Meeusen (Neutelings Riedijk) assumed that the Council was similar to other committees they presented their project to: "I went there myself and I actually thought I was going to end up in some kind of committee, so specialists […]. I was previously not informed either. […] And I get in there and I actually see all sorts of experience-oriented people on that committee. That was kind of a surprise to me at that point."

Since the composition of the group was unknown to the architects, Berno Bosch (BUUR) and Sander Plets (ION) were surprised by its size. They are used to meetings with one or two people with whom you check your plan once: "What surprised me most when we arrived was that the group was so wide. […] That was a very broad group, which is of course a lot of perspectives to look at."

19.3.1.2 The Meeting

Kirsten Gabriels (Sergison Bates) describes the course of the meeting as an interactive conversation: "It really is a conversation. … Questions are also asked in between. It's not that we gave a presentation or told a whole story and then the questions were asked at the end. But it was really a conversation 'Can you clarify this?' or 'No, I don't understand that completely.' or… It was really a dialogue and that, I think, is just very strong about the consultation with the Advisory Council."

The dialogue between user/experts and architects is crucial during the meetings. Everyone gets a chance to contribute and express their needs. The user/experts can describe clearly what is problematic, Meeusen explained: "They are very good at pointing out what a problem is […] or what we have to take into account. And then it's up to us to find the solution to design for it.

Fig. 19.1 Timeline design process Podiumkunstensite, Sergison Bates

It's actually already a bit in the word 'advice', the Advisory Council is not coming up with solutions, that's not necessary at all."

It is important that architects interpret the user/experts' comments correctly, Ludo Bekker (A33)[1] stressed. If misinterpreted, the solution to the problem also fails to meet the needs and requirements: "I'm always very open to understand 'What do we really mean?'. There's a difference between what someone says and the way it's said and the message behind it. So important for me is to know the message behind it. And if I'm not sure, I also ask 'Do you mean that or…?'".

After a plan discussion, the Council writes a report and encourages the architects to come back in later phases so that they can give more targeted advice. As the design progresses, there are always other points of interest that can be addressed. Four of the interviewed architects did come back with a more elaborate plan, Sergison Bates even multiple times (Fig. 19.1).

19.3.1.3 Architects' Experience with the Collaboration

Overall, the interviewed architects experience collaborating with the Council as positive and instructive. It has an added value for them in the design process and of course also for future users. The architects realize the difficulties people with an impairment experience in their environment.

Meeusen describes this as follows: "I immediately experienced the added value because you see much broader the difficulties people experience for which solutions have to be devised. […] And I also thought that everyone there actually had the chance to make such a contribution from different angles." The added value seemed to transcend the architects' expectations: "On the one hand due to the nature of the composition of the Advisory Council, but also really new insights that we may not be able to meet everything yet, because of course you're also limited when designing, in the given building, budget, …".

At first, BUUR and ION had prejudices because they did not know the role of the Council. They took a distant attitude, but eventually the collaboration felt very familiar: "I think the word 'growth process' is right in place […]. Like I just said, first that everyone had his own vision and were a bit suspicious of each other, that we've really grown around the table literally and have grown toward each other and accomplished something in a positive way."

Our observations revealed a similar change in the architects' attitude, from distant to acceptant and actively engaging. Their final experience did not match their initial expectations. The user/experts' comments were very detailed and specific, which surprised the architects. Meeusen put it as follows: "That was a very constructive atmosphere, though. I didn't feel like we were attacked either. So that was a very open and constructive meeting."

The constructive criticism motivated Sergison Bates to further develop the project. They were very enthusiastic and excited: "We never saw it

[1] Meanwhile Bekker moved to Ćzaar architecten, which grew out of A33.

as some kind of obstacle or so like 'Oh now we have to go to the Advisory Council.' It just never was like that. […] It's a very interesting conversation that you have at that moment where you go home and think 'Okay that's what we're going to work on now.'".

19.3.2 Accessibility Legislation versus User/Expert Advice

19.3.2.1 Architects' Experience with Accessibility Legislation

Accessibility legislation fosters architects' awareness to pay attention to user diversity, but provides little explanation. According to Vandenberk, applying the regulation is not always easy: "You read the rules in the legislation, […] you try that but sometimes you don't quite know the meaning behind it, the origin of that rule. And so, you can't always execute that perfectly in detail according to the spirit of the rule, the origin of the rule."

Bekker experiences similar difficulties. The idea behind some rules is unclear, and specialists cannot always answer questions about the meaning of the standards: "One of the major problems within the accessibility decree is that there are some really stupid things in it that I can't understand. If you have a difference in level of more than 18 cm, you have to bridge that level difference with a slope plus a staircase or a staircase plus an elevator, but if you have a slope, you don't need stairs anymore. Someone who can take a staircase can also walk up a slope of 5%, which is nothing. What's the problem? No one can give me an answer, and yet that's in that decree. "All streets in the city are in slope, they're accessible, most of them anyway."

Furthermore, the accessibility norms only prescribe those aspects that can be objectively verified, which feels restrictive and incomplete for Mark Tuff (Sergison Bates): "Certainly I feel in the UK often accessibility is reduced to […] something that can be put down into a diagram and conveyed to the professional bodies that need it and there's a kind of tick … Of course, these are important, they have to bring a certain kind of standard to new buildings but what I found so interesting about meeting the Accessibility Advisory Board is that what they bring is something quite different and certainly more sophisticated than these simple diagrams."

19.3.2.2 Added Value of User Expert Advice

The added value of user/expert advice showed during the observations, as we illustrate with the case of Burenberg (Fig. 19.2). During the design process, accessibility-related difficulties arose due to the topography of the site. Because the park garden is divided into a lower and higher part, the legislation was difficult to apply. Placing a slope according to the standards would have too much of an impact on the experience of the space, according to the designers. Their initial idea was therefore to place only a staircase and expect people who cannot take it to reach the higher garden via the surrounding streets. Through the conversation with the user/experts, the designers very quickly understood the importance of equal use and decided they had to find another solution.

The designers started investigating different options to shorten the slope. The Council's concession was that the slope may be a little steeper than the standards prescribe. The designers further found a way to lower the landscape, allowing the slope to be less steep in the end. In this way, they found a solution together so that the slope can serve almost everyone. Moreover, placing the slope slanting considerably reduced its impact on a historic wall on the site.

19.3.3 Impact of the Collaboration

19.3.3.1 Application of Advice

To gain insight into how architects apply the user/experts' recommendations, we analyzed the plans of the selected cases using colour codes (Fig. 19.3). Three categories of recommendations were distinguished: exactly applied, differently applied, and not applied.

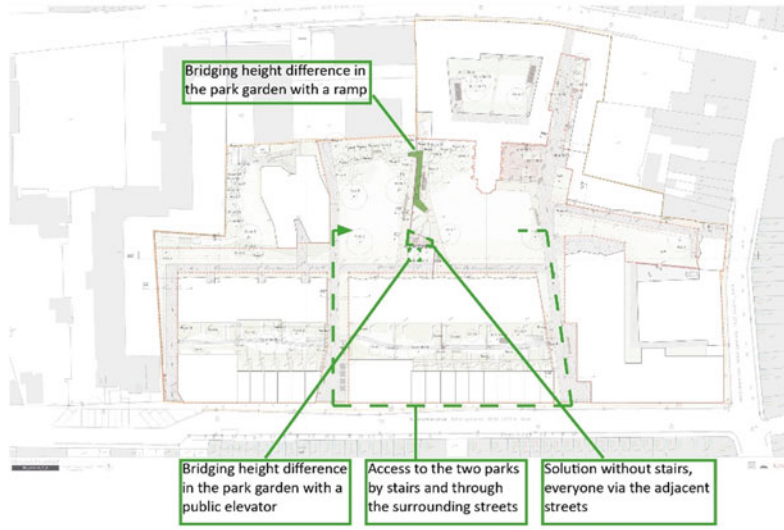

Fig. 19.2 Analysis masterplan Burenberg, BUUR

For Gabriëls the application of the advice depends on the type of comment: "It always depends pretty much on what the comment was, so for some things a very concrete comment was made that we then literally incorporated into the design."

Some comments are very clear and mainly a matter of straightforward implementation. For example, for a ramp whose initial design meets the standards, the user/experts still recommend providing intermediate platforms for more comfort. Other comments require more time to come up with creative solution: "Then the people in a wheelchair said, '4% is nice but it's a long ramp so even though it's not legally required to make an intermediate platform we'd recommend that because otherwise it's really a long way.' That was literally […] we process that. But other comments […] are not specific questions or comments. […] In the foyer, for example, it must also be a pleasant space for people with autism, for example, so how do you ensure that this large space, that you can also create quiet places there, […] of course, we had to work on that in a creative way."

Other recommendations are differently applied. For example, Bekker will apply recommendations about signage and flashing lights for fire protection, but has not yet decided where and to what extent: "[…] the icons. I don't know how far we'll go in that. The flashing light in each room for the deaf before the fire. I don't know if that should be in every room, the public classrooms, there in the attic, I think I'll put one there and down here because you have to, or maybe just here in the hall, because it's an open space."

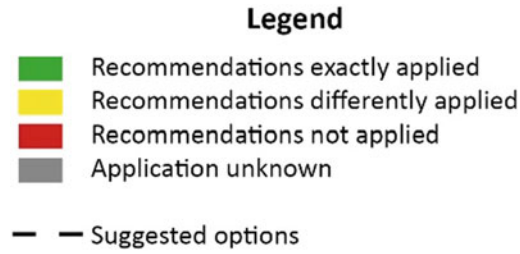

Fig. 19.3 Legend application advice

The last category covers recommendations that are not applied. On the Hertogensite master plan (360 architects), for example, three elements are indicated in red (Fig. 19.4). This means that the changes proposed by the Council have not been applied. While the architects mainly took the comments regarding vision impairment, they chose to use the city walls as a blind guide strip, against the Council's advice: "Also one of the concerns was, if you make the blind guide strip along that raised city wall, which is a bench, so at height 35 cm, you can sit on it. There was someone there who said 'If someone is sitting,

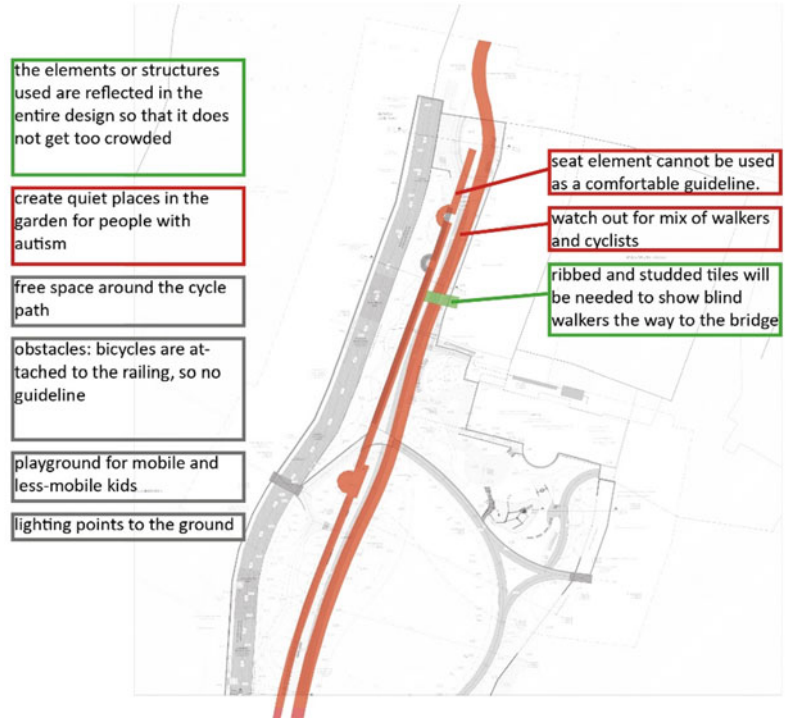

Fig. 19.4 Analysis masterplan Hertogensite, 360 architects

you can't pass.' But we think of that this seating zone is 1 m 70 wide, often young people will be there who don't necessarily sit on the edge with their feet on the footpath. They're sitting there in a group, cross-legged or with one leg to the other side. And we also think when you sit there, and you see someone passing with a guide stick, then you will make room. So those are such things, we don't think you should make an extra blind guide strip if you already have an urban object."

The advice about a resting place for autistic people is not applied either in this part of the master plan. Vandenberk clarifies this choice as follows: "This is […] a part of a public domain that's just an important connection. This is not the place to make a resting point. A resting point in our master plan, we can find it in phase two, in the park zone. This is the end that's an important connection point."

Another important remark the architects did not follow concerns the separation of traffic flows. They made this choice with a view to the concept of the master plan: "'We want to pull traffic flows apart.' Yes, that's not possible, isn't it? […] There was actually someone who said of 'yes, actually we always want a footpath, a green strip in between, a bike path, another green strip and another bike path.' Yes, that's impossible on this narrow strip. […] But that's just something you can't make in this place and from the vision of the design, that was also not the choice to focus on."

19.3.3.2 Broader Impact

The architects realize that collaborating with the Council changed their vision on inclusive design. Inclusive design became much more than just (wheelchair) accessibility or mobility.

Through the collaboration with the Council, the meaning of inclusive design is much clearer for Gabriëls: "[…] what I have now noticed very strongly here, because of the cooperation with the Advisory Council, is that inclusive design of course goes much further than just designing for wheelchair users, for example. […] So that's also about […] that the building can be used by really everyone."

The introduction to user/experts and the cooperation also broadened the architects' vision

on diversity. Sander Plets explains: "But above all it is about opening your mind a lot more and indeed you have to try to take different groups into account as much as possible and especially you can empathize with their world and how do they think? How do they reason? That that's very important."

Bekker highlights that the target group is much broader than only people with an impairment. Architects must design for the future users: "It's basically that the designer creates for all users, all current and future users. The current users we may have an idea of, but future users we have no idea of. […] These can be people with an impairment, but also people with lower income or health problems, family problems, psychological problems."

A misconception about inclusive design is that architects only have to follow the legislation in order to make a project accessible to a wide audience. According to Meeusen, inclusivity actually should not be imposed on the architects, but become self-evident: "Tension in the inclusivity, all those requirements that arise from it, […] those are good steps. But it doesn't make the design easier, because yes, even more requirements are imposed. […] And to make it workable and livable, you have to do that in a way that of course works and doesn't disturb. […] On the other hand, I'd also say I think that this inclusivity shouldn't be imposed anymore in the sense of it's just like with sustainability. […] things like sustainability and inclusivity, they actually should become self-evident."

By collaborating with the Council, BUUR gained many insights on a theoretical level of inclusive design. At the same time, they had the opportunity to apply these insights to a concrete project, which also has a huge impact on practice. The cooperation was an instructive process with several positive consequences for future projects. According to the interviewed architects, several comments made by the user/experts were taken to other projects.

Through the collaboration with different architects, the staff of different offices get to know the Council. For example, Meeusen gave a presentation in the office about the project discussed with and the advice received from the Council. The collaboration was unique for him and he shared his experience with his team. Other team members spontaneously included elements that are exactly applicable in new projects: "But I'd say paying attention to broadening our vision on inclusivity, that's what I found very interesting about it. […] And the interesting thing is that I see it now and then popping up in other projects, so that something of it has been picked up by the staff and included in other projects."

19.4 Discussion and Conclusion

Research suggests that architects are not yet convinced of the added value of user/experts (Heylighen et al. 2016). This motivated us to investigate the collaboration between architects and user/experts of the Accessibility Advisory Council Leuven. Aspects addressed include how the architects experience the collaboration, accessibility legislation versus user/expert advice, and the impact of the collaboration. As these themes feature in research on the international (lack of) attention for inclusive design (Bordas Eddy 2017), discussing our local case study has broader relevance.

Since the role of the Council was unprecedented for the interviewed architects, they did not know what to expect. Due to the application of accessibility legislation, they had some experience with user diversity. Our analysis suggests that the interviewees are indeed familiar with the standards, but the underlying idea or meaning is not always clear to them. Moreover, the guidelines are limited to wheelchair accessibility and impose minimum and/or maximum sizes, while the relationship between the human body and the built environment entails much more than accessibility (Pallasmaa 2005).

This is where the experiences of user/experts play an important role. Like other user/experts (Vermeersch and Heylighen 2015), the Council members focus on identifying spatial qualities. Moreover, they can clarify their needs and requirements, which are not all summarized in the accessibility legislation. In this way it

becomes clear to the architects why they must apply certain standards and recommendations in the design process. Last but not least, the user/experts give constructive advice and help find acceptable solutions that are feasible instead of just focusing on problems. As a result, the Council proposes solutions that occasionally deviate from the norm.

This constructive attitude stimulates the interviewed architects to apply the recommendations. They experience collaborating with the Council as positive and instructive. Thanks to the collaboration, they do realize the added value of user/expert advice in the design process. Combining insights from user/experts and architects thus shows potential to contribute to designing high-quality space (Heylighen et al. 2013). The dialogue between both provides an interesting form of knowledge exchange (Strickfaden, Devlieger and Heylighen 2009).

What is called "constructive advice" also shows similarities to what Cross (2006) calls "designerly ways of knowing" and might help explain why architects appreciate this form of advice. In the dialogue, we see a similar solution-focused problem-solving approach that aims first for practicality and correctness second. For example, the discussion between architects and Council about Burenberg leads to a slope that does not meet the norms exactly, but fits the site, and is evaluated by the group as better than a system of stairs and elevators. Here, the Council shows they understand the ill-defined nature of design problems: they do not end their advice with a single evaluation, but make suggestions for design directions, e.g. by describing other cases and solutions that work for them, and adapt their advice along the way as in the Burenberg slope example. This is a sign of how problem space and solution space move together (Rittel and Webber 1972).

Another quality of designerly ways of knowing is empathy (Cross 2006). In design, empathy is said to rely on two important steps that tend to be skipped by designers: the ethical decision to apply empathy and the embodiment of others' experiences (Heylighen and Dong 2019). The dialogue with the Council can help in this. First, the ethical decision is advanced as is illustrated in the architects' changing attitude throughout the meetings. Secondly, the embodiment step, if not complete, is at least initiated, as is illustrated in the added values described: where legislation is prescriptive, the architects describe the user/experts' advice as explanatory of why certain prescriptions are important and how they can be interpreted. This aligns with how other scholars advise implementing ethnographic knowledge in design, not as guidelines but as explanatory narratives (Dourish 2006). That this second step is still incomplete, we see in the argumentation when advice is partially/not applied; e.g. the argumentation to skip a guideline where there is a bench, but diminishing the impact of seated persons potentially disturbing the guidance.

Without meaning to suggest an ideal way to involve user/experts in design, we refer back to Sergison Bates' timeline, which reflects the iterative nature of their design process when it comes to user/expert involvement. This again shows how the designerly nature of the interaction makes it worthwhile to architects.

Besides the dialogue between user/experts and architects, the dialogue among the user/experts themselves is also an important part in the plan discussion. It is crucial that the user/experts understand each other's needs and come to an acceptable solution together. A solution for one group is not always good for another. "For example, a curb is very useful as a guideline for the blind, but creates a barrier for wheelchair users" (Leuven Accessible 2021).

Inclusive design emphasizes designing for a diverse audience, taking into account the needs and requirements of diverse users (Connell et al. 1997). Remarkable among the interviewed architects is their conviction to take into account certain groups, such as wheelchair users, about which they already have knowledge from the standards. For other groups the interviewees are convinced to do something, but have insufficient

knowledge. For example, they know that they must provide blind guidance, but its application is not entirely clear. There are also unknown groups the architects must take into account, such as people with autism and people with hearing impairments. Architects know little about their needs and requirements. This may explain why these user/experts give advice during every meeting. They appear in almost every report.

The collaboration with the Council also has a broader impact on the vision of the interviewed architects. Through this collaboration, they understand that inclusive design is much broader than (wheelchair) accessibility or mobility. Also, the impact within their office and on other projects is worth noting. Advice that is easily applicable is integrated into other projects.

During the meetings, the communication between architects and user/experts plays an important role. The observations and the interviews show that it is not obvious for the architects to verbally explain their plans. Since the user/experts find the experience of a space very important, they appreciate presentations constructed as a kind of 'walk' rather than presentations about the associated concepts. Moreover, the former are also much easier to follow for vision impaired people as mutual connections between spaces are more clearly displayed.

Our study relied mainly on interviews with architects, observation of meetings, and analysis of design documents and reports. A similar study can be conducted with more attention to the experience of user/experts, interviewing Advisory Board members about how they experience the collaboration. Further research can include visiting finished projects together with user/experts with attention to the recommendations formulated by the Council earlier in the design process. In this way, the impact of the advice becomes clear to the researchers and to the user/experts themselves. Finally, their advice can be compared to other forms of advice, e.g. by governmental agencies, Accessibility Advisory Councils in other cities in Flanders, or consultancy firms.

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20 Exploring the Physical Environment Opportunities for Accessibility in Homes of Children with Cerebral Palsy in Malaysia

Nur Halinda Halimi, Norwina Mohd Nawawi, and Srazali Aripin

Abstract

Cerebral palsy (CP) is a common disorder and disability in children. Statistically, 2 to 3 out of every 1000 births are diagnosed with CP globally. The therapists are the main point of reference among caregivers of children with CP for advice when building the appropriate built environment. This study aims to identify the elements in the home-built environment to improve accessibility and promote independence among children with CP. The methodology used for this study was interviews with occupational and physiotherapists in Malaysia. Findings show that the elements in the physical environment designed or modified for the use of children with CP are similar to the guideline MS 1184: 2014 Universal Design and Accessibility in the Built Environment—Code of Practice. These physical attributes are commonly suggested by therapists to families of children with CP when making adaptations to their homes. However, most therapists are not familiar with the said national legislation. Accessibility in the built environment to promote the independence of children with CP is very important for their well-being and preparation to enter adulthood. This study concludes the importance of MS 1184 as a reference for modifying and designing the built environment for both therapists and architects. A suitable built environment will be beneficial to children with CP to enhance accessibility and promote independence while also mitigating the dependency on their caregivers.

Keywords

Cerebral palsy · Built environment · Accessibility · Independence

20.1 Introduction

Cerebral palsy (CP) is the most common disability among children (Himmelmann et al. 2005). It is estimated that CP is recorded in 2 to 3 out of every 1000 births, i.e., twice the number for Down syndrome (Cans et al. 2000). CP is a compilation of permanent disorders involving disability in movement, functional motor skills, and/or posture (Sadowska et al. 2020). It is caused by an injury or damage to the developing brain during pregnancy, birth, or a few years after birth (Patel et al. 2020). There are three main types of CP: (a) spastic, (b) ataxic, and (c) athetoid, and the spastic type is the most common that contributes to 70% of all CP

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conditions (Padmakar et al. 2018). Diagnosis of CP after birth can be detected as early as 6 months of age (Novak et al. 2017). To date, there is no cure for CP; hence, the detection of CP must be made earliest possible to commence medical treatments and therapies, which may increase the quality of life (Summers et al. 2019). This condition results in physical disability and sometimes intellectual impairments (Krigger 2006). The physical impairment mostly renders the usage of assisted devices, such as wheelchairs and walkers. Degree in mobility and functionality is measured via Gross Motor Function Classification System (GMFCS), with Level V being the most severe and dependent on others. In Malaysia, the Department of Social Welfare received 1147 registration under the Persons with Disabilities (PwD) from January 2019 until November 2021. Individuals registered with CP under PwD are usually categorised as having a physical disability.

Previous studies proved that the appropriate built environment benefits children with CP in terms of accessibility, functionality, participation, and quality of life (Halimi et al. 2022). Most studies about the physical setting for children with CP were made by scholars from the rehabilitation and medicine disciplines. Studies by architects or professionals from the field of the built environment are scarce. Moreover, studies by scholars from the built environment mostly cater to PwDs in general and are not scoped down to the CP community. Although studies focus on the attributes of the built environment, usually involving professionals from the built environment industry, occupational and physical therapists are the source of information as they work very closely with children with CP and their caregivers. Therapists are the main reference among caregivers in all aspects when it comes to managing and caring for their children with CP. This includes advice and assistance from occupational therapists regarding modifications and adaptations of their homes (Boniface and Morgan 2017; Wellecke et al. 2022; Russell et al. 2018). The modifications made to the physical settings of their home not only ease the caregiver but also train the child to be as independent as possible. Home modifications also help to enhance health-related quality of life (Carnemolla and Bridge 2016). Facilitative equipment, such as adjustable tables and fittings to the built environment, like railings, are considered home modifications (Stark et al. 2015).

In line with the Sustainable Development Goals 2030 (SDG), Malaysia is also playing its part towards achieving the goals and targets of transforming into a developed and sustainable nation. This study coincides with Target 11.3 and 11.7, i.e., to deliver a safe, inclusive, accessible built environment for all, including the elderly and PwDs. In Malaysia, the practice of Universal Design started in the late 1980s after Malaysian Standards release three guidelines namely MS 1183:1990—Specification for Fire Precautions in the Design and Construction of Buildings, MS 1184:1991—Code of Practice on Access for Disabled Persons to Public Buildings and MS 1331:1993—Code of Practice for Access of Disabled Persons Outside Buildings, back then. It is compulsory for architects and professional designers in Malaysia to refer to and comply with the latest Malaysian Standard 1184: 2014 Universal Design and Accessibility in the Built Environment—Code of Practice (Department of Standards Malaysia 2014) in all physical developments, embedded in the Uniform Building By-Law 1984 legislation. This document elaborates on the minimum requirement for designing and building for PwDs to allow accessibility and ensure inclusivity. It also envisions fulfilling the accessibility needs of everyone, including people with hearing, visual, mobility, learning, and hidden disabilities, as well as the frail and ageing population.

Policies and references ensuring that the built environment is accessible to all persons with disabilities, including individuals with CP, are scarcely discussed in the literature. Services providing guidance and advice on making adaptations in the residences of CP individuals are lacking (Švraka 2014). Likewise, the legal framework and regulatory underlining barrier-free environment for children with disabilities are limited (Moore and Bedford 2017). Local authorities should introduce additional laws to

enhance the physical environment of homes, communities, schools, and workplaces (Rezaei et al. 2022). Despite the challenges and encounters faced by disabled children in the built environment, these were not channelled to inform the policymakers (Stephens et al. 2017). Regardless, it is unknown to what extent the MS 1184: 2014 has been made known to the public, and even the law enforcers of the built environment are still not barrier-free and fully accessible.

Currently, reports, references on comparisons and assessments of the built environment for children with CP at home versus the MS 1184: 2014 are limited. Therefore, this study aims to identify what are the elements in the home-built environment that may assist in improving the accessibility and independence among children with CP. It also would like to seek whether advice from the therapists to caregivers in home modifications is similar to the requirements underlined in MS 1184: 2014 (see Fig. 20.1).

Fig. 20.1 Malaysian standard 1184: 2014 Universal design and accessibility in the built environment—code of practice (Department of Standards Malaysia 2014)

20.2 Materials and Methods

This study employed the qualitative method via a semi-structured interview. Interviews in qualitative methodology are commonly conducted physically, through telephone calls, or by gathering a group of six to eight participants (Creswell and Creswell 2018). The informants are invited according to the inclusion criteria as follows:

(a) A physiotherapist or occupational therapist who is involved with children with CP of any Gross Motor Function Classification System (GMFCS) Level and any usage of the type of assisted device.
(b) Has a minimum of five-year work experience in public or private healthcare facilities or non-governmental organisation (NGO).

During the semi-structured interview, a list of protocols was followed to ensure the process ran smoothly. Protocols in interviews are also essential to guarantee that the information gathered is sufficient and optimum (Turner 2010). The data collection was done in three main phases: (a) pre-interview, (b) during the interview, and (c) post-interview. The process is as follows:

(a) Pre-interview
The interview questions were established according to the review of literature and the objective of the study. Experts were referred to seek their professional opinions. The potential candidates to be interviewed were contacted, mainly from NGOs and public healthcare facilities.
(b) During the interview
The interviews were conducted via video calls on Google Meet online application and conventional phone calls, according to the preference of the interviewees. Prior to the session, the interviewees were informed of the interview questions to be asked, and permission to record the session was obtained.
(c) Post-interview
The recorded interview sessions were translated into verbatim transcripts for analysis.

The questions are as below:

(a) In your opinion, are there any physical barriers or problems towards children with CP related to the physical environment?
(b) If YES, in your opinion, are modifications needed in homes of children with CP?
(c) What problems and issues need modifications to address for the accessibility of children with CP?
(d) Have you heard of MS 1184: 2014 (Malaysian Standard) Universal design and accessibility in the built environment—Code of Practice?

After the completion of the verbatim transcripts, thematic analysis was adopted to identify the similar inputs suggested by the informants and comparing them to the MS 1184: 2014 document. Thematic analysis is a tool to analyse data into emerging patterns and codes (Clarke and Braun 2013).

20.3 Results and Discussion

Seven informants comprising three physiotherapists and four occupational therapists working for local NGOs and public healthcare facilities all over Peninsular Malaysia accepted the invitation to participate in the interviews. The demographic background of the informants is as demonstrated in Table 20.1. Four therapists are stationed in Selangor and Kuala Lumpur (Central of Peninsular Malaysia), meanwhile one informant each from Terengganu (East of Peninsular Malaysia), Johor (South of Peninsular Malaysia) and Penang (North of Peninsular Malaysia). Three informants are servicing under public health institutions while the rest are working for NGOs. Their range of working experiences is between five to 28 years. When repetitive opinions were heard and unique views stopped emerging, a point of saturation was achieved (Cobern and Adams 2020). Saturation is mostly reached earlier when interviews were from a homogenous sample or purposive sampling (Guest et al. 2006). All therapists unanimously agreed that many barriers and problems in the built environment are still inaccessible to children with CP. These physical barriers reduce and influence the functionality and participation of a child. It also affects their caregivers, as they may face a hard time and hindrance in managing their child. Accessibility for children with CP or disabilities should not be concentrated only at home; it should be extended to all settings in which these children are involved.

Occupational Therapist S:

> Aside from modifications of the home, recommendations are needed to enhance the physical environment of those attending primary schools, secondary schools and even matriculation. Currently, the built environment in higher education institutions is not fully disabled friendly for PwDs.

The most frequently used spaces informed through this interview are the bathrooms and the bedrooms, as tabulated in Fig. 20.2. One informant responded that all spaces in the house should be equally utilised by children with CP, just like any other members of the family. The interviewees voted that the bathroom is the most

Table 20.1 Demographic background of informants

Therapist	Institution	Location	Years of experience
Physiotherapist A	NGO	Selangor	7
Physiotherapist S	NGO	Penang	7
Physiotherapist Az	Public Health Facility	Kuala Lumpur	15
Occupational therapist H	NGO	Johor	10
Occupational therapist S	Public Health Facility	Kuala Lumpur	28
Occupational therapist Su	NGO	Selangor	25
Occupational therapist L	Public Health Facility	Terengganu	5

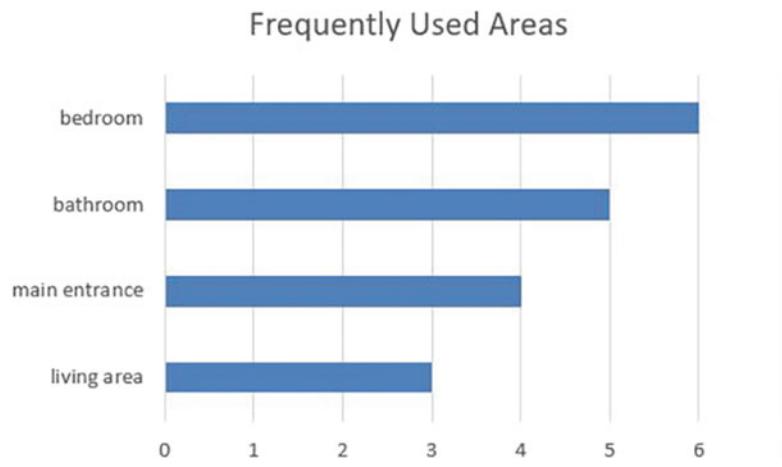

Fig. 20.2 Frequently used areas in the house according to therapists' experiences

common space that needs modification. On the contrary, two interviewees agreed that the whole house needs to be modified to suit the child's needs instead of focusing on certain spaces. This is to ensure optimum participation of the child with CP with other family members and to enhance inclusivity. Meanwhile, bathrooms top the priority list that needs to be modified, as demonstrated in Fig. 20.3. Bathrooms are commonly used privately; therefore, it is important to ensure their safety by making the required modifications. Accidents and injuries often occur in bathrooms and toilets because of their wet condition (Cesario 2009; Capezuti et al. 2008; Johnson et al. 2011). However, adapted bathrooms are also beneficial for the elderly or family members with temporary injuries or disabilities.

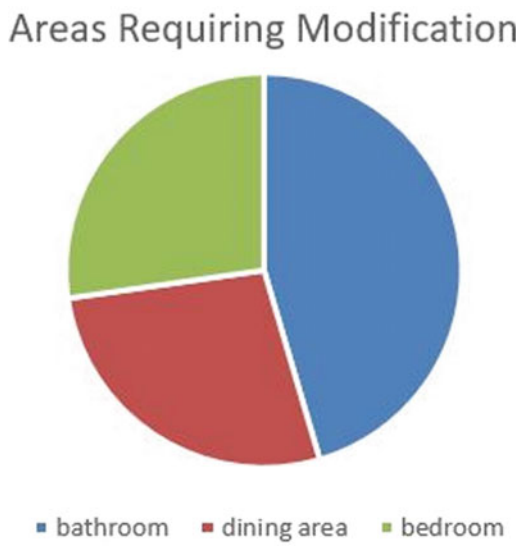

Fig. 20.3 Areas that require modification according to therapists' experiences

Most of the attributes and architectural elements introduced by the therapists are similar to MS 1184: 2014. These suggestions are general and commonly needed for children with CP with the GMFCS Level III to IV and require assisted devices to mobilise. Table 20.1 demonstrates the general attributes that need to be modified in the homes of children with CP, as advised by therapists. The far-right column indicates the attributes listed in MS 1184: 2014. Two recommendations are not stated in the document, while the other attributes are described intricately and with detail. Installation of water taps or hand bidets at the water closet (WC) shall be located on the side of the dominant hand, either left or right. Some children do not have good coordination and functionality of both hands; therefore, they normally use their dominant hand to function better. In contrast to MS 1184: 2014, the water taps or hand bidets are to be installed on the right side of the WC. It is also recommended that all four walls be installed with grab bars, so the child has something to grasp when utilising the bathroom. Meanwhile, MS 1184: 2014 demonstrates that the grab bars should only be located around the WC (see Fig. 20.4).

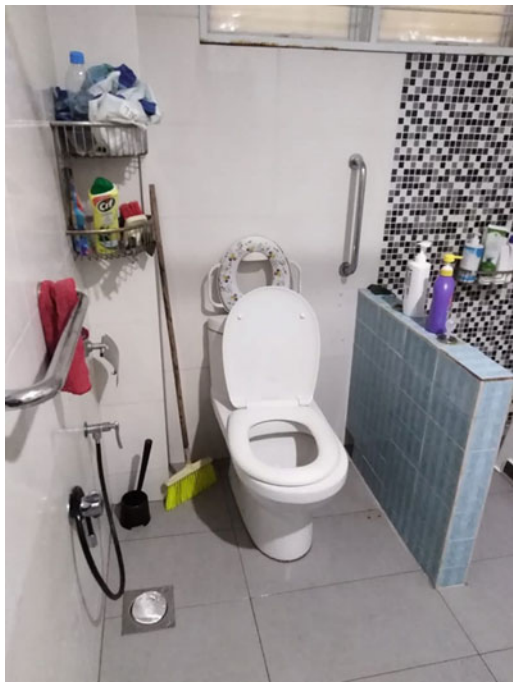

Fig. 20.4 Modified disabled toilet at home

Fig. 20.5 Ramp, crucial element for wheelchair users

Physiotherapist S:

> The floor finishes shall be not too slippery and not too rough. Slippery finishes may cause falls while rough surfaces may make it difficult for wheelchairs to move around.

The above findings and information from the therapist are comparable to the MS 1184: 2014 document, as shown in Table 20.2. These were the common design strategies offered by the therapists to families when making home modifications. From the list, four attributes need additional enhancement, i.e., the installation of a water tap or hand bidet at the WC space is best to be on the side of the dominant hand, fittings of taps may be of crossed-type design for better grasping and not just the lever type, grab bars are on all four walls instead of focusing on areas like the shower cubicle and WC area, and furniture, in general, would be great if they were all adjustable, such as tables, beds, and chairs. Other attributes listed such as seamless entrances and ramps as illustrated in Fig. 20.5, non-slip floor finishes, sufficient circulation, sufficient lighting and appropriate height of furniture were similarly highlighted in the MS 1184:2014 document. However, referring to Table 20.3, most therapists are not familiar with MS 1184: 2014. Despite the similar suggestions by the therapists to the MS 1184: 2014, details on the dimensions and measurements are specifically more elaborate in the MS 1184: 2014. The measurement demonstrated in the document suitably fits the ergonomics and anthropometric requirements of any disabled person. It is crucial that these sizes be followed to enable optimum functionality and accessibility and, most importantly, to create a safe environment to avoid accidents and injuries. Even with minimal technical knowledge of construction and built environment, therapists may advise and assist families of children with CP by referring to the MS 1184: 2014, as they are one of the first points of reference families of children with CP turn to for advice on home modification and home therapies. Therefore, it would be beneficial for therapists to equip themselves with MS 1184: 2014. The interviews with the therapists

Table 20.2 Physical attributes for the home modification for children with CP

Attribute	Description	MS 1184: 2014
Entrance	No kerb, no step, no threshold, ramp, wide door	√
Non-slip floor finishes	Selection of floor finishes especially in bathrooms and wet areas	√
Circulation	Sufficient area for turning radius and mobility of devices	√
Toilet/bathroom feature	Location of water tap or hand bidet on the side of dominant hand use at WC space (left or right side)	Right side only
	Appropriate size of WC according to child. Squatting type should be avoided	√
	Taps are best to be cross-type or lever-type handle for easy operation	Lever type stated
	Grab bars around the toilet of good quality and durable	Not fully on all four walls
Sufficient lighting	All spaces shall be clearly lit and visible, especially wet areas	√
Appropriate height of furniture	Adjustable furniture such as beds and tables allow children with CP manage by themselves	Adjustable tables stated

Table 20.3 Awareness on MS 1184: 2014 amongst therapists

Therapist	Awareness on MS 1184: 2014
Physiotherapist A	No
Physiotherapist S	Yes
Physiotherapist Az	No
Occupational therapist H	Yes
Occupational therapist S	No
Occupational therapist Su	No
Occupational therapist L	No

confirmed the claim in previous studies, whereby one of their tasks is to facilitate families of children with CP in modifying and transforming the physical environment of their homes to be more accessible.

Modification and adaptation in homes are usually needed for children with GMFCS Levels III, IV, and V, who move around using assisted devices. Children with GMFCS Levels I and II could mobilise independently and usually do not require much assistance. Besides enhancing accessibility and promoting independence, modifications lessen the burden of the caregiver without having to attend to all activities of their child. These modifications also increase the safety of children with CP. Universal design elements in homes introduce safety, comfort, and ease among PwDs (Ab Rahman et al. 2018). This is another crucial factor in ensuring the safety of these children during their independent time, particularly in wet areas like the toilet. The findings of this study can also be applied to other physical impairment that limits an individual's accessibility, adults, and the elderly. As these elements are focused to improve physical accessibility and not addressing to other impairments such as visual, hearing and intellectual. The only difference is the dimension and specification sizes, as it is not only bound to children with CP. For instance, the height of the water closet (WC) and diameter of grab rails will differ from children to adults.

This study has further identified the difference in roles between architects and therapists and

Table 20.4 Difference in roles between architects and therapists

Context	Architects	Therapists
Home modification	Minor participation	Major participation
Newly built home	Major participation	Minor participation
Newly built facility	Major participation	Minor participation

when their participation is needed, as listed in Table 20.4. The purpose of the role segregation roles is to have families with CP children or stakeholders understand whom to refer to when making home modifications or in a new building. The involvement of the architects and therapists is divided into major and minor participation. Major participation represents maximum involvement with the family of children with CP or stakeholders, such as NGOs, while minor participation is defined as minimal involvement. Home adaptations that are minimal and minor, such as installing grab rails and construction of additional ramps which do not involve structural integrity of the home, may be referred and advised by therapists who have the basic knowledge of the MS 1184: 2014 while integrating other needs of the child with CP. In contrast, architects play a major role in designing new homes or facilities because it requires approval and consent from related local authorities.

20.4 Discussion and Conclusion

This study proves that the findings from the interviews of the seven therapists concurred with what is described in the requirements of the MS 1184: 2014 guideline. However, most therapists are unfamiliar and unaware of MS 1184: 2014. This is not a surprise since they are not involved directly in the development of the built environment. Therapists are aware of the barrier-free environment, as most of their patients are disabled. From these sets of interviews, it can be concluded that design strategies and modification elements shall include barrier-free spaces, safe and non-slip finishing, sufficient lighting of space and reachable height of furniture. It is recommended that therapists and caregivers are educated and exposed to MS 1184: 2014. As an architect, this paper is one small step to spread the knowledge of MS 1184: 2014 and the importance of universal design in homes as well as the public built environment. The MS 1184:2014 should not be kept among designers in the built environment only but to everyone in the public, especially those dealing with PwDs. The therapists can provide better advice according to MS 1184:2014. The knowledge of MS 1184: 2014 will allow accurate dimensions as required in the built environment, creating a more accessible and safer environment for this cohort. Although they are not experts in the built environment, the approach or solution for home modifications can be carried out with a better perspective. Home modifications can be made with accurate dimensions and appropriate usage of materials. Subsequently, caregivers can also do adjustments at home independently, without engaging with professional designers, which may be costly. It is already a financial burden for caregivers to raise a child with CP. The average expenditure to care for a child with CP is estimated to be USD 12,515.03 per year (Ismail et al. 2022). Caregivers can also make home adaptations according to their preferences while implementing the correct universal design approach. Some caregivers complained that they were not fully involved or well-informed of the planning, and their personal opinions were not attended to when designers and builders were engaged (Roy et al. 2008; Morgan et al. 2016). Therefore, exposure and knowledge regarding MS 1184: 2014 would benefit all parties to execute home modifications independently while creating the right physical environment for children with CP and people with disabilities.

Overall this study is beneficial for the home built environment and other building typologies that involves the habitants of PwDs. In the context of homes, this study may be the basis to

improve the current housing and government quarters built environment scenario, where universal design has yet to be fully implemented. Furthermore, the findings of this study can be adopted when designing other building typologies such as special schools for children with disabilities, hospitals, work places and other related institutions. It is recommended that the next phase of this study is (i) to make further observation in homes of families of children with CP that have undergone modifications to investigate and correlate the findings, (ii) to organise more knowledge-sharing gatherings and social platforms that involve professionals from the built environment and rehabilitation fields and, (iii) to cover the spectrum of CP children's life as suggested by therapists to include physical environments of schools, shops and other public facilities to be independently accessible. Future studies may venture beyond these aspects.

Acknowledgements This study is part of my ongoing postgraduate research towards accessible built environment in homes for children with CP. I would like to express my deepest gratitude to all the therapists who volunteered in this study. I am sincerely grateful to my supervisors, Datin Seri Ar. Dr. Norwina Mohd Nawawi and Assistant Professor Ar. Dr. Srazali Aripin, for their endless support and guidance.

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Enabling Abilities by Universal Design: Mapping Academic Initiatives

21

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Abstract

The concept of Universal Design (UD) embraces the diversity of user needs in relation to both the built environment as well as design products. The concept also addresses the current agenda of "Leave No One Behind" and UD can be seen as a framework for architectural practice and architectural research to operationalise UN Sustainable Development Goals. Though, there is a gap between the theoretical elements of UD and the practicing world of design and architecture. Several research initiatives have operated within this intersection of architectural practice and research, trying to bridge the research-practice gap. Based on a systematic literature review this paper addresses the questions: How do the initiatives aim to exceed a traditional user perspective, and by which means do they engage with abilities and disabilities? How is the gap between design ideology and architectural practice operationalised in these academic initiatives? Four overall tendencies were discovered across the sources: (1) use of the seven principles of UD, (2) user involvement or involvement of an expert, (3) systematisation of user needs and (4) use of knowledge or a tool from another field. To conclude, these findings illustrate that planning and designing our future built environment is a shared responsibility and involves a range of stakeholders. The review shows attempts of bridging ideology and design practice. However, to see the different studies as a patchwork across research and design, could help us evolve the field by standing shoulder by shoulder to reach even further regarding inclusivity.

Keywords

Universal design · Literature review · Inclusivity · Design ideology · Design practice

21.1 Introduction

In line with the United Nations 2030 Agenda (UN 2015) encompassing the sustainability development goals and the pledge to "Leave no one behind", the scope of inclusivity gain traction in society due to several issues including an aging population, increasing obesity and cultural diversity (Steinfeld and Smith 2012).

Addressing these issues from an architectural stance is a challenge as the architectural practice is a complex context to navigate, with a wide variety of projects, stakeholders and agendas.

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Because in the framework of the individual project, inclusivity is up against measures of functionality and time-cost-efficiency (Zallio and Clarkson 2021). Hence, design ideologies as Universal Design (UD), Inclusive Design (ID) and Design for All (DfA) have been developed to embrace the diversity of user needs and are frequently used as synonyms among a variety of different design procedures, both industry-established and tailored by the specific practice (ibid.). The concept of UD was coined in the 1980'ies as a "[…] way of designing a building or facility, at little or no extra cost, so it is both attractive and functional for all people, disabled or not" (Mace 1985 p. 147). Today UD is integrated in UN statements as designs and built environments "usable by all people, to the greatest extent possible, without the need for adaptation or specialised design" (UN General Assembly 2007 article 2). However, Story et al (1998) argued that UD should be considered a process rather than a result, as it was unrealistic to design solutions that everyone could use. The notion of UD as a process was emphasised in the work of the Global Universal Design Commission and later integrated in the work of WHO. Here UD is described as "a process that increases usability, safety, health, and social participation through design and services that respond to the diversity of people and abilities" (WHO 2011). Furthermore, it is described as a dynamic way of thinking and working with design, a process that enables designers to create environments that accommodate and embrace the myriad different types of users that are represented in our diverse and ever-changing societies (Steinfeld and Maisel 2012). Beyond the traditional categories of disabilities, UD holds a broader focus on abilities where functional impairments can also be temporary due to e.g. injury, socially or economically vulnerable living situations, economic restrictions, medication, pregnancy or being a caregiver to a disabled family member—where "circumstances of everyday life reduce human abilities all the time" (Steinfeld and Smith 2012). To ease application for architectural practitioners there have been different efforts of concretising the design philosophy of UD, as seen in the seven principles (Cornell et al. 1997), and the eight goals (Steinfeld and Maisel 2012).

However, despite being a "pervasive interdisciplinary design methodology" (Steinfeld and Smith 2012, p. 2540) in branches as product design and industrial design, UD has still not been fully implemented in engineering and architectural design. Professionals working within the field of UD have criticised it for being too abstract to apply as a process methodology or tool in practice (Erdtman et al. 2021). Furthermore, the inclusive design ideologies have not been fully integrated in architectural curricula (Tauke et al. 2016). They are often confused with the paradigm of accessibility e.g. in continuous professional development (Shea et al. 2018) or only seen relevant in relation to contexts of care, e.g. hospitals and assisted living facilities (Van der Linden et al. 2016). Consequently, there is a gap between the ideological and meta-theoretical elements of UD and the practicing world of design and architecture (Ielegems and Froyen 2014).

One of the reasons for the inertia in the field in making the built environment applicable by a much larger group of users, can be found in the management and transfer of knowledge between practice and academia (Kirkeby 2015). How context-dependent and context-independent knowledge is operationalised in each of the professional fields of practice, where user perspectives and inclusivity ideally should be guided by a dialogue between architectural research and architectural design practice. Where ideologies as inclusion and UD are used as inspirational and context-independent metaphors supporting and qualifying the process, while context-dependent knowledge is used to guide the practical problem-solving of the design process. Kirkeby (ibid.) emphasises the transformation of knowledge at stake in the design process as the design solution and problem are identified and processed in parallel. And more particularly, for knowledge to be implemented in this process and across different contexts, it must be transferable. However, the knowledge that design practitioners typically apply in their design process range from random, but context-specific exemplars to

context-independent industry standards and Building Regulations. The operationalisation of user knowledge has most often been unsystematic, and the knowledge of practicing UD has not been articulated, documented or accumulated across the individual projects. Instead of reading research reports or articles, the practitioners want to engage with the researcher 1:1, inviting the expert to the table (ibid.). Thus, Kirkeby points at that, the dialogical in-person attendance of the researcher and the shared "reflection in action" concerning the specific task (p. 544) is an opportunity for a new kind of cooperation. Thus, she suggests that to ease implementation, research should focus more on context-dependent knowledge.

In recent years, several research initiatives have operated within this intersection of architectural practice and research, trying to bridge the research-practice gap, developing frameworks, tools or methods for incorporating user knowledge and to support more inclusive designs. In this paper we investigate initiatives that focus on the design process and assess them in relation to their focus, approach and outcome by posing the following questions: How do the initiatives aim to exceed a traditional user perspective, and by which means do they engage with abilities (and disabilities)? And how is the gap between design ideology and architectural practice operationalised in these academic initiatives?

21.2 Materials and Methods

In this section, we account for the methodological approach applied in the review and working process. From November 2020 to December 2020 a systematic literature search was conducted using primarily the scientific database Scopus with supplementary and minor searches in Avery Index of Architectural Studies, as well as library engine searches and general web searches. The search strategy included the keywords *universal design; architecture; built environment* and *landscape*, and an array of cluster concepts related to UD; *design for all, inclusive architecture, inclusive design, barrier free design* and *accessibility*. Searches were carried out using singular keywords and were also combined in links comprising two and three of the identified keywords. The result consisted primarily of conference papers. The collected material amounted to a total number of 3289 hits on the keyword of *universal design* in Scopus alone. Furthermore, the combined keyword searches in Scopus, along with the supplementary searches in the complementary databases and resources, contributed with a small quantity of novel findings and a body of recurring and previously identified material. The criteria for including papers were that they had undergone a peer-review process and were subsequently deemed suitable for publication in a scientific publishing channel. Overall, a total of 4837 documents were found, of which a vast amount was excluded due to duplications or assessed out of scope, based on an initial screening of title, keywords and abstract. Following the identification of articles and papers that were initially evaluated and deemed appropriate in continuation of our research questions, the abstracts were distributed in the group of authors for further scrutiny and a more thorough examination. This reading resulted in the formulation of 6 preliminary working clusters *comprising learning/teaching, user and environment, process/method/tool/policy, examples on buildings/build environments/cities, status in the field* and *theoretical articles/review articles*. Each of the 44 papers categorised in the cluster *process/method/tool/policy* was classified regarding what phase of the construction process they addressed: mindset/program/predesign (sketching)/engineering design/occupancy phase/redesign. Papers on space-mapping; specific design solutions and occupancy were excluded, resulting in 25 sources for the full review. At this point of the work, the documents were distributed among a group of four reviewers, and the papers were delegated to a primary reader. In the first round of coding, each paper was given a short description and supplied with descriptive keywords (e.g. "tool", "proposal of a new model" etc.) in order to characterise and systematise the sample. Some of the literature could potentially belong to two or

more categories as it addressed different elements in the defined thematic clusters. However, we decided that they would only figure in one category. In addition, and as a result of the focussed reading carried out at this point, four of the previously identified 25 sources were excluded from further investigation, landing at a total of 21 papers. The last part of the review process consisted of readings and re-readings leading towards discussion, analysis and the insights presented below.

21.3 Results

Across the 21 sources, published in the years between 2005 and 2020, four overall tendencies were discovered in the reviewed literature: (1) use of the seven principles of UD (2) user involvement or involvement of an expert, (3) systemisation of user needs and (4) use of knowledge or a tool from another field. In the following section, the four tendencies are presented.

21.3.1 The Seven UD Principles

A tendency in the reviewed literature is, not surprisingly as we deal with Universal Design, the use of the seven principles of UD. In three of the five papers in this category, the seven principles are integrated and used directly as a structure for a tool while they play a more basic role and are applied together with other concepts in the two remaining papers. In the first paper, the authors' interpretation of the seven principles is presented aiming at raising awareness about human diversity in the design process concerning bus rapid transit. The framework is completed with the suggestion of four initiatives to enhance the goal focussing on operationalisation, best practices, production of knowledge about user experiences, and creation of an understanding of the complexity of identity systems (Bitterman and Hess 2008). In a paper by Siu et al. (2019), another framework is based on a case study of open space in three Asian cities in relation to people with visual impairments. The seven principles of UD and its 29 sub-points (Cornell et al. 1997) are applied in a content analysis of documents, the evaluation of the spaces and the subsequent comparison of the three cities. Yet another paper suggests a new design philosophy: 'universal safety and design'. The original seven UD principles are used as a starting point in the development of a basic guideline for product design focussing on the products themselves but also productivity and the working conditions for the workers acknowledging that the age of the workers will increase (Kim and Jeong 2020). This guideline is composed of six principles: physical support, flexibility, accessibility, ensuring safety and health, diversity and inclusion, and sustainability. Another paper describes the development of a model for the design of Assistive Technology projects related to the physical environment. The model is based on a fusion of the principles of usability and the seven principles of UD combined with five categories from Gibson's sensory system in order to integrate knowledge about the human sensory system into design practice (Livramento da Silva et al. 2019). Based on a literature review, another paper (Mosca and Capalongo 2020) presents the seven UD principles together with five other concepts and their criteria including e.g. the eight goals formulated by Steinfeld and Maisel (2012). Thus, a Multi-Criteria Analysis concludes that they all intend to encompass three types of qualities: physical-spatial, sensory-cognitive and social. Based on this structure of categories, a model composed of criteria and indicators is developed. What characterises this cluster of papers is the 'personalisation' of the seven UD principles in the development of an adapted and expanded version aiming at the creation of a kind of usability or tangibility in the design process when evaluating a design solution. Unfortunately, the papers do not explain how their models or frameworks should be used in the design process.

21.3.2 User/Expert Involvement

In this category, the reviewed literature explores approaches towards the acquisition and integration of user and expert knowledge in the process of working with UD. As a common outset, the research reflects an aim to strengthen and develop the level of inclusivity within built environments. By acknowledging and gathering perspectives and experiences from groups of actual and potential users (Gossett et al. 2009; Siddall et al. 2011), user participants in design processes (Broffman 2015; Gossett et al. 2009), stakeholders (Ask 2016), as well as from a range of different experts (Heylighen et al. 2016; Vermeersch et al. 2018), the ambition is to produce knowledge applicable in the design process. Common to the literature in this category is the strive to decrease distances between the creative work carried out by architects during design stages, and the end users for whom the final design must be suited, appropriate, supportive and applicable. The argument posed is that insights from e.g. disability studies and other relevant disciplines very rarely find their way to mainstream architecture and construction processes even though conducted market studies reveal interest in the idea of user and expert involvement (Vermeersch et al. 2018). Furthermore, the implementation of inclusive design strategies is challenged by barriers such as overall economic factors and a lack of economic incentives towards including perspectives of people with functional impairments and other 'minorities' (e.g. Heylighen et al. 2016). Other barriers are complex policy, local languages, cultural differences, and the effect of diverse cosmological understandings and traditions at play in given settings (Broffman 2015). These are significant problems, as well as great opportunities, in the operationalisation of universal design within the architectural practice: They point to a crucial need for deeper empirical understandings of particular people, their needs as users of architectural space and solutions, and of the broader socio-cultural and socio-spatial contexts in which given design projects are developed and implemented. Therefore, as the authors argue in different manners, knowledge of user and expert experience constitute a highly important foundation for the development of successful inclusion in the built environment.

Different methodological approaches towards the acquisition of these types of knowledge are suggested in the articles. One is the development of (fictional) personas applicable as a tool for visualising diversity among future users in the design stages (Siddall et al. 2011). Ask (2016) describes how representatives for various user groups are engaged during consecutive meetings and feedback sessions along a design process to inform the work of architects. While Heylighen et al. (2016) apply explorative approaches towards the engagement of user-experts with diverse impairments to assist and inform the redesign of an existing building. Another ambition is to create inclusive design among aboriginal peoples of Australia, and to overcome cultural and linguistic differences between users and designers in the process. Thus, Broffman (2015) proposes the application of a visual and story-based methodology responsive to the diverse cosmologies and worldviews of the users and the architects, respectively. In another context, Vermeersch et al. (2018) suggest the facilitation of a participatory workshop to include the views and needs of future users. An example of a more consistent and holistic design approach founded in the philosophy of UD is presented by Gossett et al. (2009). They explore and describe the decision-making process during the construction of a new office building in Chicago housing a disability-rights organisation.

21.3.3 Systematising User Needs

The demand to include human needs in the design process has led to the development of different tools and methods to generate, organise and use information. As an example, on a macro, meso and micro level a UD pattern tool put

forward problems that users encounter in the physical environment and suggests architectural and technological solutions for inclusive design. These empirically based solutions are proposed with the intention of accommodating a diversity of users with different functionalities in a multitude of situations and contexts. The UD patterns are meant as a basis for discussing the quality of different design solutions and to give design guidance (Froyen et al. 2009; Verdonck and Froyen 2011). The authors suggest that interviews with user-experts and architects as well as case studies of real-life architectural projects should be used to test this UD pattern tool and develop it further (Verdonck and Froyen 2011). Furthermore, a variety of methods and tools (e.g. observation, participation, role playing) are available to form a standardised approach in the inclusive design process. The methods and tools focus on collecting, analysing and applying information on user perception and can be used to cope with design issues. The standardised approach is seen as an alternative to the use of standardised criteria and different methods and tools are still to be tested for advantages and disadvantages (Lukman et al. 2014). Moreover, a manual is proposed to support the design process of spaces for all users. It should inspire and ease a design for all strategy and includes features on communication, organisation, understanding and use. The attention is on understanding and reflecting on the different users' needs in different types of circumstances and on informing on existing relevant knowledge to develop creative solutions. The manual is still in development and can be seen as the basis for an informative tool (Mosca et al. 2018). In general, the focus of the tools and methods is on providing structured design information which makes it possible to handle a variety of different user needs in the design process. They aim at going away from standardised criteria and understanding the "why" motivating creative and innovative solutions. A common characteristic is that the tools and methods are still in the making and therefore not fully developed.

21.3.4 Transferring a Tool from Another Academic Area

When architects and designers design the actual solutions, that offer the most equal access for a diverse group of people and, the best possibility of taking part in society and its surrounding environment, they look for guidance. How to complete a thorough process that results in a universally designed environment is an often-posed question. One of the answers is straightforward: to reach out for well-known tools in other areas and adjust them so that they fit within the new situation. The reviewed literature in this category all describes the use of tools and methods from other fields of research to discuss how to achieve environments that can be characterised as UD. Designing for a vulnerable user group needs specific attention where knowledge about the users is of importance (Ielegems et al. 2015, 2016). This approach is also present in the discussion of a model emerging from software design (V-model). Based on a reinterpretation of this model it is discussed how to generate valuable information concerning the design process by securing a closer link between the user and the architects (Ielegems et al. 2015). In continuation of this discussion, Afacan and Erbug (2009) place their discussion on how to test usability. Incorporating UD in an architectural design does not automatically succeed in a fully accessible environment. Therefore, testing through an interdisciplinary heuristic evaluation method is suggested to help pinpoint where the design has achieved its goal and where there are shortcomings (ibid.). On a larger scale, Afacan and Afacan (2011) see a relationship between city planning —through the method of Mat urbanism, sustainability and UD. This approach still must be tested in real life.

Integrating the concept of UD directly into the design process of 3D programs makes the design of an accessible environment easy and efficient for designers and architects in the design phase (Ormerod and Newton 2005; Jarde and Valdez

2012). Two studies tested 3D model systems incorporating guidelines and building codes related to UD. The result of the two tests is described very differently. Jarde and Valdez (2012) conclude that it is efficient and a very well-functioning tool to include UD guidelines in 3D modelling. While Ormerod and Newton (2005) do not find the integration satisfactory. They see the concept of Universal Design as a holistic approach and the 3D program primarily succeeds in integrating the quantitative aspects but not the qualitative aspects. Conclusions like these that reflects two different interpretations of UD make it difficult to compare recommendations. This furthermore points towards the importance of discussing the approach to and the understanding of the concept of UD.

Summing up, four categories or approaches of how to operationalise user knowledge are present in the literature, each reflecting a focus within the design process. The first category, *ideologies*, the studies demonstrate that the focus on inclusive ideologies is channelled into the design process by developing their own versions of an ideological tool or model. These attempts are often based on the seven principles of UD. The second category, *involving users*, focuses on gathering knowledge about specific users to understand their position and challenges. The third category, *systemising user needs*, shows attempts to repudiate from standards. Paradoxically, this approach could result in a creation of a new kind of standardisation. And in the fourth category, *transferring a tool from another academic area*, involves attempts to implement methodologies or tools to operationalise UD, originating from other contexts than architectural design.

21.4 Discussion

Looking across the sample of studies reveals an interesting patchwork of UD in practice. Concerning the user perspectives, all the studies, by subscribing to the overall ideology of UD, or other corresponding approaches, support a broader perspective on users. Embedded in the ideological approaches recognising the aging society (Kim and Jeong 2020), addressing the human sensory system in design practice (Livramento da Silva et al. 2019) or embracing the physical-spatial, sensory-cognitive and social qualities of built environments (Mosca and Capalongo 2020). Moreover, in addressing user knowledge, some of the studies also demonstrate a broader understanding of the user in the way they acknowledge the importance of needs, perspectives and experiences in reaching appropriate, supportive and applicable design, including the complexity and diversity of local policies, languages and culture. User knowledge can be enabled and supported by visual methodologies (Broffman 2015) or by the development of fictional personas (Siddall et al. 2011). Diversity in user information can be supported by multiplicity in both functionalities, situations and contexts, and human perception is a way to accommodate user experiences regardless of (dis)abilities (Froyen et al. 2009; Verdonck and Froyen 2011), and design strategies target communication, organisation, understanding and use (Mosca et al. 2018). In line with this, usability is also a point of departure for assessing and evaluating UD (Afacan and Erbug 2009).

In relation to Kirkeby's (2015) note on the use of context-independent and context-dependent knowledge in the design process the four tendencies can be seen as levels of abstraction positioned between the two types of knowledge: the context-dependent and the context-independent knowledge.

All the initiatives demonstrate some level of transferring knowledge, however each of the papers is positioned in one of the different layers of the user-ideology divine. None of the studies concern the translation from the general to the specific, or the other way around. A design methodology of inclusivity would ideally use both the qualitative knowledge of users, and the academic knowledge base to guide and navigate the design process. However, despite that some of the papers found inspiration in another field, the coordination or continuation of knowledge base is not demonstrated in the studies reviewed. Instead, each focussed on designing new models, concepts, or methods. Similar tendency was

present in a study of the practice of architecture published after our review was completed. Here Zallio and Clarkson (2021) suggest a new method to this practice: 'The Inclusive Design Canvas v. 1.0' comprises user journey, user capabilities and user needs in relation to physical, sensory, and cognitive abilities. Furthermore, a new definition of Inclusive Design is introduced: the acronym of IDEA; Inclusion, Diversity, Equity and Accessibility. Where academia holds a long tradition of transparency and developing fields of research, it seems as if the research-practice relation in these cases holds the characteristics of the design practice, reinventing and innovating rather than mobilising. Consequently, a relevant discussion to the field of inclusive architecture is whether we need new concepts to understand and communicate the ideology to practice, or if we need to maintain a consistency to enable, cultivate an operationalisation of the ideology, through the knowledge layers embedded in design practices, standards, tools and data.

We praise the contributions for being active and developing the field, and a reason for the different scopes may be due to the format of the scientific paper that primarily supports a delimitation of a specific case or problem. In this sense, each of the academic initiatives in bridging the gap between design ideology and architectural practice is only partly succeeding. Our own scoping review demonstrates this type of focus: To assess and discuss the design process we have deselected other phases and activities of the construction process. Reaching across the themes is complex and would require another format e.g. a book or that we connect and coordinate between the efforts taken. The design of the literature review was exclusively focussed on scientific literature indexed in Scopus, which does not include textbooks, manuals or grey literature. The latter encompass materials produced and disseminated by organisations outside of the traditional commercial or academic publishing and distribution channels. In this sense the traditional paradigm of the academic review also excludes certain types of knowledge, adding to the gap between research and practice.

Our mapping shows a patchwork of concepts, methods and models, which would be interesting to follow into their implementation in a situated architectural practice. To learn more about the considerations and negotiations informing the use of the design—as the proof of the pudding is in the eating. We do acknowledge that in the nature of architectural design practices, there might not be neither resources nor interest in sharing practice knowledge 1:1. However, the lack of both knowledge and competences regarding how to reach the inclusivity in our built environment is obvious. What we need in order to mobilise the field is perhaps to keep on operationalising knowledge across research and practice, between the general and the specific, and to make the translation from ideologies into a specific context more explicit. Not by standardising the solutions but to recognise the means that scaffold these processes, and with the overall patchwork in mind. Furthermore, we encourage that this dialogic encounter reaches beyond the personal attendance of the researcher in the design processes (Kirkeby 2015). In the way that both researchers engage with the actual real-life processes and frameworks for design and that architects and designers confer deeper with both the ideological frameworks and the growing knowledge base on inclusion in academia. We believe that the skill of the designer to synthesise, coordinating details and totality and coordinating across the trajectory of time, would be the right fit for facilitating more diverse user needs. Planning and designing our future built environments are a shared responsibility and involve a range of stakeholders, where the studies reviewed shows attempts at bridging ideology and design solutions. However, to see the different studies as a patchwork across research and design, could help us expand and evolve the field in a way where we, standing shoulder by shoulder can spot the shortcomings and the potential improvements and thereby reach even further regarding inclusivity.

21.5 Conclusion

"Creating a built environment that allows as many people to participate and use it, is one of the greatest challenges for architects going forward" (UIA 2022). With this paper, we want to contribute to the promotion and discussion of UD as an essential tool to achieve inclusivity as described in the UN 17 Sustainable Development Goals to be attained by 2023. UD is a process that aims to respond to the diversity of people and abilities by increasing usability, safety, health and social participation via design (WHO 2011). Awareness and use of UD in the architectural field is still in its infancy and face many challenges. A consistent one is that both academics and practitioners consider UD too abstract a term and process tool. Although we point to and investigate this crucial gap in bridging ideology and design solutions, our results also indicate a budding and energetic will to make UD usable in achieving a built environment for all of us.

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22 Research on Inclusive Design Strategy to Enhance Accessibility in Global Ageing: A Case Study of the Public Housing Wayfinding Design in Macau

Sin In Sou and Jianyi Zheng

Abstract

Under the background of ageing society and housing shortage, achieving authentic inclusion in public housing design has been a global issue. With the framework underpinned by several design guidelines and related research in wayfinding, seven accessible wayfinding design criteria are summarised. The main purpose of this research was to identify the priority and importance of accessible wayfinding features in social housing by different decision-makers and stakeholders. This research examined an Analytic Hierarchy Process (AHP) with local architects, social workers, and related experts to develop evaluations of 13 cases of public housing in Macao, China. A further typology analysis of corridors in these cases was developed to study the effectiveness of the wayfinding process. Overall, a positive impact can be found between wayfinding in social housing and the enforcement of accessible design regulation. Other findings include: (a) compared to universal design, the inclusive design method is more valued in the wayfinding design of public housing; (b) despite of site planning and position of buildings, it is considered that the scale and shape of corridor has the second highest influence in one's wayfinding experience; (c) a few spatial typologies could be derived from the circulation systems of the research cases, in which linear, T-shape and H-shape corridors provides the most effective wayfinding process. This study has provided an insight into the implementation of inclusive design in wayfinding and contributed reference to effective wayfinding design in public housing. For practical analytical reasons, there is room for further progress in determining the size and variety of the research cases.

Keywords

Inclusive design · Accessible guidelines · Wayfinding · Social housing · Global ageing

22.1 Introduction

The objective of the United Nations (UN) Sustainable Development Goal 3 (SDG 3) is to ensure healthy lives and promote well-being for all at all ages. According to the World Population Prospects by the UN (2019), the proportion of a society's population that is comprised of persons aged 65 or older is called the "ageing rate". If a society's ageing rate exceeds 7%, it is qualified as an "ageing society". If the rate surpasses 14%,

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it is an "aged society"; if over 21%, it is a "super-aged society" (United Nations 2019). Take Macau as an example, the overall population census results published in 2021 shows that 14.5% of the local population is aged 65 or older, which implies that Macau is already an aged society (Government of the Macao SAR Statistics and Census Service 2021). Moreover, as per the prediction published in Trends and Challenges of Ageing Population (Government of the Macao SAR Statistics and Census Service 2013), Macau will become a hyper-aged society in 2036. Therefore, building an environment to face the challenge of ageing population is the key to achieve sustainable society development.

The rapid changes in the population structure emphasise the importance of an age-friendly society that can lead to 'successful ageing' or 'healthy ageing' (Rudnicka et al. 2020). The definition of healthy ageing established by the World Health Organization (WHO) refers to the process of developing and maintaining the functional ability that enables well-being in older age (Fallon and Karlawish 2019; Michel and Sadana 2017). WHO considered that functional ability is developed between intrinsic capacity and environmental characteristics (Beard et al., 2017), which is related to home, community, and society as a whole. The study also suggested that building an age-friendly environment is the meso-level action to enhance healthy ageing, despite there are macro-level actions such as legislation and funding (Rudnicka et al. 2020). The current data highlight the importance of healthy ageing and achieving functional ability in the environment globally. Under this background, the term 'accessible' has been gradually replaced by 'universal' or 'inclusive', implying that the need for accessibility is no longer limited to people with disability but the majority who has longer lives (Kose 2021).

22.1.1 *Ageing Society and Public Housing in Macau, China*

The underlying relationship between ageing society and the concern about public housing has been well-established. The Joint Centre for Housing Studies of Harvard University (2016) has released the Projections and Implications for Housing a Growing Population: Older Households 2015–2035, which focused on the implications of ageing populations and the housing needs of older adults with disability. Similarly, the Local Government Association (2017) in the United Kingdom suggested that well-designed and integrated housing can respond to an ageing population and reduce hospital admission.

In Macau, public housing was initially constructed as humanitarian aid. In 1985, the Housing Institute refurbished 3 blocks of the standard housing estate as elderly-friendly housing and continued to improve various facilities (Housing Institute of the Government of the Macau S.A.R. n.d. a). A service centre has been established in the building by a social services group to offer 24-h emergency care for the elderly. In 2017, the Final Report of Social Housing Demand (Macao Public Governance Research Centre 2017) precast that due to the reduced income caused by population ageing, the demand for public housing would rise to 42,401 units by 2026. However, this report has undervalued the growing need for affordable housing. By June 2021, the cumulative number of social housing and economic housing in Macau has reached 52,000 (Directorate of Policy Studies and Regional Development Services 2022). Together these studies provide important insights into the relationship between ageing society and accessible public housing.

According to the Social Welfare Bureau, there are 1,006 units designed for seniors in the social housing programme. In case the tenant has made a request, the Housing Bureau would carry out improvement works for the elderly's homes, such as removing bathtubs and adding handrails in bathrooms (Social Welfare Bureau 2016). It is only until 2022 that the government officially proposed the concept of 'Apartment for the seniors' in the document of Study on the Policy of Housing for Residential Purposes in the Macao S.A.R. However, it is claimed that the current social housing and economic housing system can meet the housing needs of some

elderly people. The 'Apartment for the seniors' is designed to house those who live in a building without an elevator (Directorate of Policy Studies and Regional Development Services 2022). Yet the target tenant of the 'Apartment for the seniors'(AFS) is elderly with economic foundations, therefore the 'Apartment for the seniors' is a housing type similar to private housing and not to be confused with public housing. As such, it is still necessary to study the accessible design problems of public housing in the background of an aged society. The AFS will be included in the research cases in this study to reflect the accessible design with other public housing.

The issue of accessibility was not much addressed in the design of public housing in Macau, other than the interior improvement made in some of the housing estates in 1995 (Housing Institute of the Government of the Macau S.A.R. n.d. b). This may be related to the 'Establishment law for the suppression of architectural barriers' which came into force in 1984. It has been the only legislation regarding accessibility in architecture for the past 30 years, which makes it necessary for the local government to amend the law. Since the government published the Architectural standards for universal and barrier-free design in the Macao SAR in 2018, it thereafter compulsory for architects to comply with its mandatory requirements in all new-built local public construction and government-funded building design, including public housing. This study will look into professional attitudes towards the guideline and its influence on local public housing design.

22.1.2 Design for Wayfinding in Ageing Society

As people age, many begin to experience difficulties in hearing, vision, and mobility, or cognitive issues such as memory loss. Some of the age-related cognitive issues are dementia and Alzheimer's Disease (AD). The percentage of the population who have dementia is expected to significantly increase due to ageing and reduced family sizes (Moffat et al. 2006). The U.S. Census Bureau (2010) identifies a collection of age-related declines in perceptual, cognitive, and physical ability in normal ageing, many of which are well-known in studies on ageing cognition and perception. This is due to spatial disorientation and declining wayfinding abilities are among the frequently mentioned early symptoms of dementia (Marquardt 2011). Davis and Veltkamp (2020) concluded that wayfinding is a complicated process that requires multiple cognitive functions that will degrade with normal ageing. They also performed a series of experiments showing that people with AD are more likely to experience spatial anxiety. Most importantly, the research found that the behaviour of spatial design could lead to spatial anxiety, which correspondent to the number of mistakes and the time required for navigation (Hund and Minarik 2009). These studies highlight the need for well-designed wayfinding in buildings to aid the ageing population.

22.1.3 From Universal to Inclusive Design

It can be concluded that accessibility is widespread in architectural practice through regulations and guidelines. Yet, there is a distinction between a facility that demonstrates evidence of universal design and one that is simply 'handicapped accessible'. These accessible features may appear aesthetically clunky compared to the others, or they may isolate a disabled person due to their location or appearance (Smith 2013). Additionally, when designers consider accessibility as a checklist to meet these standards, they are only concerned with the technical aspects of accessibility. As a result, social interaction is commonly compromised, and accessibility is not reached (Web Accessibility Initiative n.d.).

Compared to accessible design, universal design is a user-centred design approach that focuses on understanding a particular population's needs and how those needs can be considered in the design of a product that will also cater to a wider user base (Harrington Koon and Rogers 2020). Notwithstanding, as stated in the

Universal Design Handbook published in 2001, these initiatives retain that all mainstream products should be available to as many people as is technically feasible, however, this implies that universal design has the same literal interpretation which rationally recognises that one product cannot always fulfil the requirements of the whole population (Preiser and Ostroff 2010). In the past decade, this philosophy is applied in the regulations and guidelines for accessible design globally, including Norway, Singapore, Hong Kong and Macau and many more (Norwegian Ministry of Children and Equality 2016; Building and Construction Authority 2016; Architectural Services Department 2004; Architectural Standards for Design Conception of Universal and Barrier Free in the Macao SAR Group 2017).

In contrast, inclusive design is a more dynamic and iterative process. As discussed previously, the current trend of disability research tends to aim for the full range of diversity and needs, which could be referred as an inclusive approach. The British Standards Institute defines inclusive design as 'the design of mainstream products and environments that are accessible to, and usable by, as many people as reasonably possible … without the need for special adaptation or specialized design' (Keates 2005). In 2018, the inclusive research centre in Canada developed a three-dimension guiding framework of inclusive design, including recognising diversity and uniqueness, inclusive processes and tools, and broader beneficial impact (Trivianus 2018). Collectively, these studies outline the critical role of community collaboration and process-based iteration in the inclusive design process. It could be used at any point during the design process, not just at the start or when referring to accessible guidelines during the detail design stage.

22.1.4 Inclusive Wayfinding Design

In the philosophy of social science, the ability to navigate in a built or natural environment is known as wayfinding. It is a skill people developed from early childhood and an experience that has built over time (Piaget and Inhelder 1956). The construct of wayfinding in cities was first articulated by American planner and urban designer Kevin A. Lynch (1960), who popularize wayfinding in his book 'The Image of the City'. He defined a legible city as one that implements patterns of noticeable symbols that are simple to identify and logically grouped. According to Lynch, paths, edges, districts, nodes, and landmarks are the five key elements that make up these symbols. It was not until the late 1980s that architects considered wayfinding in the building worthy of scholarly attention. Architect and environmental psychologist Romedi Passini and his collaborator Paul Arthur published two of the first comprehensive works on wayfinding in architecture. These studies expanded the concepts of wayfinding to graphic communication including signage, colour, tactile and auditory cues, as well as the form to navigate the built environment (Passini 1984; Authur and Passini 1992). Moreover, Arthur and Passini developed a framework which divides wayfinding in the processes of decision-making, decision execution, and information processing (Authur and Passini 1992; Passini 1984).

Nowadays wayfinding in the accessibility context aims attention at signage and maps. Provision of information centre, colour code with high contrast, and proper illumination are some of the design guidelines for architects to follow. These design requirements are commonly found in universal design guidelines. However, when different guidelines are compared, it shows that inclusive design methods address more in wayfinding.

Summary and comparison of current design standards regarding wayfinding:

With some of the best design guidelines available, the UK is acknowledged as a global leader in inclusive design. While most countries are still undertaking accessible or universal design standards, the UK has published the BS 8300-2:2018 Design of an accessible and inclusive built environment. Buildings—code of practice in 2018, which goes well beyond the limitations of statutory planning and building regulations (Morris 2016). As concluded in Table 22.1, the

Table 22.1 Design recommendation for wayfinding in the latest accessibility design guidelines internationally

Country/ Region	Latest Design Manuel/ Guidelines	Doors	Signage	Fire Exit and Emergency Escape Routes	Information Centre / Service Counters	Illumination	Strategic site and building layout	Principle of two senses
United States	ICC A117.1-2009	●	●	●	●	●	○	○
United Kingdom	BS 8300-2:2018	●	●	●	●	●	●	●
Taiwan	Design code for barrier-free facilities in buildings	●	●	○	●	○	○	○
Beijing, China	Urban Design Guidelines for Accessibility of Beijing	○	●	○	●	●	○	○
Hong Kong	Design Manuel: Barrier Frees Access 2008	●	●	●	●	●	○	○
Macau	Architectural Standards for Universal Design and Barrier Free	●	●	●	●	●	○	○
● = Including ○ = excluding								

BS 8300-2:2018 has covered most of the topics related to modern accessibility. Most importantly, it provides insights into the strategic site and building layout for designers, which stands out among all the guidelines.

22.1.5 Research-Based Wayfinding Design for the Ageing Society

Several studies in real-world and virtual environments have discovered that elderly people have weaker wayfinding abilities than younger individuals (Benke et al. 2014; Harris and Wolbers 2014). As a result of age-related hippocampal changes, navigational shortfalls in the elderly appeared to be caused by a decline in the ability to use orientation strategies (Davis and Veltkamp 2020). Similarly, several studies have found that older adults prefer route-based strategies to orientation strategies, indicating they tend to memorise rigid routes rather than navigate (Moffat et al. 2006; Rodgers et al. 2012).

Researchers have been studying the impact of different spatial designs on the wayfinding performance of the elderly. Recent findings of wayfinding design that aid normal ageing is summarised in Fig. 22.2. Kaplan (1973, 1976) was among the first authors to investigate what variables benefit interior wayfinding, emphasizing the significance of visual landmarks and a comprehensible layout system. Gärling et al. (1986) outlined three architectural factors that influenced environment navigability: degree of differentiation, visual access, and spatial layout complexity. Orfield (2015) conducted a research-based design (RBD) practice for dementia and ageing as an underlying sensory issue. Most interestingly, the layout of the circulation system has a significant impact on users' perception and is recognised as the most influential environmental factor in their wayfinding (Marquardt 2011). Marquardt (2011) also found that users were able to find their way better in straight circulation systems than in any layout with a change in direction.

Literature review on ageing-friendly wayfinding design:
See Table 22.2.

22.2 Methodology

To evaluate the wayfinding inclusive design features in Macau public housing estates, this research will first examine an Analytic Hierarchy Process (AHP) questionnaire to measure the hierarchy of design criteria, followed by a typology analysis of a group of public housing estates to access the influence of design guidelines. These housing estates will be compared with the significant design criteria adopted from the AHP questionnaire. The final stage of the

Table 22.2 Review of design suggestions for the elderly with cognitive problems

Topic	Design suggestions	Source(s)
Sensory stimulation	Sensory-provoking elements	Motealleh, Moyle, Jones and Dupre (2021)
	Visually distinguishable landmarks	Wiener and Pazzaglia (2021), Richter and Winter (2014)
	Entrance of natural sunlight	Day, Carreon and Stump (2000), Marquardt (2011), Zeisel et al. (2003)
	Colour contrast	Wiener and Pazzaglia (2021), O'Malley, Innes and Wiener (2017)
Visibility	Direct visual access to the destination	Marquardt (2011), Nillsen and Optiz (2013)
	Activity space at the end of the corridor	Buuren and Mohammadi (2021), Marquardt and Schmieg (2009), Zeisel (2001), and Zeisel et al. (2003)
Layout	Configuration of the floorplan layouts	Buuren and Mohammadi (2021), Wiener and Pazzaglia (2021)
Ease of access	Width of the corridor	Zeisel et al. (2003)
	Short length of corridor	Aedes-Actiz (2018), Marquardt (2011) and Nillsen and Optiz (2013)
	Shape of the corridor	Brawley (1997), Cohen and Weisman (1991), Marquardt (2011), Marquardt and Schmieg (2009), Netten (1989), and Passini et al. (1998)
	Sequence of spaces in the house	Buuren and Mohammadi (2021)
	Location of the entrance door alongside the wall	Zeisel et al. (2003)
	Icon and text	Buuren and Mohammadi (2021), Wiener and Pazzaglia (2021)
Signage	Maps	Buuren and Mohammadi (2021), Wiener and Pazzaglia (2021)

study comprised an evaluation of the most valued wayfinding design features will be explained.

The AHP questionnaire was designed to measure the following constructs in wayfinding: site planning and position of buildings, legibility of space, scale of corridor, graphic communication, tactile communication, audible communication and sounds, and visual communication. Using a comparison scale of nine levels, participants were asked to rate the importance of these inclusive wayfinding design strategies. A quantitative approach was employed since this will avoid misleading information due to the general avoidance of involvement in the disability topic in the elder generation, which commonly appears in user group surveys and interviews. The importance and weight of these criteria will later be accessed by professionals, which will provide a framework for inclusive design for this specific project.

The Analytic Hierarchy Process (AHP), developed by Saaty (1980), has been studied extensively and applied in almost all fields related to multiple criteria decision-making in the last 4 decades (Ho 2008). It supports a multi-tiered hierarchical structure of goals, decision-makers, criteria/sub-criteria, and alternatives. After the hierarchy is established, preferences from a collection of pairwise comparisons are used to obtain the decision criteria's weight of importance (Triantaphyllou and Mann 1995). The preference will be marked in a comparison scale of nine levels as listed in Table 22.3.

To establish the influence of accessible regulation in wayfinding, the AHP framework is tested with a group of social housing estates. A further study of architectural typology in this group is carried out with the results from the framework. The most and least effective wayfinding systems will be examined and discussed.

Table 22.3 Comparison scale of nine levels in AHP research

Levels	Definitions
1	Equal importance
2	Equal ~ weak importance
3	Weak importance
4	Weak ~ strong importance
5	Strong importance
6	Strong—very strong importance
7	Very strong importance
8	Very strong—absolute importance
9	Absolute importance

22.2.1 Framework of the AHP Method

To assess the hierarchy of inclusive wayfinding features in social housing design, the AHP survey was used. Information from the literature review section will form part of the design criteria in the AHP original data. The focus group of this research was limited to architects, engineers, social workers, therapists, medical nursing staff and doctors since these professionals are likely to be the decision-makers in the design process of social housing in Macau. The decision-makers priorities were given as outcomes of the AHP-based methodology (see Fig. 22.1).

Professional representative	Decision-makers	Number ofparticipants
Design team	Architects	11
	Engineers	4
Stakeholder for user group	Social workers	6
Science and medical support for people with disability	Therapists	3
	Medical nursing staff and doctors	4

All data relevant to the social housing inclusive criteria assessment using the above-said AHP tool was gathered via email invitation. The AHP survey was released from 2022 September 19 to 2022 September 29. Twenty-seven professionals from the focus group participated in this research. All analyses were carried out using commercial AHP software YAAHP. Since intangible factors may cause inconsistency in human judgment, AHP has the advantage of providing an inconsistency check to deal with inconsistency. Considering that 10% error is suggested as the acceptable limit for inconsistency, the levels of inconsistency measured through surveys were corrected in AHP software.

This research compared the wayfinding features between local public housing designed before 2018 and after 2018, to value the impact of accessible regulation on their design. According to the Housing Institute of the Government of the Macau S.A.R. (IH), among all the public housing estates, only Edf. Mong Tak (PH12) and the Apartment for the Seniors (AFS) is built after 2018 (see Table 22.4). After gathering architectural floor plans from IH, eleven public housing estates built in the past decade (PH1–PH11) had been chosen to be the comparative study of PH12 and the AFS in this research.

22.3 Results

Overall, there is a positive correlation between inclusive design and wayfinding, since the most important criteria are ‘C1-Site planning and position of buildings and other features’, ‘C3-Scale of corridor’, and ‘C2-Legibility of space’. The above figure presents an overview of the

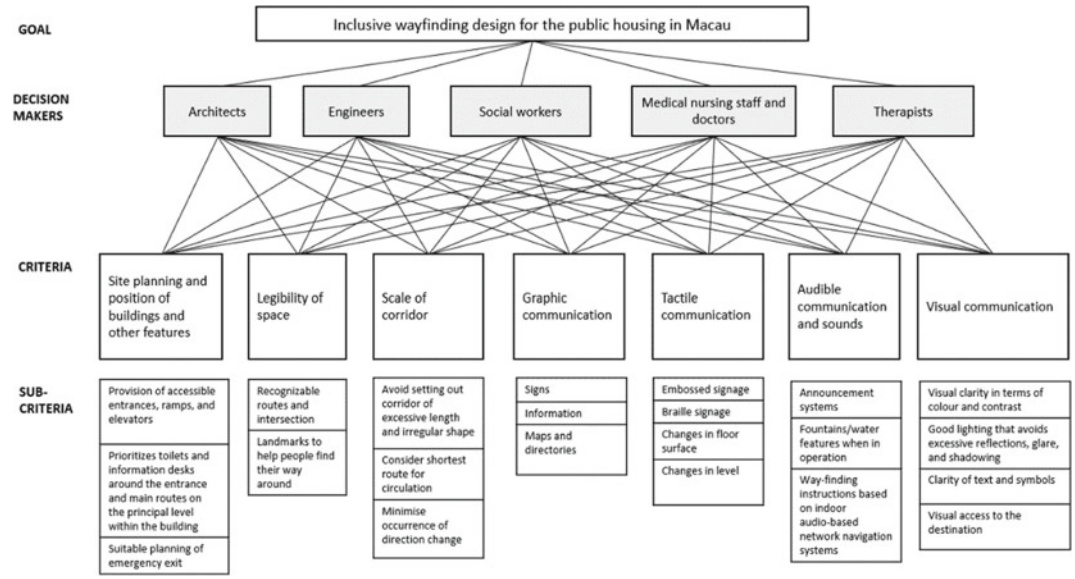
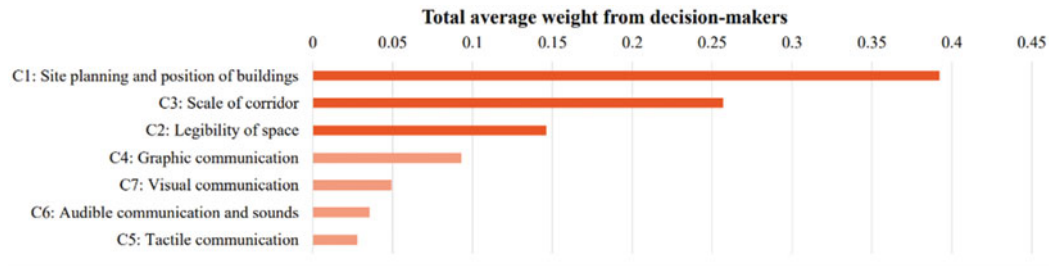


Fig. 22.1 The AHP framework of the current research. Seven inclusive design criteria related to wayfinding were listed based on the literature review. The pairwise comparison of these criteria formed the AHP survey for the focus group. Although these criteria are considered inclusive features, it is noteworthy that criteria C1–C3 are process-based, whereas criteria C4–C7 are result-orientated, i.e., compared to C1–C3, C4–C7 are more likely to be included in a universal design guideline

Table 22.4 Final sampling of public housing estates for evaluation

No	Year of completion	Name of housing estate	Apartment units
PH1	2011	Edifício de Alameda da Tranquilidade	880
PH2	2012	Edifício do Lago	2703
PH3	2013	Edifício Ip Heng	2153
PH4	2013	Edifício Cheng Chong	500
PH5	2013	Edifício On Son	366
PH6	2013	Edifício Koi Nga	1824
PH7	2016	Edifício Cheng I	770
PH8	2017	Edifício Iat Fai	288
PH9	2018	Edifício do Bairro da Ilha Verde	2356
PH10	2018	Edifício Fai Ieng	436
PH11	2018	Edifício Cheng Tou	378
PH12	2021	Edifício Mong Tak	768
AFS	By 2025	Apartment for the Seniors	1900

average weight of design criteria related to each focus group. Interestingly, architects considered tactile communication as the most remarkable inclusive wayfinding design, where most professions had little consideration for it. Additionally, therapists believed the scale of the corridor was the primary inclusive feature. In contrast, visual communication appeared to be the least preferred inclusive design method among all the professionals. In summary, these



Wayfindign criteria	Total average weight	Architects -average	Engineers -average	Social workers -average	Medical nursing staff and doctor -average	Therapists -average
C1: Site planning and position of buildings	**0.3923**	0.2991	0.4825	0.4106	0.4369	0.2133
C3: Scale of corridor	**0.2569**	0.0651	0.1442	0.0633	0.2749	0.377
C2: Legibility of space	**0.1461**	0.0439	0.169	0.2697	0.0412	0.0384
C4: Graphic communication	**0.0928**	0.0409	0.0677	0.1669	0.0781	0.1186
C7: Visual communication	**0.0491**	0.0394	0.0578	0.0298	0.0629	0.0354
C6: Audible communication and sounds	**0.0353**	0.1345	0.0393	0.0298	0.0536	0.0401
C5: Tactile communication	**0.0276**	0.377	0.0393	0.0298	0.0524	0.1773

Fig. 22.2 Hierarchy of inclusive design features valued by decision-makers

results provided important insight that wayfinding design could be improved with an inclusive design method (see Fig. 22.2).

22.3.1 Inclusive Design Features in the Research Cases (See Table 22.5)

C1-Site planning and position of buildings and other features

PH11 and the AFS have a similar spatial configuration in terms of site planning and proper layout of functions. Both cases provide 4 basic elevators that is close to the entrance in each block. Additionally, each tower in the AFS has an emergency elevator that can fit a stretcher bed in case there is an emergency. The AFS also provides an accessible toilet in any of the lobbies, which makes it the most outstanding case with proper site planning.

C2-Legibility of space

See Fig. 22.3.

C3-Scale of corridor

See Fig. 22.4.

C4/C5/C6/C7-Graphic/tactile/audible/visual communication

On the other hand, C4, C5, C6 and C7 often act as additional features to improve accessibility after construction work is completed. However, there have been few implications of these criteria by the decision-makers since it is not statutory compulsory to include these design features. It is noteworthy that although C4, C5, C6 and C7 are listed as the less important inclusive wayfinding criteria, these design requirements commonly appear in most of the universal design guidelines.

22.3.2 Spatial Typology and Circulation Systems in Social Housing Estates

As shown above, linear, and H-shape circulation systems are reported as the most common typologies in social housing. It is concluded in the previous section that linear, T-shape and H-shape provide the most effective wayfinding process as these spaces can limit users' change of direction to 1–2 times when they move from the lift lobby to the farthest flat, at the same time minimising the length of corridor to 10 m or less. It is encouraging to compare this figure with that

Table 22.5 Analysis of the 7 Inclusive design criteria in the research cases

	Housing estates	PH1	PH2	PH3	PH4	PH5	PH6	PH7	PH8	PH9	PH10	PH11	PH12	AFS
	Year of completion	2011	2012	2013	2013	2013	2013	2016	2017	2018	2018	2018	2021	By 2025
	Tower	4	6	10	2	2	8	2	1	3	1	1	2	2
	Apartment units	880	2703	2153	500	366	1824	770	288	2356	436	378	768	1900
	Building lot area (sqm)	7452	16398	20744	4050	2689	14195	4608	2526	15,243	3431	2210	3000	6828
C1	Main entrance	4	3	10	2	2	8	2	1	4	2	2	2	6
	Average accessibility to main entrance per apartment unit	0.0045	0.0011	0.0046	0.004	0.005	0.0044	0.0026	0.0035	0.0017	0.0046	0.0053	0.0026	0.0032
	Ramp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Elevators to residential level in each block	2	4	3	4	2–4	3	4	3	6	2	4	3	3 to 5
	Nos. of public toilet cubicle	11	26	0	2	0	0	0	2	0	0	5	10	17
	Nos. of public accessible toilet	2	3	0	1	0	0	0	1	0	0	1	1	6
	Reception near entrance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C2	Memorable intersection/ landmarks	Basketball court	No	No	No	Greenery	No	No	No	Yes	No	No	Plaza	No
C3	Approx. length of corridor in typical floor (m)	10	35.5 and 31	29.5	10.1	46	12.7	26	24	31.5 and 26.5	33	56	4.7 and 9.4	49.6 and 62.8
	Shape of corridor in typical floor	Linear	Linear	Inside courtyard	Y-shape	T-shape	H-shape	X-shape	Irregular	Linear/T-shape	H-shape	Irregular	H-shape	H-shape
	Maximum change of direction in corridor (from lift lobby to flat)	1	1	3	2	2	2	2	3	1	2	4	2	2
C4	Accessible signs/maps	No	No	No	No	No	No	No	No	No	No	No	No	Yes
C5	Tactile guide/braille	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C6	Sound communication	No	No	No	No	No	No	No	No	No	No	No	No	No

(continued)

Table 22.5 (continued)

	Housing estates	PH1	PH2	PH3	PH4	PH5	PH6	PH7	PH8	PH9	PH10	PH11	PH12	AFS
	Year of completion	2011	2012	2013	2013	2013	2013	2016	2017	2018	2018	2018	2021	By 2025
	Tower	4	6	10	2	2	8	2	1	3	1	1	2	2
	Apartment units	880	2703	2153	500	366	1824	770	288	2356	436	378	768	1900
	Building lot area (sqm)	7452	16398	20744	4050	2689	14195	4608	2526	15,243	3431	2210	3000	6828
C7	Direct visual access to destination (from entrance to elevator lobby)	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes

Fig. 22.3 Floor tile design in podium garden at PH12. A few landmark designs are observed in this study. These include basketball court, greenery, and plaza. Take the outdoor space in the podium garden at PH12 as an example, users can follow the pattern on the floor tiles to the centre of the plaza, where toilets and main exits are visible from this point

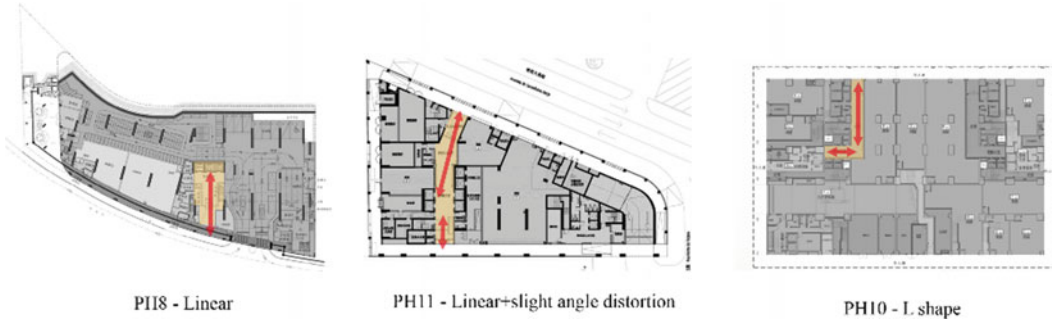


Fig. 22.4 Comparison of different scales of corridor and spatial layout of lobby. Take PH8 as the most straightforward example, the linear lift lobby can be directly seen on the doorstep at the entrance, however, this might be related to the small scale of the building as it has a single entrance. Given that most cases in this study have at least 2 entrances to the main lobby, it could be concluded that a linear shape lobby with a slight angle distortion such as the one in PH11 is the most effective design. Other design typology such as the L-shape lobby in PH10 is less effective as there is no direct visual access. The spatial typology and circulation systems related to C3 will be further studied in the following section

found by Marquardt (2011) who established that the most influential environmental factor in effective wayfinding is straight circulation system. These results further support the idea that effective wayfinding is often overlooked using current statutory requirements since the width of corridor is the main concern in universal design, while effective wayfinding is in correlation with the change of direction in the process (see Fig. 22.5).

22.4 Discussion

The current study found that decision-makers generally prefer C1 and C3, indicating that the inclusive design process plays an important part in wayfinding design for social housing. What stands out from the data is that architects consider tactile communication as the prominent inclusive design feature. This may be explained

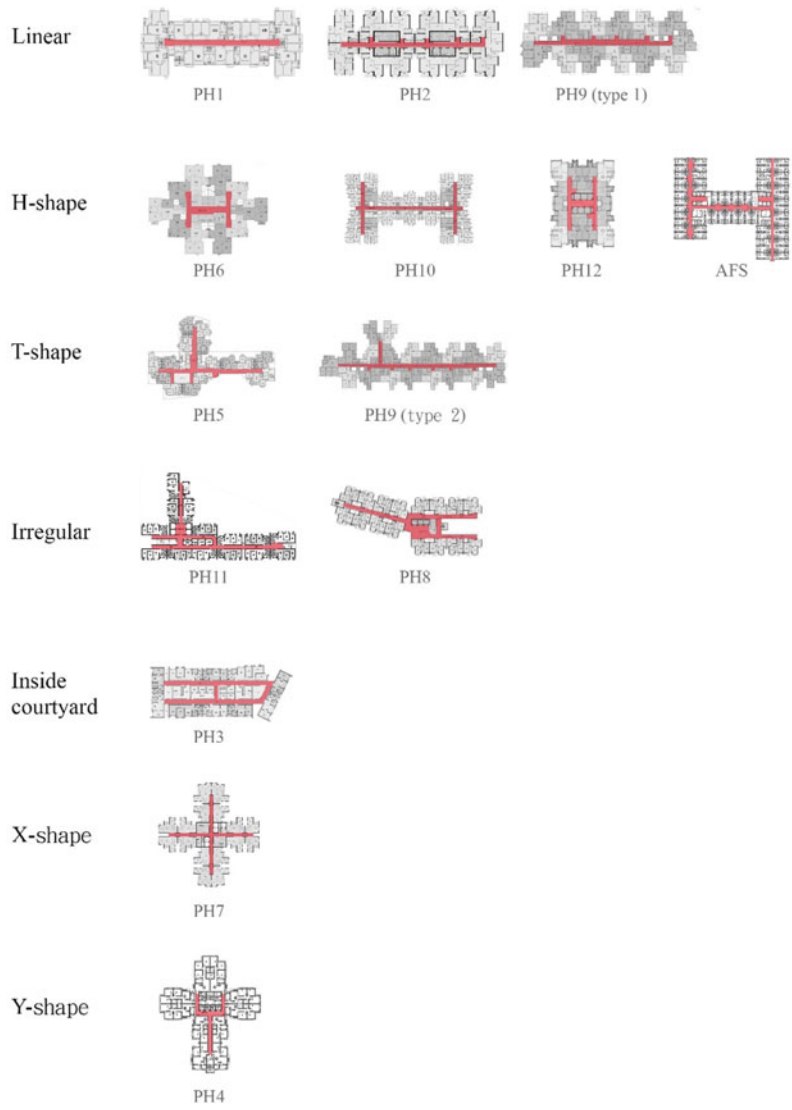


Fig. 22.5 Spatial typology of the typical floor plan in the research cases. It is interesting to note that in all twelve cases of this study, the spatial typology of corridor can be categorised into 7 groups, which are linear, inside courtyard, Y-shape, T-shape, H-shape, X-shape, and irregular configurations

by the fact that tactile and braille maps are the most apparent accessible features in a typical government-funded building in Macau. To interpret, the yellow colour of the tactile path can also be seen as visual colour contrast or leading sign in a pathway. Comparatively, therapists value the scale of the corridor the most. A possible explanation for this could be that therapists are more concerned with the interior setting as this is a basic accessible requirement in their working environment.

A positive impact can be found in the social housing which is built after the regulation came into enforcement. It is obvious that the Apartment for Seniors (AFS) values for the best accessible case. The most possible explanation for this might be that there is only one housing estate (PH12) to act as the sample of new-built housing estates which complies with the universal design guidelines implemented in 2018. In addition, the AFS is specially designed for the elderly so there are more accessible features. There are, however, other possible explanations that other local statutory regulations such as the 'Design guidelines for public housing in Macau' has partly affected the accessibility in the design

of these social housing estates. These data must be interpreted with caution because different design approaches between architectural firms, statutory interference or budget limitation could cause inconsistency between different housing estates. Although it is observed that there is no significant difference when comparing the social housing estates, however, notable findings may contribute to the understanding of universal and inclusive design. Firstly, more toilet cubicles are set up in PH1, PH2 and PH12. A possible explanation for this may be related to the 'Design guidelines for public housing in Macau' which limits the minimum number of public toilet cubicles according to the anticipated spatial user capacity. Another possible explanation is that the podiums of these housing estates are open for public use, therefore more toilets are set up to cater to visitors. Secondly, although the length of the corridor on the typical floor is related to the scale of a building, the linear corridor is found to be the most effective approach to minimize the change of direction in wayfinding, followed by a circulation system with a change in direction such as L-shape, Y-shape, H-shape, X-shape, or T-shape. The irregular shape of a corridor often causes the occurrence of direction shift.

This research aims to investigate the use of AHP in improving inclusive wayfinding design in architecture. For practical analytical reasons, there is abundant room for further progress in determining the size and variety of the focus group, i.e., increasing the number of survey participants and the number of housing estates in the assessment. For security reasons, the limited access to most of the housing estates makes these findings less generalisable. Another source of weakness in this study which could have affected the measurements of inclusion was the differentiation of design approaches between different projects and designers. If there is more new-built public housing to act as a reference in the future, a larger scale of local assessment could be used to explore the possibility of improving the accessible design guideline. From the perspective of architectural practice, to develop a full picture of true inclusion in a design project, the design team and related consultants of the project could be invited to complete the AHP survey to determine a specific weight of design criteria for the project. Further studies are recommended to use a different perspective other than wayfinding to investigate architectural inclusion.

22.5 Conclusion

The purpose of the current study was to examine the preference of wayfinding design criteria of the decision-makers in the social housing projects in Macau and analyse the influence of accessible regulation in wayfinding. The present research set out to integrate the theory of inclusive design and research on wayfinding in social housing estates with the seven criteria established from previous guidelines and research. An AHP survey is released to a focus group of decision-makers including architects, engineers, social workers, therapists, medical nursing staff and doctors. Overall, a positive effect can be found between wayfinding in social housing and the enforcement of universal regulation. Other findings include: (a) compared to universal design, the inclusive design method is more valued in the wayfinding design of public housing; (b) despite of site planning and position of buildings, it is considered that the scale and shape of corridor has the second highest influence in one's wayfinding experience; (c) a few spatial typologies could be derived from the circulation systems of the research cases, in which linear, T-shape and Y-shape corridors provides the most effective wayfinding process. Although a positive impact can be found in the social housing which is built after the regulation came into enforcement, yet some criteria related to site planning and spatial legibility have not been addressed. Additionally, the spatial typology study helps to conclude some effective circulation design, which has made this study gone some way towards enhancing our understanding of the importance of implementing inclusive wayfinding design.

This study has provided an insight into the implementation of inclusive design in wayfinding and contributed to a new design approach. Consideration for a comprehensive wayfinding design is often overlooked in some of the universal design

guidelines. More specifically, as universal design tends to be a regulation-based mentality, it relies on additional features such as signage or tactile guide, while excluding the most effective design for wayfinding in site planning. Although the inclusive design approach cannot be easily measured by written design guidelines since designers need to review these criteria on a case-by-case basis, taken together, this study can be used to develop new design approaches in wayfinding.

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Teaching for Inclusivity

23

Vanessa Lucianna Zadel Velásquez

Abstract

As architects, we must think about improving people's quality of life through the spaces we design, spaces where human life unfolds. Therefore, our architectural designs must consider the diversity of users and situations that can affect our lives temporarily or permanently. As teachers, we must ask ourselves what we are doing to change what does not contemplate said diversity. As teachers, we are responsible for training future generations of architects to consider not only accessibility and universal design in their projects but also the inclusive communication of the architectural project and thus guarantee "leaving no one behind". This article shows, as an example of good practice, the didactic methodology used in an architectural design course at a university in Lima, Peru, where students interact from the beginning of their training with real users; users with disabilities, the elderly and children to learn by putting themselves in the place of the other. Different sensory strategies emerge from these interactions that seek to offer with equity different ways of bringing users closer to architecture and to the different situations and atmospheres that it is capable of achieving. Leaving no one behind also means training future architects to achieve equitable and inclusive cities and societies.

Keywords

Architectural education · Accessibility · Inclusion · Universal design

This article shows, as an example of good practice, the didactic methodology used in the second-year architectural design course of a university in Lima, located in Peru, where students interact from the beginning of their training with real users (users with disabilities), older people and children) to learn by putting themselves in the place of others and achieve accessible and inclusive architectural projects that contribute to the achievement of Sustainable Development Goal #10 "reduction of inequalities" and promote social inclusion. Different sensory strategies emerge from these interactions that seek to offer, in a fair way, different ways of bringing users closer to architecture and to the different situations and atmospheres that it is capable of achieving. "Leaving no one behind" also means training future architects who are capable of designing equitable and inclusive cities and societies. Understanding the diversity of users is essential for the professional practice of all architects, who have the responsibility of improving people's quality of life through the

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design of spaces where human life takes place. For this reason, the design and development of architectural projects must be carried out considering accessibility and universal design, principles that should be learned from the beginning of the training level of the undergraduate architecture career. It is therefore essential not only to achieve accessible architectural projects but also to ensure that future architects know how to communicate their development in an inclusive manner, instilling in them values such as equity, empathy and respect for others.

Universal Design applied to learning architectural design allows not only "putting yourself in another's place" but also learning in an equitable and inclusive manner, eliminating physical, sensory and cultural barriers. Students "learn to learn" in different ways, becoming aware of the diversity of users that inhabit and form our societies. As human beings, we try to understand our environment through the relationships we generate and the way we interact with objects and other living beings. Reyes et al. (2015) maintain that not only is one born human, but that humanization is a process of learning to be human and, in this process, the school has much to contribute. Education centered on the human being as a social being encourages and allows a harmonious social coexistence (Paz 2017).

Talking about accessibility and universal design in architecture is talking about inclusion. Learning to live together and learning to be is also learning about inclusion. Architecture students must learn that inclusion in architecture is part of the responsibility they will have in their professional practice. How will they understand this great responsibility if they never dealt with these issues in their undergraduate training? How are they going to understand the value and impact of inclusion in architecture if they haven't learned to live together and to be? These students constitute the population directly affected since they will be the ones who must graduate and exercise professionally with these deficiencies. This, without a doubt, has an impact on society. Cattaneo (2015: 105) maintains that "architecture is an excuse to build human relationships and community", therefore, it is essential to understand the importance of training future architects in values, who will thus be able to practice ethically and always think of the good. common (Peiró et al. 2018). To think about the formation of values is to think about universal design in architecture. Gallardo and Alarcón (2019) in this regard mention that universal design considers the needs of people with disabilities from the design stage to the construction stage, this avoids having to make subsequent modifications to the built work.

UNESCO proposes a new educational pedagogy based on the proposal of Delors (2013): learning to know, learning to do, learning to live together and learning to be (Chávez 2020). Unfortunately, learning to live together, learning to live with others and learning to be (Delors 2013) are not addressed in higher education. Learning to live together, learning to live with others and learning to be responsive to social coexistence and the relationships that flow from it. Higher education students, future professionals, must understand their role as individuals but also the impact they generate with their professional practice in our societies. The reality in Latin America shows us a different situation, architecture and built urban spaces that do not consider the principles of accessibility and universal design (Solano et al. 2018). Universal design is understood as the design of products, environments or services designed for the diversity of users, as far as possible, without adjustments or adaptations for which the Arch. Ronald Mace established 07 principles in 1997. It seems that speaking of ramps, accessibility, even functionality and topics that refer to design for all, whether outdated or a minor issue that is only discussed in very specialized events and not as solutions to a problem, which is there (Lizárraga 2006: 32).

These designs bring benefits to everyone (not just for people with disabilities) as they have been universally conceived for all people in all possible situations. Training architecture students in values go hand in hand with the new vision posed by the 2011 UNESCO and UIA (International Union of Architects) Architecture Training Charter regarding the relationship that exists

between the designer (architect) and user, where the social commitment is clear and reinforces the training of the architect as the professional responsible for improving people's quality of life (Villalobos-González 2020).

23.1 Materials and Methods

> Historically, accessibility in the field of design has focused on people with disabilities, but as knowledge and experience of accessible design has increased, it has become clear that many necessary accommodations can be designed in ways that benefit to all. (Lidwell et al. 2018: 16)

The teaching methodology in the subject consists of approaching the learning of architectural design from the development of inclusive projects, working with the principles of design and universal accessibility, under the premise that if it works for a person with a disability, it works for everyone. All this has a great goal ahead: to make students aware of the importance of understanding the diversity of users and their spatial needs. The compulsory subject is developed in three sessions per week, each with 3 hours of development. The activities are varied, seeking to engage the student in their own learning. A project is developed per cycle linked to understanding the importance of accessibility and inclusion in the architectural project. This involves first understanding the user, their characteristics and ways of using and perceiving the architectural space through the senses. Thus, the subject is organized into four parts, following the characteristics of universal accessibility: operability, perceptibility, simplicity and indulgence.

23.1.1 Operability

> (…) is achieved when everyone can use the design, whatever their physical abilities. (Lidwell et al. 2018: 16)

Our learning begins with a review of the literature on universal accessibility and universal design, as well as national regulations on the aforementioned topics. This allows students to understand the importance of thinking about the accessibility of the architectural project from the beginning and at the same time to realize that, as far as regulations are concerned, we still have a long way to go. They then see the need to investigate and review the regulations of other countries in order to make a comparison and be able to recognize good criteria in terms of accessible design. At this stage, students also learn by investigating different references both by typology and by sensory strategies to understand that architecture is a great sensory experience. Accessibility is often understood only as physical accessibility (place ramps), in Peru, this is understood as complying with the norm "to avoid the fine" and thus appear as "mobile" ramps that are placed before a municipal inspection.

Talking about universal accessibility encompasses much more than physical accessibility, and it is at this point in the course that students become aware of this, bodies change and age, therefore accessibility will allow the architectural project to adapt to the changes that are originating in the user and it is not the user who must adapt to the architectural space, thus trying out many experiences. This initial stage also allows students to become aware of what their city is like and what limitations are placed on people with disabilities on a daily basis, making their social development more complex.

The pandemic shows the lack of awareness of the people who live in cities like Lima. It makes it clear that no thought was given to how these places of travel that people pass through on a daily basis should be. What do they find on the way? Can they find rest points along their route? Many times, there are no sidewalks and people must walk along the road hoping that no one runs over them. "When, consequently, pedestrians are forced to keep to the right of the street to traverse it, the freedom of movement has more or less been lost. People no longer meet, but walk in line one behind the other. The overcrowding is too great" (Gehl 2017: 148).

Understanding this is important but it is not enough to do architecture. It is not enough to understand how the users use the spaces and how

Fig. 23.1 This image shows the development of an architectural project class where the Peruvian accessibility regulations are investigated and compared with those of other countries in the region

Fig. 23.2 Explanation by the students to their classmates about what is observed in the current accessibility regulations

the spaces that the architect designs affect the development of life in different aspects. This is how the next step in the methodology of the course is taken, the perceptibility that seeks to place the student in the place of the other (Figs. 23.1 and 23.2).

23.1.2 Perceptibility

> (…) is achieved when everyone is able to perceive the design regardless of their sensory abilities. (Lidwell et al. 2018: 16)

In order to be able to design an architectural project with the diversity of users and their sensory capabilities in mind, it is important to first put yourself in the place of the other. The best way for students to become aware of the implications of their professional practice is to confront them directly with reality through different experiences that are presented to them during the cycle. For many, it is the first time they have put themselves in someone else's shoes. Many students, at this point, had not yet become aware of the diversity of users that inhabit our cities and

Fig. 23.3 The students learn to be sighted guides, they learn through experimentation to put themselves in the place of visually impaired users

with whom we interact to a greater or lesser extent every day, few knew a person with a disability. Finally, all these experiences lead to design and sensory strategies that allow students to develop an inclusive architectural project, understanding the importance of knowing and understanding users.

It is important for the architecture student to experience different spaces and their urban environment paying attention to different senses and stimuli. The subject proposes an initial exercise of urban tours in a wheelchair, the students experience the visits as users with physical disabilities and thus recognize the different barriers that many people face every day: narrow sidewalks and/or ramps in poor condition with a steep slope that prevent independent movement, among others.

The following activities seek to understand the importance of sensory accessibility. In order to carry them out, we visited as a group the Special Basic Education Center "San Francisco de Asís" located in the district of "Santiago de Surco" in Lima. The activity begins with a presentation by the management about the history and mission of the Special Basic Education Center "San Francisco de Asís". Then there is a guided tour of the facilities by a team of teachers appointed by the management. Finally, the activity directed by the team of psychologists from the Special Basic Education Center "San Francisco de Asís" which consists of students putting themselves in the place of a person with total visual impairment and learning to move using one of a guide canes, learning to use the tactile paving and the "tracking" technique as a method of tactile orientation. All activities are carried out within the Special Basic Education Center "San Francisco de Asís" and are guided by the team of psychologists at all times. At the end of these first activities, architecture students learn to be sighted guides, which means learning to guide a person with total visual impairment. They learn to offer help, to place the arm so that the blind person can hold on and finally to accompany and guide. From otherness, they learn to respect the time and space of others and to recognize themselves as active members of the society in which they live (Fig. 23.3).

These activities allow the architecture student to be aware of their neighbor and the need for accessibility that exists. The important thing is not only to experience the city and architecture from otherness but also that through these experiences, the student becomes aware of his own body, his own senses and realizes how little attention we pay to our senses and how little we know how to orient ourselves and guide

Fig. 23.4 Architecture students are observed learning by experience. They are guided by the tactile paving and are supported by a partner who acts as a sighted guide

ourselves using someone other than sight. How little space we give to spatial experimentation through our senses, our bodies (Fig. 23.4).

23.2 Simplicity

> (…) is achieved when everyone can easily understand and use the design, regardless of their experience, level of education or degree of concentration. (Lidwell et al. 2018: 16)

At this stage of the course, architecture students develop the architectural assignment for the course by applying everything observed and learned so far. They all receive the same architectural commission. They all perform the same previous steps; analysis of the context, analysis of the terrain, understanding of the typology through the analysis of references, etc. Each design decision will be defined by the different experiences carried out throughout the course and, above all, how each of them personally affects each student, each future architect.

"We believe that the consultations and discussions should take place in the processes and not in the deliveries. As students that we once were, we are very clear that the doubts, insecurities and uncertainties occur almost entirely in the moments of project production." (Eliaschev et al. 2014: 61). The subject not only generates concerns and discussions throughout the design process (Eliaschev et al. 2014) among the enrolled students but also the reflection of transversal learning between the design subjects and the other academic areas of the Curriculum. For this, teachers from the different academic areas are summoned to attend the class for a week to listen to the presentations of each student's progress. The comments as feedback are focused on understanding how the design is linked to different variables and knowledge that they acquire in other courses, for example, structure, materiality, environment, among others.

This is a subject of 9 h a week where the student presents the design process and project development in each session to the teacher in charge of the section, what is different for the students enrolled in this session is that in certain class sessions They present the progress of the project to real users, people with disabilities invited by the teacher in charge of the section. The student must expose and support the different design and sensory strategies that the project

Fig. 23.5 Explanation of the project progress by architecture students to users with physical disabilities

contemplates. Those invited to these sessions also share their own experiences within our city and from their position they issue comments to the students that contribute to improving the project in progress. It does not become a participatory design because they do not intervene in the design process, but there is a joint reflection that gives rise to the improvements and adjustments of each project. These activities make the student gain more security and confidence about their project decisions.

It is then that, through the experience of real approach, students can realize how the architecture that we design directly affects people. It affects how they feel comfortable or not in the space, but it also influences how this person relates to others in that space. Without understanding our users, we will not be able to understand our role as designers. In this stage, the students present the advances to people with physical disabilities who place greater emphasis on physical accessibility and displacement within the project. They also present the advances to people with low vision and visual impairment who approach the comments from the sensory experience that the spaces can offer them or what elements they can find to guide themselves in the project. For example, tactile paving and different textures that allow tactile exploration to be able to orient oneself in space. The odors of the proposed vegetation serve as references and guides to identify areas within the project. The smell of food can refer us to a dining room or kitchen, the smell of aromatic plants can refer us to an orchard or a garden, etc.

The important thing about this stage is the real contact that the student has with his professional practice and the awareness of his role as an architect to achieve projects that contribute to having accessible and inclusive cities, understanding that if the spaces are used by people with disabilities, they will also be for people without disabilities, children, pregnant women and the elderly (Fig. 23.5).

23.3 Indulgence

> (…) is achieved when the designs minimize the occurrence of errors and their consequences (Lidwell et al. 2018: 16)

We are talking about inclusion and equity, we are talking about all users being able to enjoy accessible architecture and we are also talking about inclusive communication of the architectural project. What are the tools that architects use to show and explain the project to a client? What if your client is someone who won't be able to see your printed plans and PowerPoint presentation? What if you are designing for a

Fig. 23.6 User with total visual disability reads the descriptive report (of the architectural project done in class) done in braille

child? Is the user involved in the design process? With what tools? The subject does not work only with traditional tools such as drawn plans (either by hand or by computer) and cardboard or balsa wood models (Fig. 23.6).

The students learn to work with haptic planes, planes with reliefs and different textures where each one represents the areas of the project. These plans are drawn up for each level of the project and in the process the progress is shown to people with total visual impairment in order to verify if the information is being transmitted correctly. Each plan has a legend that indicates the areas of the project. This legend is also worked in braille. I teach my students to use digital fabrication technology to achieve inclusive communication of the architectural project. I use 3D printing to make models that are more resistant to tactile exploration. The advanced pieces are made of cardboard that allows the student to visualize the project and make modifications in the process. The final pieces printed in 3D are shown to people with low vision and total visual impairment who carry out tactile exploration and, together with the haptic plans with legends in braille, they manage to understand the architectural project from the development stage. Students also prepare brief descriptive reports of the project printed in braille. All this information constitutes the delivery of the architectural project in the subject (Fig. 23.7).

23.4 Results

The results of this entire process derive in an architectural project that from start to finish has the user at the center of the design and originates a project accessible to all. The student becomes aware of the importance of understanding the characteristics of the user who will make use of the spaces that are designed, but also of the importance of the social relations that can be established in the meeting and interaction spaces, the public spaces of the project are the spaces where the human being meets his peers and recognizes himself in them. Accessibility and universal design allow public spaces to be spaces of integration, spaces where the rights of all people are promoted and respected regardless of their race, age, sex, disability, culture, etc.

Students develop diagrams and maps of social interactions of the project to be developed. They propose these schemes and situations for all possible social encounters, interaction between users inside the project, users in outdoor spaces, relationship with the inhabitants of the immediate

Fig. 23.7 User with total visual impairment listens to the explanation of the architectural project given by the student and touches the haptic plan to understand the architectural project

context and with eventual visitors to the area or project. By establishing these interactions, a user-centered project begins (Fig. 23.8).

Students become aware of the diversity of users and the diversity of experiences linked to the senses. They understand that thinking of strategies that will be perceived only by the sense of sight is also a way of generating limitations and barriers, so they think of the perception of spaces from the other senses. They create a "sense chart" to identify which are the senses that participate the most in the experience (or atmosphere) of said space. "(…) The learning and work of an architect goes through the complexity of sensory experience, and little by little, forms are restored, procedures are adjusted, in an almost endless process. And perhaps, in this whole process it is necessary to start with an elementary experience "open your eyes", so that each one, with their own identity, can propose new ways, new "forms" of establishing an open and fruitful dialogue with the medium that is architecture" (Juárez 2011: 33) (Fig. 23.9).

All this derives in the elaboration of different sensory strategies that support the accessible project, the experience is thought from all the senses. The proportions of the space, the spatial relations, the entrance of natural light, the different temperatures that all this generates in the spaces, but also the temperature of the materials and their smells, the smells of the vegetation and the textures that are placed in the different planes, all of this articulates different spatial experiences seeking that all users can enjoy the architecture, the spaces and the proposed meetings (Fig. 23.10).

23.5 Discussion and Conclusions

The students understand that their responsibility as architects is not only the good design of accessible spaces that allow all users to have different spatial experiences that can be perceived by the different senses but also to correctly communicate the development of the project to those who will use it. This is why the students prepare for 16 weeks to achieve an architectural project that is accessible in all parts of the process. A project that is designed for people from start to finish, creating architecture for everyone.

The learning process concludes by exposing the architectural project through inclusive communication tools to children and adults with disabilities who check them. For many of them, it is the first time that someone spoke to them about architecture, for our students it was the first time

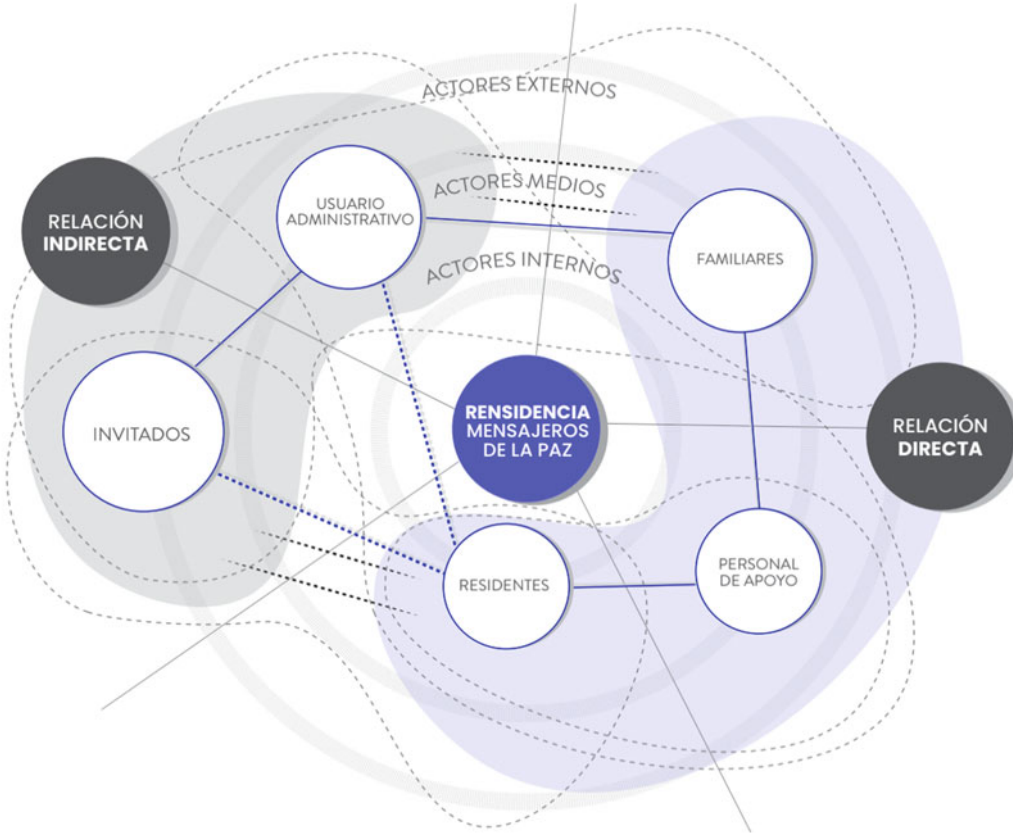

Fig. 23.8 Map of social interactions made by the students to understand the connection needs between users

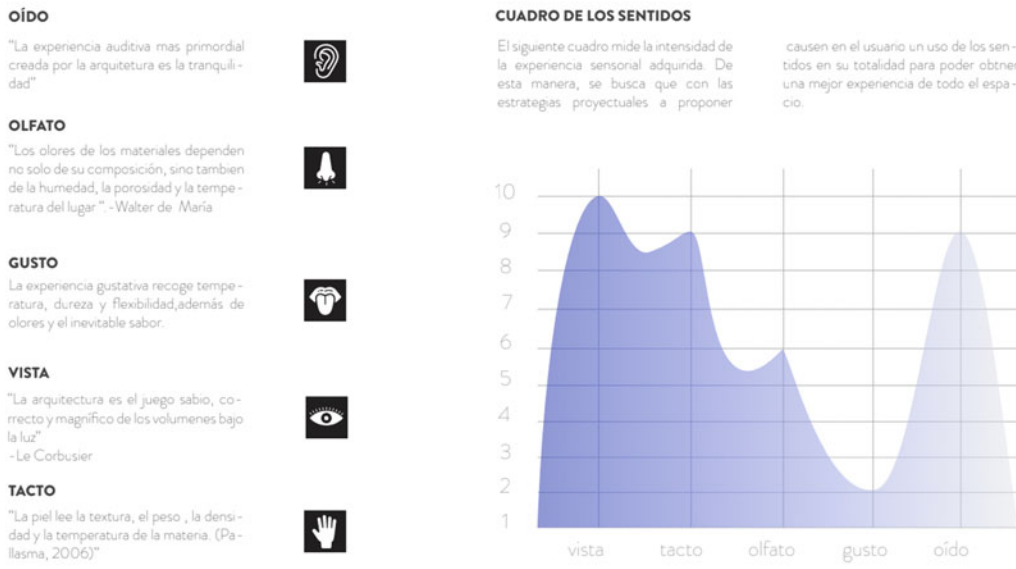

Fig. 23.9 Chart of senses made by the students to understand the sensory experience of the users in the programmatic areas of the architectural project

Fig. 23.10 Sensory strategies proposals made by the students to improve the experience of users with disabilities

that they exposed their completed academic projects to real users. These types of experiences strengthen the understanding of the role that the architect has in the construction of inclusive cities. Definitely, this type of experience contributes to the Sustainable Development Goal #10, which addresses the reduction of inequalities, also seeking to provide the same possibilities for all people, from architecture this translates into accessible spaces for all, eliminating the barriers that currently exist (Fig. 23.11).

Fig. 23.11 Architecture students explain their projects in an inclusive way to children with disabilities

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24 Playground for Blind and Low-Vision Children—Improving Access and Play for Children, Parents and Carers in Cities

Dagmar Reinhardt, Sue Silveira, Kathleen Tait, Lian Loke, Eliane Jones, and Leona Holloway

Abstract

Outdoor spaces such as parks and playgrounds provide opportunities for play and intergenerational experiences between children and adults. Play is an essential part of childhood and outdoor play supports the development of physical skills such as strength, coordination, and balance as well as cognitive, social, and emotional skills. Children with blindness and low vision (BLV) have been observed to have developmental delays in social play behaviours due to a lack of opportunity for physical and social interactions with the environment and people. However, often playgrounds are not equipped for BLV access; retrofitting is highly desirable, but few strategies exist to date; and there exists little knowledge of what BLV users like or want. With input from early intervention specialists, BLV educators, touch access designers, architects, and interaction designers, this paper presents research into playgrounds, and how play, tactility and mobility for blind and low-vision children and their parents/carers in cities can be improved. Through analysis of the literature and precedents for accessible playgrounds, barriers to participation by BLV children were identified. To address these barriers, our research is investigating two pathways: firstly, a case study into touch access for descriptive or instructive support to support orientation and mobility; and secondly, parent and vision specialist teacher surveys on the school playground experience. Our initial results confirm known issues and gaps in lack of empirical evidence on the lived experience, needs and preferences of BLV children and their parents/carers, and point to future research grounded in participatory co-design with these communities.

Keywords

Playgrounds · Blindness · Low vision · Children · SDG4: inclusion and access

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24.1 Introduction

Play is an essential part of childhood, an act of world-making and learning. In play, children develop physical skills such as strength,

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coordination, and balance, together with cognitive and emotional skills (Ginsburg 2007; Hyndman et al. 2021). Play environments encourage children to be imaginative, creative, and social—and the urban infrastructure of cities provide such opportunities through playgrounds for children and their parents and carers. Children's views and experiences need to be taken seriously, and this is where planning and design can support expanding their opportunities to play, explore and get around neighbourhood and city (Gill 2020). City decision-makers, politicians, parents, designers and architects should address children's needs equally to other examples of the built environment (Kollarová and Lingen 2016). Consequently, children are users and critical agents for playground planning (Gill 2020; Arup 2017), yet children typically have no say in playground design.

Urban playgrounds are embedded globally in our city structures (Figs. 24.1 and 24.2). They represent cultural values—they are important social environments that engage citizens in active play and movement, enable communication and connections between all age groups. Playgrounds provide learning experiences that are formative and long lasting, and create resilient, sustainable, and social communities.

While playgrounds should be inclusive and accessible to all members of the community, they often pose poses challenges for people with blindness and low vision (referred to as BLV). Participation depends on individual characteristics and abilities, and children with BLV are underrepresented users. In this context, it is helpful to define blindness and low vision. Vision impairment refers to a range of visual abilities related to blindness and low vision across all human age groups (World Health Organization United Nations Children's Fund (UNICEF) 2001). People with low vision may experience a mild to severe impact on their function, which affects their ability to understand the spatial layout of a playground and location of equipment. Blindness holds greater functional implications. BLV is a disability of access—people with BLV derive information in pieces until a mental image or map is formed. BLV-suitable playgrounds need to enable access across different dimensions—from orientation to moving across the playground; to understanding the equipment and spatial setups; to interacting with parents and carers, and most importantly, interacting with other children. A fundamental gap in understanding exists including the unique experiences of playgrounds for children with BLV and their parents or carers; the impact and role of playground equipment; and how to best support mobility and orientation on playgrounds. Play environments that are appropriately designed for children with BLV need to be accessible, safe, exciting and complex (Molina-García et al. 2021). Yet in most current playgrounds, equipment is standardised and specified for people with full sight. Information maps on site, infrastructure and equipment location may be missing so orientation is difficult. Playgrounds do not include enough touch or sound elements and so fail to

Fig. 24.1 Playground in dense inner-city structure, block infill. Multiple heights, swing, slide. Includes carers/parents seating. Safety features include fencing, recognisable steps and street lighting. Copenhagen, Denmark

Fig. 24.2 Playground in dense inner-city structure, as part of school grounds. Specialised area for soccer, with a sunken play surface that allows easy visual access. Copenhagen, Denmark

cater for the different perceptions and resulting experiences of children with BLV.

Consequently, this research focuses on inclusion and accessibility in playgrounds for people with BLV, through learning, play, and all-senses interactions with natural and built environments. We aim to encourage designers, city planners and community groups to support inclusive access to playgrounds while considering the needs of people with BLV, thus enhancing the resilience of people and communities in our changing cities.

This paper combines significant dimensions such as early childhood and BLV education; universal design and accessibility design; architecture; and city planning and legislation. We present research into inclusive playgrounds, and how play, tactility, and mobility for children with BLV and their parents/carers in urban environments can be improved. Section 24.2 identifies barriers including aspects of child development and the role of playgrounds in the context of urban environments, providing a selective overview of current initiatives and approaches to accessible playgrounds. Section 24.3 introduces two case studies, one on touch access as a new tactile medium for descriptive or instructive support: and the other on parent and vision specialist teacher surveys on the school playground experience. Section 24.4 discusses resolving barriers and introduces a matrix of significant elements for BLV playgrounds. Section 24.5 concludes the paper, with an outlook to future work.

24.2 Playgrounds and Barriers for BLV Children

Public playgrounds are vital parts of cities and urban landscape, situated adjacent to or integrated within a school or kindergarten with restricted access hours (Fig. 24.1), part of dense urban city blocks (Figs. 24.2 and 24.4), or situated within parks (Fig. 24.3), they are often perceived by children as attractive feature over other facilities and infrastructures (The United Nations Convention on the Rights of the Child (UNCRC)). Yet barriers exist for children with BLV on the level of city planning, playground equipment facilitation and intergenerational and peer play.

24.2.1 Barrier: UN Convention and Regional Guidelines

On an international level, the United Nations Convention on the Rights of the Child [10, article 13] explicitly states the fundamental *right of the child for rest and leisure, for play and recreational activities appropriate to the age of the children*. Some nations address this issue through national or regional guidelines, for example the Australian NSW Child Care Planning Guideline (NSW Government Planning & Environment) describes good playground design

Fig. 24.3 Playground in park with climbing frames and a small slide. Adjacent adult playground (bowling) and seating plus café. Dangar Island, Greater Sydney Area

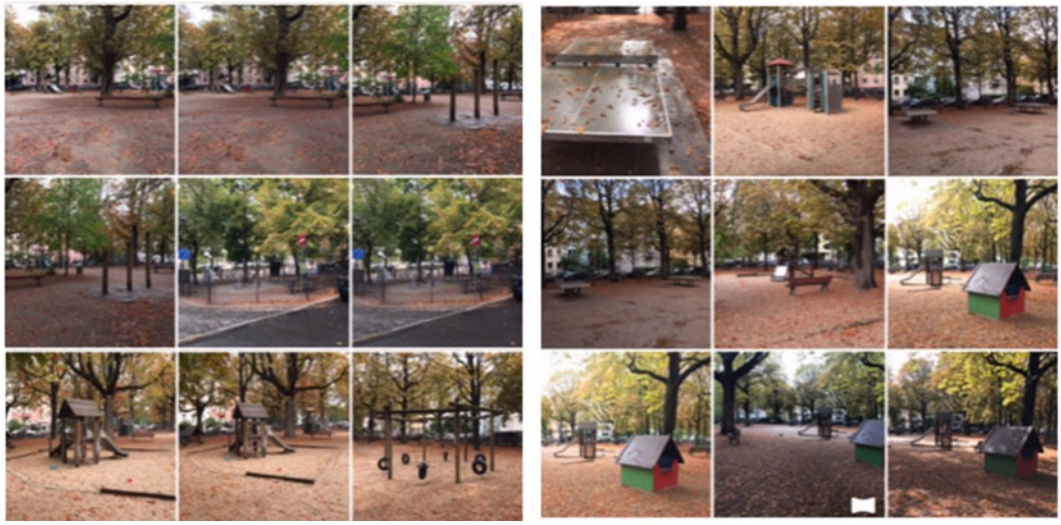


Fig. 24.4 Playground in inner-city structure, forming a mini park space with climbing frames, several swings and slides. Includes carers/parents seating. Safety features include fencing, street lighting, soft surfaces (sand) that can be played with. Frankfurt, Germany

as a mix of inclusive learning spaces, to cater for all children and different modes of learning. The *Supplementary Provisions Regulation* (NSW Government 2019), section 64 (a)–(c) of the *Children (Education and Care Services)* states that "all children must be supported to fully participate (with any necessary help and support) in programs at a service. If a child has a disability, they are to be given access to (a) buildings, areas and facilities at the service and (b) appropriate support services and specialised equipment and resources" (Code et al. 1992). This notion is further supported by the *National Construction Code, Discrimination Disability Act 1992*, *Disability (Access to Premises—Buildings) Standards 2010* (Stanton-Chapman and Schmidt 2016), which sets out the requirements that equitable access to childcare facilities must be available for all community members. Equipment designed across council initiatives commonly focuses on arrival zones and on infrastructure including seating, shading, toilets,

safety, playground areas, surfaces and equipment. While this reflects accessible and inclusive characteristics (via wheelchair focus; swings, pathways and high points), there is limited understanding of BLV playground experiences. Items such as orientation maps, signage, BLV playground equipment, natural areas or sensory play equipment or tactile elements are rare. When playground developers only target the minimum standards (in the construction and architectural design of playgrounds), play value may be ignored and children with disabilities miss out on the potential social, emotional, and communication benefits (Yantzni et al. 2010). Despite laws and regulations aiming to grant better access to play equipment, many children with disabilities miss out on the benefits of playground play (Senda 2015). In Australia and elsewhere, participation of children with BLV is not adequately considered.

24.2.2 Barrier: Can I? Risks, Trust and Confidence

Concerns have been raised that playgrounds have been stripped of challenges due to excessive safety-related concerns (Pierce-Jordan and Lifter 2005). In contrast, risky play allows children to test their limits and challenge their perspectives. According to Stuart et al. (2006) different levels of risk for children of all abilities is critical for cognitive development and physical well-being. In the context of limited movement, children with BLV have additional pressures to achieve adequate physical activity for health, growth, and development. A study of 10–12-year-olds and their parents (Stanton-Chapman et al. 2020) found that with decreasing vision, parental confidence in the children's ability to be physically active decreased, as did the child's self-assurance in their abilities. When confidence and trust levels were low, parents and carers were likely to create barriers by not supporting children in risk-perceived high-motion playground activities.

24.2.3 Barrier: Designed by Whom? Playground Experience and Access

Playgrounds are often planned insufficiently. They may be designed without normative understandings of a child's cognitive process, mobility, and ability, or insufficient representation of childhood disability (NSW Government 2019). Playground manufacturers include activity panels on playground equipment, e.g., reach panels, however, these are not frequently used or are soon abandoned. Significantly, playgrounds are designed by adults for children, without consideration of childhood experiences or giving children agency. Moreover, inclusive and accessible playgrounds build on specific consideration for diverse abilities and include stimuli that account for non-normative world views and world experiences, providing opportunities for play across abilities and ages instead of being 'disabled-focus' playgrounds (NSW Government 2019).

Studies have highlighted the need for greater creativity, innovation and planning in playground design, where inclusive environments offer quality experiences and choices, equally rich in value to all (Cushman n.d.). Not all children choose to use equipment items to explore and manipulate such as latches, chains, knobs, bells which are impactful (Mellou 1994), but rare. Studies reinforce preferences for sensory play including sand and water, and high-activity play including ground-level trampolines and wheelchair swings. Unstructured areas encourage innovative play linked with self-motivation, self-direction and freedom of choice (Gill 2020). Playground equipment for children such as exercise equipment suited to all ages/abilities, that develop body awareness (such as low-level balance beams), or speed (such as spinning equipment, wheelchair swing, moving bridge) were recommended (Cushman n.d.). Yet gaps exist for unusual or speed-related play equipment—uncannily, similar play equipment can be found across the globe.

24.2.4 Barrier: Play—With Others?

Engaging in play is an early form of learning, whereby children develop the ability to communicate with their peers and acquire the ability to make intelligent decisions (Pizzo and Bruce 2010). Play is integral to a child's physical, sensorimotor, neurological, and social development (Verver et al. 2019) as it supports the learning of adaptive, flexible, and resilient responses to challenging situations, with others. Yet regardless of the physical qualities of the playground, social participation can be difficult for children with disabilities, and families can feel unwelcome. Children with BLV often experience social participation difficulties during peer play with fully sighted children (Newstead and King 2021). In the context of SDG 4 and the general approach of 'leaving no-one behind', customised activities may improve play for children with BLV and enhance their unique worldviews and experiences. An enquiry into caregivers of children with disabilities aged 2–5 years described goals for inclusive playgrounds including development of friendships and access to a peer support network for caregivers (Stanton-Chapman and Schmidt 2018; Burgstahler n.d.).

24.2.5 Barrier: Specialised or Universal?

Accessibility and inclusion strategies can also unintentionally create barriers for playground users; by disadvantaging or stigmatising and by specialising individual preferences and abilities for efficiency and comfort use to an exclusive level. BLV children may not play with equipment that they perceive as being reserved for others, and universal approaches are multifactorial to avoid 'disabled' equipment. Such equipment can be over didactic or accidentally discriminatory and prevent social exchanges. In contrast, Universal Design (UD) defines principles such as (a) equitable in use; (b) flexible in use; (c) simple and intuitive; and (d) offer perceptible information; (e) allow for a tolerance for error; (f) require low physical effort; and (g) provide size and space for approach and use (American Society of Landscape Architects (ASLA) 2021). Universally designed playground features ensure children have ample opportunities for social inclusion, cognitive development, sensory stimulation, access to nature and physical exercise. Such features can include for example sensory play, which engages the senses, such as musical corners and sandpits, and thus appeal to a diverse range of senses to enrich the development of all children (Wiener et al. 2010). Landform design is another possibility for unstructured play that offers open-ended play and is critical to brain development. Through the use of land shape and structures, rolling, jumping, sliding and exercising encourages multiple forms of spontaneous gross-motor movement skills. Wiener et al. (2010) report that good use of natural elements can support opportunities for social inclusion and enable children with disabilities to learn about the world.

24.3 Research Pathway and Case Studies

Drawing on existing research, real-world developments and policies, this paper offers three research pathways that address known accessibility issues for BLV, including (3.1) Tactile Media (TM) for enhanced mobility and physical activity; (3.2) an audit of individual experiences of parents and specialist teachers across the Australian BLV community with strategies for a consecutive survey; and (3.3) a visual catalogue/matrix that illustrates design precedents for inclusive BLV playground instances.

24.3.1 Pathway One: Tactile Media

Tactile maps are raised line drawings, which are used within standard approaches to supporting orientation and mobility training. In the context of playgrounds, tactile maps are a method for enhancing playground accessibility and engagement by providing an overview and identification

of key locations. This form of access to a spatial layout assists people with BLV in route planning and the choice of areas of interest. We provide here a background and study on adapting this medium to playgrounds.

24.3.1.1 Background

3D tourist maps cast in bronze of cities, historical sites and topographical maps of national parks are a popular approach in the USA and Europe (Stewart 2019; MacEachren 2004). While these could be described as universal (accessible to all), tactile maps enable BLV audiences to build a cognitive map which supports orientation or knowing where you are in space, and wayfinding or navigating to a desired location (Golledge and Golledge 1999). Tactile maps support learning of an area (Espinosa et al. 1998; Jacobson 1992; Ungar et al. 1993) or route (Holloway et al. 2018). Prior to visiting the depicted area, people with BLV may familiarise themselves via web information or paper-based tactile maps. Durable tactile maps installed in situ will also support people with BLV; however, these are rare (braille maps exist in just four locations in Australia). Braille in playgrounds and parks in an Australian context is collated by the Australian Braille Authority, demonstrating that the BLV community values such accessibility measures. BLV readers prefer 3D maps for better accessibility over common relief maps because these facilitate better short-term recall (National Center on Accessibility 2019).

24.3.1.2 Tactile Media—Developing Tactile Icons for Playground Maps

Print maps make significant use of representational icons for easy recognition and understanding (Robinson et al. 1984; Aldrich et al. 2002). To further enhance accessibility, 3D tactile icons without reference keys were tested for playground maps, including common features such as audio play, climbing equipment, swings, slides, water play, scented gardens, balancing activities, tunnels and sand pits. Other important features not specific to playgrounds were trees, toilets, steps, bridges, picnic tables, seats, rubbish, car parks and entrances. Prototype 3D tactile icons measuring a maximum of 2 cm^3 were developed based on existing print icons, free association, and in consultation with a blind collaborator. After evaluation, nine playground icons were found to be easily identifiable without reference to a key, with over 80% accuracy by both blind and fully sighted touch testers (Fig. 24.5).

Tactile maps have the potential to alert visitors with BLV about playground features they are otherwise unaware of, encouraging greater exploration and independence, and signalling an inclusive playground space providing rich and engaging environments that develop tactile skills (Curtin et al. 2019; Columna et al. 2019). Braille alphabet signage, maze puzzle boards and giant abacus offer opportunities to enrich playgrounds with customised materials to stimulate the senses beyond vision. Sculptures, relief models, raised line drawings, and tactile games also encourage inclusive play and raise accessibility awareness.

24.3.2 Pathway Two: Playground Experiences

A second research pathway explores a Preliminary School Playground Audit and Focus Group. To better understand how playgrounds work for children with BLV, four specialist teachers shared their observations of students with BLV and intellectual disability in a regularly used but unadapted school playground. The teachers provided feedback on significant safety barriers for independent movements including a lack of rails for trailing and safe paved areas; uneven surfaces and an absence of textured surfaces; and no colour contrast on objects such as poles and pillars in the playground. Furthermore, barriers that impacted student play and the level of movement, resulting in low levels of self-initiated activity, particularly when students used wheelchairs were discussed. This included equipment such as large blocks, stationary play equipment and bikes not adapted for the students' needs; lack of access to a quiet or retreat

Fig. 24.5 Touch access through 2.5D and 3D maps of playgrounds/parks or city structures. In situ with 3D icons that represent attractions in the park

area; lack of access to games painted on concrete; lack of multisensory experience, free movement play and a lack of opportunity to use their hands to explore spaces.

The teachers reported positively on the availability of chairs and tables which enabled students to engage with one another by chatting whilst sitting and listening to music. Significant improvements to the playground would address, firstly, opportunities for movement and fitness using safe, fixed equipment. Structures such as fixed bridges and steps with rails to encourage essential cardio activities of bouncing, balancing, and walking were suggested. Further opportunities for running with close supervision, opportunities to hang from structures to support their own weight, and an activity area for free dancing and movement were recommended. A sensory area for students to experience through touch, sound and smell, and a fixed station for sensory play, games and music-making activities were encouraged. Finally, teachers stressed the need for students to be orientated to the playground area, with support to know where they were and how to use all available activities. This audit largely confirmed previously identified barriers outlined in this paper.

One on One Focus Groups: In an informal interview in an educational context, a parent and a 10-year-old child with BLV cited significant discrepancies in expectations and likes of a particular playground. In response to the simple questions: "What do you like/what don't you like in playgrounds?" the parent liked "swings, swings and more swings". The child liked a wide range of high speed and mobility playground equipment, including "swings, running ropes, flying fox/zip line, climbing chain, jumping balloon, wobbly bridge, stairs and slides, rockers and railings; but also, musical pipes and free running in open space"; and more risky activities. Different expectations and desires were apparent between the child and parent. Further in-depth research is needed to establish childrens' preferences in playground design, to ensure excitement and challenge. Similarly, orientation and mobility instructors and physical education teachers noted a need for skill and opportunities development, including opportunities to (a) explore

with gross-motor and fine motor skills (e.g. alcoves, fixed sensory gear); (b) enable cardiovascular activities (e.g. running rope, railings, jumping balloon, fixed exercise equipment); (c) hold own weight (e.g. zip line, monkey bars, rope ladder); (d) fall safely from low height (may need to be taught) or commit body into space (e.g. jump from low height, run downhill safely); (e) reach to sound (e.g. movement activated soundscape poles for orientation or musical instruments); and (f) vestibular stimulation (e.g. swings, rockers). These answers clearly indicate that a more refined survey is necessary for the two groups, parents/carers and children to better understand what can support playground experiences for children with BLV and their community.

Building on the preliminary playground audit and focus groups, an online survey is in process. Parents and specialist teachers for children with BLV are asked for their experiences of supervising a child with BLV in a playground in two sections. Section A focuses on the parent/carer, while section B asks parents/carers to report back on the child's experience—effectively, notating for the child. Specifically, section A investigates the parent's awareness and thoughts of variables, such as (a) frequency of playground attendance; (b) convenience of the playground location; (c) their judgement of playground accessibility including any accessibility features; (d) whether the playground allows independent movements and play with other children; (e) safety concerns and supervision. Section B focuses on the child's experience, including (a) playground enjoyment; (b) preference for equipment; (c) mode for physical and imaginative play; (d) interaction with others, i.e., playing together; and (e) requests for enhancing features. The survey outcome will identify the criteria that frame the user experience, to develop best practice guidelines for design of accessible and inclusive community environments that cater specifically for BLV users. Significantly, the survey is designed to better understand what children want, so that a later co-design phase in collaboration with children with BLV can also reflect this understanding.

24.3.3 Pathway Three: Matrix for Playground Criteria for Children with BLV

Several playground reports, initiatives and reviews have been collated to provide an overview/matrix of criteria (Matrix built from following resources: Cities Alive 2017). The design framework and matrix illustrated in Table 24.1 explores a stepped approach to designing for children with BLV and builds upon existing strategies.

Figure 24.6 illustrates precedents in Australian playgrounds that hold the potential to offer enjoyable play experiences for children with BLV. It should be noted though that these examples, while representing good design directions for play for blind or partially sighted children, are not designed or specifically dedicated to this user group. The precedents showcase narrative and explanatory signage (1); distinct colours, colour contrasts, surface textures and patterns (3, 5, 6, 9, 10); sensory stimulation via sound and musical activities (3, 7, 8); haptic play with water (4); raised zones and plateaus (2, 5, 9, 10); high-motion play and risk play (2, 10). More in-depth research is required that explicitly explores the individual experiences of children and their parents and carers.

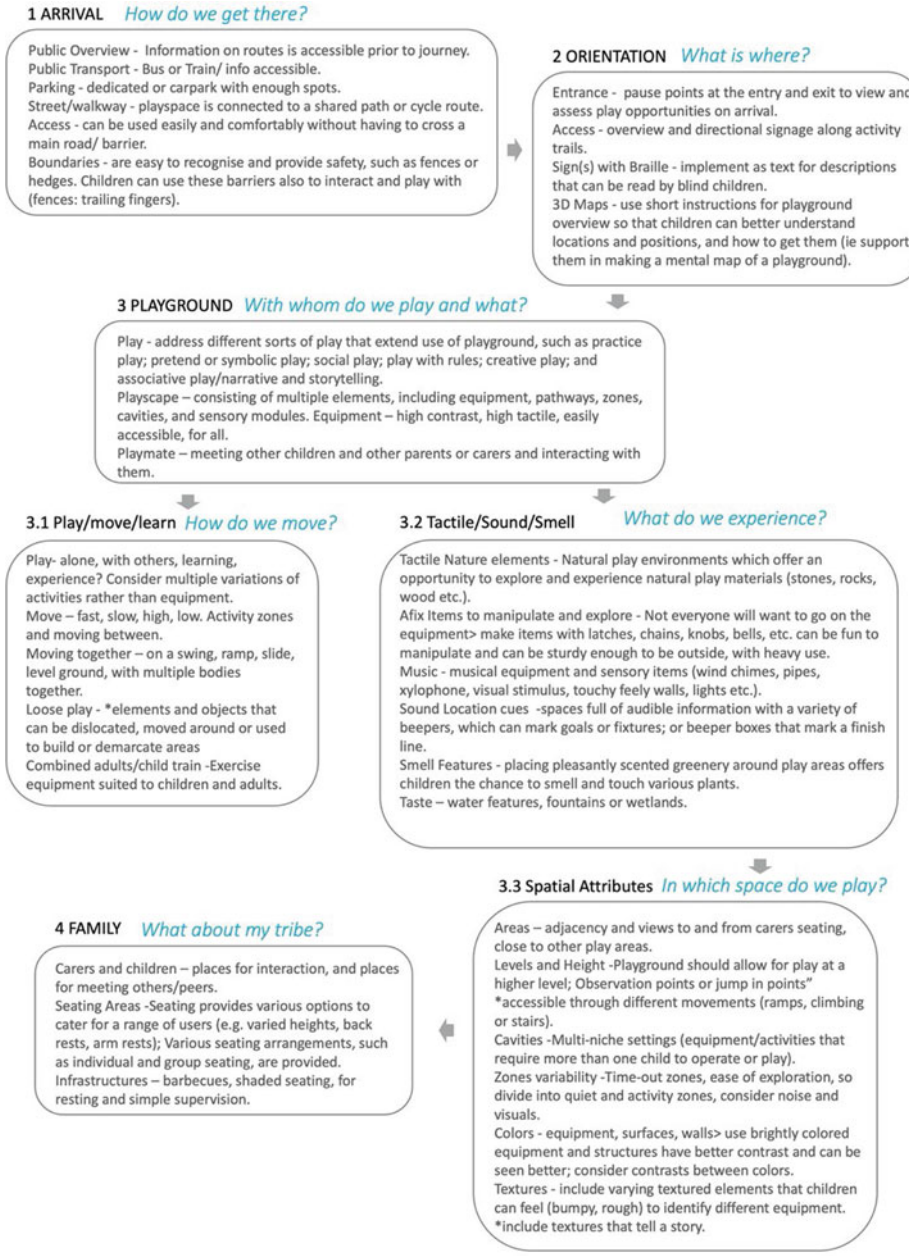
24.4 Discussion

Based on the three research pathways described previously, in this section we discuss resolving highlighted barriers for playgrounds that are BLV friendly and offer universal play experiences for all children.

24.4.1 Resolving Increasing Children's Agency

Children with BLV need to be asked what their preferences for playgrounds are so that this becomes a design condition. This aligns with childhood consultation, whereby 'children's voices' are core, a term that describes expression

Table 24.1 Matrix for inclusive playground design for children with BLV, with focus on arrival, access, orientation and mobility, tactility, play with others, family integration, and community building. Note that this framework is a departure point for further research investigations



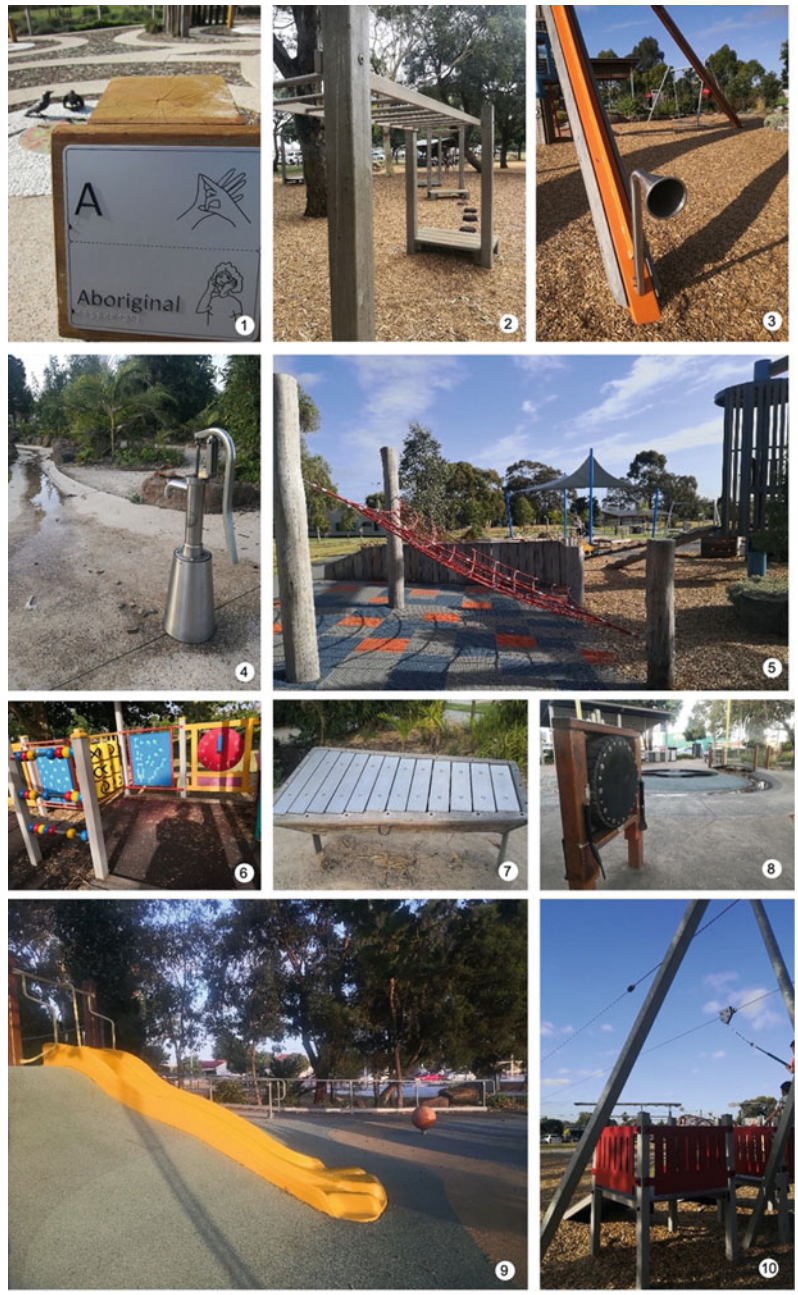


Fig. 24.6 Visual catalogue of BLV inclusive strategies for playground and equipment in Victoria, Australia: (1) Sign language/braille signage; paths to play areas, defined by different ground surface; large, unique sculptural details that can be accessed by touch (Brimbank Park, Keilor). (2) Balancing and low weight-bearing activities/monkey bars (Kingston Heath Reserve, Moorabbin). (3) Audio play—talking pipes for communal play (Hansen Reserve). (4) Water feature (Sunvale Community Playground, Sunshine). (5) Sloped soft surface under climbing net for safety (Hansen Reserve, West Footscray). (6) Tactile, high contrast activities including clock face, tic tac toe and abacus (Yarraville Gardens, Yarraville). (7) Music garden with percussive instruments (Sunvale). (8) Musical instrument and In-ground trampolines (Errington Reserve Playground, St. Albans). (9) Ramps to slides, sloped ground under slides for safety (Errington). (10) Flying Fox with ramp access and plateau (Kevin Wheelan Gardens, Sunshine)

of meaning through talk and ways such as dance, movement, song, music, poetry, and many more. Emphasizing children's preferences in playground design will ensure that children's voices are channeled through multiple modes, and will underscore their play based needs in a full and rich way (Brulé et al. 2016). Significant to this context of questioning playground design, children's voices matter, and so when surveying and consulting parents, adult frames of reference must not be imposed. Consulting must involve sustained engagement and what occurs before and after the consultations is as important as the consultations themselves. Consultation strategies

must be inclusive of all children, including those with additional needs. The involvement of families and specialist staff who best know children is preferred to ensure the development of effective strategies. There is no doubt that surveys will give a much needed dimension to future discussion on BLV playgrounds. However but more importantly, careful co-creation workshops are necessary that allow BLV children to express their ideas for good play and good playground experiences both verbally and physically via tangible models.

24.4.2 Resolving Parents' Expectations

Active adult engagement is particularly important in supporting play, and thus parent and carers' support for children with BLV requires further attention in playground design. Out of three fundamental factors that are significant for free play raised in this chapter—space, time and adult attitudes—the latter is often overlooked. Yet this variable is critical as hostile or unsupportive adults can utilize repetitious playground designs that result in the suppression or even eliminate the possibility of play. Parents or carers may be hesitant to allow their BLV child to engage in play with fully sighted children due to a fear of harm; unintentionally causing social isolation from the child's peers (Burriss 2002). Rather than engaging in peer-orientated play, this can force children with BLV to gravitate to parents and guardians (Götzelmann 2018). In turn, social isolation and dependence can lead to various developmental, physical and mental health issues. Our audit and consultations to date have identified that parental fears came from previous negative experiences with their child experiencing physically or emotionally harmed in play, even though they were well-informed regarding the benefits associated with physical and social play. The unfortunate coupling of personal concerns of the parents with the unavailability of BLV fit play-equipment limits social participation. Consequently, more collaborative research is needed —to better understand and allow BLV parents to enter a discourse where they can voice and overcome their concerns.

24.4.3 Resolving Playgrounds, Towards Social Participation

To allow all children to connect through shared experiences and mutual enjoyment, and to promote social inclusion, playground designs must capture both the attention and engagement of fully sighted children yet incorporate functional adaptations for children with BLV (Gay 1989). In support of children with BLV and their parents and carers, a number of strategies are significant:

(1) Use of 3D maps and tactile models: these maps allow orientation and mobility, and with added features such as depth and height allow for a clearer mental understanding of the location.
(2) Inclusive Play Concepts: should be developed where children interact and play together in loose or imaginary play, with areas, sections, nooks and equipment that allow slow approach and invitations by others. The inclusion of direct feedback including auditory or haptic, reduces cognitive load, making the information easier to process (Brulé et al. 2016).
(3) A multi-sensory approach to designing adapted equipment: whereby a variety of tactile, haptic and auditory experiences are present, and sensor-based response is geared to the actions of the user so that children with BLV are equally empowered with better peer response from active participation (Gay 1989).
(4) Open play: children with BLV are encouraged to expand their spatial knowledge and engage in syntonic learning or learning that occurs through engaging with one's bodily senses (Zajadacz and Lubarska 2020). More research is needed on implementing narrative/tactile prompts on equipment, on

areas and zones of open play, or natural areas such as water and garden features with prompts for narration and interaction.

(5) Shared experiences: children with BLV develop independence, gain social confidence (Mettler 1989) and increase social inclusion based on the premise of shared experiences when using the playground equipment.

(6) Select Retrofitting: Modification of physical environments should be undertaken carefully, to avoid dependency among people with BLV (Matrix built from following resources: Cities Alive 2017). Importantly, current equipment needs to be revised and updated to encourage or nurture children with BLV, and research is required here that centres on BLV children's experiences and wishes.

Some limitations should be discussed here. Whilst our evaluation of the current state of accessible playgrounds has revealed a paucity of design guidelines and published real-world examples that adequately cater for BLV users, our empirical studies are still in the preliminary stages. We have compiled the first iteration of a visual catalogue of best practice in inclusive design for BLV children and their parents and carers, drawn from real-world examples of playgrounds. Future work will continue to further develop the design guidelines and catalogue, through evaluation of more playgrounds that extend the typologies and provide visual examples of the implementation of specific guidelines. Importantly, the participation of children's views will form an essential component of the data informing the guidelines.

24.5 Conclusions

Playgrounds are significant public, urban, open and free spaces of our cities, but these are currently not working for children with BLV. This research has brought together multiple aspects to discuss this phenomenon from different angles, including political initiatives, council initiatives and legislation dimensions; juxtaposed with observations from early intervention specialists and BLV educators; and with research from touch access designers and architects. We have discussed the beginning of a framework for assessing existing playgrounds, playground equipment and council initiatives and general discourse, to understand better the knowledge and barriers existing in that context. We have presented a matrix that intersects BLV requirements with accessible and inclusive strategies, which highlights the discrepancies that exist. We are also currently gathering more feedback from children with BLV and their parents, to further evaluate spatial and equipment conditions. Future work will build on this, by adapting this knowledge to co-design strategies for play, design for play equipment and implementation of changes to existing playgrounds. Adopting the UN call and UNICEF Child/Youth Participation strategies involves children and youth at early stages of the co-creation process, thus recognising children as partners and as equal, active citizens, whose views and experiences are respected and integrated. Translating children's views into meaningful action will ensure that the consultation purposes are clear and that children's views are considered in decision-making. Tracking the uptake of children's messages and reporting on these publicly provides accountability and an incentive for action. Children's views and participation are often overlooked, and so the development of strategies and methods for co-designing with children and BLV children is a necessary first step towards a truly universal playground.

Results of this pilot study show clearly that further research is needed. By analysing and adapting the structures, materials, instructions and activities within the physical environment, so that BLV children and their typically developing counterparts can experience higher social inclusion and cognitive development in public playground settings. This research will then hopefully contribute to better understanding of user perspectives and will lay the foundation for the community of people with BLV and those who help to shape urban environments to come

togther as joint decision-makers, along with professionals or advocates and campaigners. A playground with exciting and stimulating elements for all senses will be a better playground for all children.

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Part IV
Neurodiversity

The Power of an Autistic Lens: Visualising Activity in Shared Public Space

25

Stuart Neilson

Abstract

The explicit zoning of space into activities, and an understanding shared by all people who share the same space, contribute to social imagination and reduce autistic anxiety focused on unknown and unimaginable future happenings in the immediate vicinity. Knowing where to place oneself with respect to action is calming. **Video processing** provides a method of visualising motion through a designed space and to find ways to explicitly demarcate the spatial boundary (the locus, in mathematical terms) of an activity. Desire lines and their intersections can be exposed with video analysis to delineate regions within an activity and between activities. Regions of differing motion intensity may be perceived as anxiety-provoking or calming by autistic people. Images of completed actions or activities, the loci, are in themselves an interesting and often aesthetic outcome with value as inputs to the design process. **Activity loci** identify both potential conflict between different activities which share a space, and the potential to rearrange space and activity to promote peaceful co-existence of potentially competing activities—and zones for self-calming inactivity—within the same shared space.

Keywords

Inclusivity · Neurodiversity · Autistic · Video analysis

25.1 Introduction

As an autistic person I constantly find public places "terribly chaotic and unpredictable" (Kinnaer et al. 2016) in common with other autistic people. The anthropologist Catherine Mary Bateson described how "*Arriving in a new place, you start from an acknowledgment of strangeness, a disciplined use of discomfort and surprise*" (Bateson 1994), a strangeness that dissipates with familiarity. My work is an attempt to share my own experiences and to "*cultivate strangeness*" to familiar places, especially amongst people who design or control built architecture. My images, if successful, depict the discomfort, surprise and necessity of careful attentiveness (Boys 2014) that neurodivergent people experience in spaces designed without reference to the neurodiverse population.

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Sensory and social overload, the hidden logic of wayfinding, anxiety-provoking transitions and insecurity reported by autistic people (Kinnaer et al. 2016) obscure the affordances (Peri Bader 2015) of public space. I experience a perpetual state of hypervigilance to the strangeness of public spaces. Architecture can be less or more disabling, by design.

Photographic images result from a chemical reaction in proportion to light captured while the shutter is open. In many senses photographs are a lie, often contradicting our individual memories of the same scene. As photographer John Berger said, "*A photograph preserves a moment of time and prevents it being effaced by the suppression of further moments. In this respect photographs might be compared to images stored in the memory. Yet there is a fundamental difference: whereas remembered images are the residue of continuous experience, a photograph isolates the appearances of a disconnected instant*" (Berger and Mohr 2016).

Digital cameras simulate chemical photography, but could equally capture motion intensity, direction of movement, edges, or other changing visual characteristics. I process video sequences to convey the confrontation between autistic people and our built environment (Baumers and Heylighen 2010), visualizing sensory exposure, active spaces, potential escape zones and desire lines. My images integrate visual change into "*the residue of continuous experience*", and not "*a disconnected instant*" of light exposure.

There is an overlap between my visual expressions of autistic experience and the seven criteria of the ASPECTSS™ design framework (Mostafa 2014): Acoustics, Spatial Sequencing, Escape space, Compartmentalization, Transitions, Sensory zoning and Safety. I highlight connections with the ASPECTSS™ criteria in **Bold** in Sect. 25.3.

25.2 Methods

For this project I was kindly granted access to Dublin City University (DCU) and the Crawford Art Gallery, Cork City. DCU is the leading third-level institution in Ireland designing inclusive learning environments with autistic students in mind (Mostafa 2021) and is a predominantly pedestrian campus. The Crawford Art Gallery is a national cultural institution dedicated to the public display of historic and contemporary works, located in a busy city centre. The art collection dates to 1820, housed in a building dating to 1724 (Crawford Art Gallery 2022).

My source material was video captured with a hand-held mobile phone and small video cameras on fixed mounts, at frame rates from 2 to 60 frames per second. Video was processed (Fig. 25.1) using OpenCV (Bradski 2000) using the Python programming language, available as free and open source software (OpenCV 2022).

25.3 Results

25.3.1 Capturing Whole Events in Motion Composites

A motion composite accumulates all the elements of change over time, creating a residual image of completed actions and motion paths (Fig. 25.2). The activity boundaries are made visible, mapping **Compartmentalisation** of space.

25.3.2 Identifying Activity Loci and Desire Lines with Motion Intensity Maps

A motion intensity map displays accumulated changes in brightness or colour, visual effects

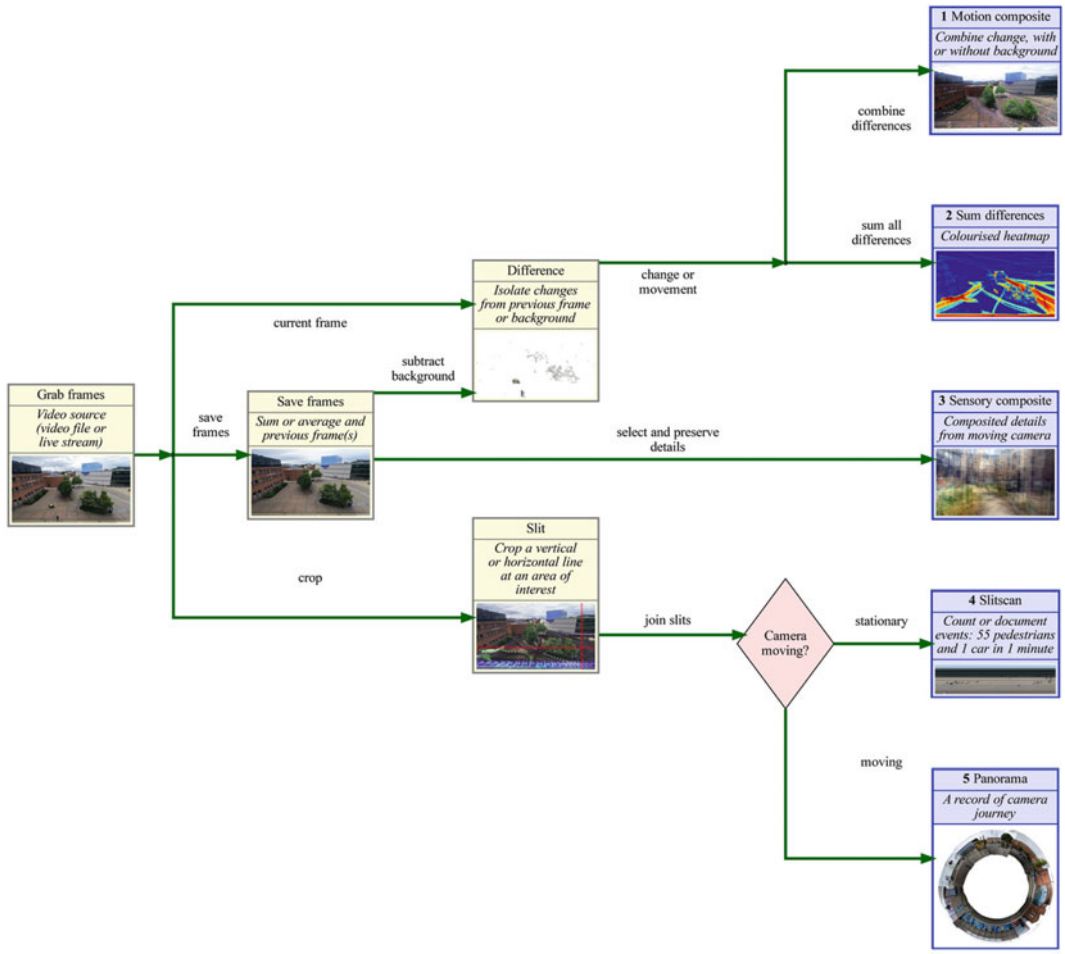

Fig. 25.1 A visual summary of the video capture and processing, leading to a variety of outputs incorporating the dimension of time into static images of the changing visual activity within the environment. Examples of each follow in the Results section below

that draw attention towards the margins and away from focus on tasks or social interactions. Pedestrian desire lines emerge, delineating potential **Escape spaces**, conflict zones where paths intersect, and regions of **Safety** (Figs. 25.3 and 25.4). Desire lines are mutable, changing over the course of the day according to need, and reforming again according to collective memory. It is hard to swim against or change a prevailing desire line.

Many autistic people experience small, repetitive changes such as light flicker as sensory overload. This is in contrast to the effect of filtering out small changes in Fig. 25.4b with an unfiltered intensity map containing artificial light flicker in Fig. 25.4d.

25.3.3 The Feel of a Place in Sensory Composites

Video from a moving camera can simulate intentional camera movement (ICM) photographs, or retain details from equally spaced or

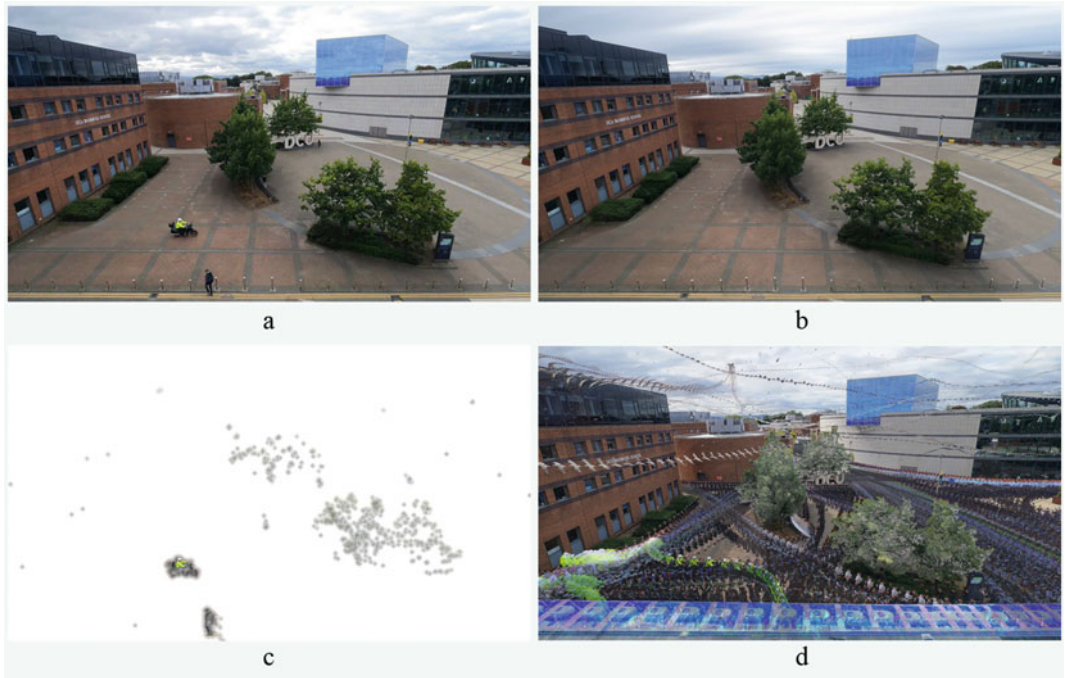

Fig. 25.2 The entrance to the pedestrian Mall at DCU (**a**). The visual background averaged from many frames, like a long photographic exposure (**b**). Movement or visual change isolated by subtracting the background from an individual frame (**c**). Crowd flow in a motion composite of equally spaced frames (**d**)

maximum-change frames. The collected frames are composited (Figs. 25.5, 25.6, 25.7 and 25.8) to overlay all the details within a space, without strict reference to relative location, evoking the embodied mood or ambience (Peri Bader 2015) or "*residue of continuous experience*" (Berger and Mohr 2016). The images often evoke a strong recall of other senses I experienced in the same moment—the **Acoustics**, the echoes from hard surfaces, the calls of seabirds, the rain falling into my collar, or the smell of food frying in the cafeteria—and whether the marginal awareness conveyed safety, comfort and welcome, or threat, danger and rejection (Liebergesell et al. 2021). These sensory composites sometimes unveil **Sensory zoning** and make explicit a strangeness which I felt, yet was unable to identify in the moment.

25.3.4 Recording Passing Events in Slit-Scan Photographs

Social attention to the bodily presence of others is a substantial part of the dynamic structure of the experience of public spaces (Bader and Peri Bader 2016), but may provoke anxiety, be unreadable to, or absent entirely from autistic

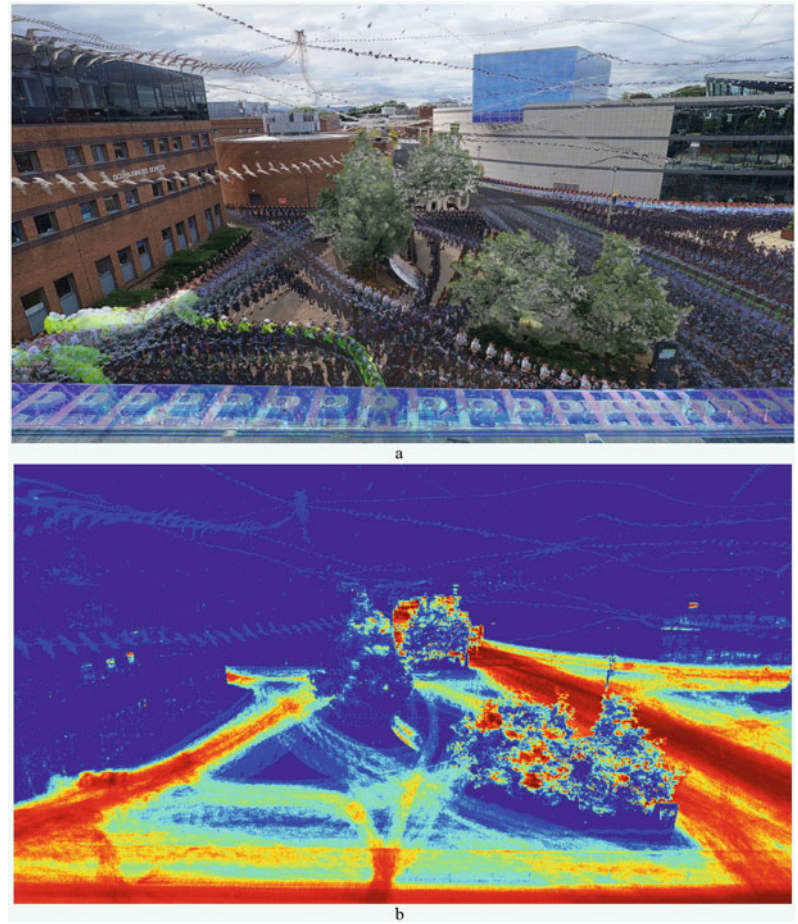

Fig. 25.3 A motion composite exposing the network of paths entering the DCU pedestrian campus (**a**). The accumulated visual change over 16 min (**b**) identifies pedestrian desire lines, from the main entrance to the left, the car park exit immediately below the camera and pedestrian footpath entrance from the street to the right. Desire lines converge entering the Mall beside the Helix Theatre at the centre of the visual field, and diverge quiet rear entrances to faculty buildings on the left. The intensity of visual change is represented by a heatmap colour-scale from blue (inactive) to red (busy)

perception. I often feel that crowds are rushing in response to an alarm I cannot perceive. A slit-scan image has the potential to count events, visualise sequences (Fig. 25.9) or portray a timetable of activity intensity and sensory stimuli (Fig. 25.10). Most people are not consciously aware or appreciative (Vermeersch 2013) of marginal effects that can transform the atmosphere (Peri Bader 2015) and utility of a place for autistic people.

25.3.5 The Sense of Journey in Panoramic Slit-Scans

A slit-scan captured from a moving camera, while walking or in a vehicle, captures the sense of journey. The sensory impact of places distorts the linearity of time, distance and direction in our residual memories. The imperfections of real life distinguish a visual map of a journey from a geometrically accurate elevation of the same structures (Fig. 25.11).

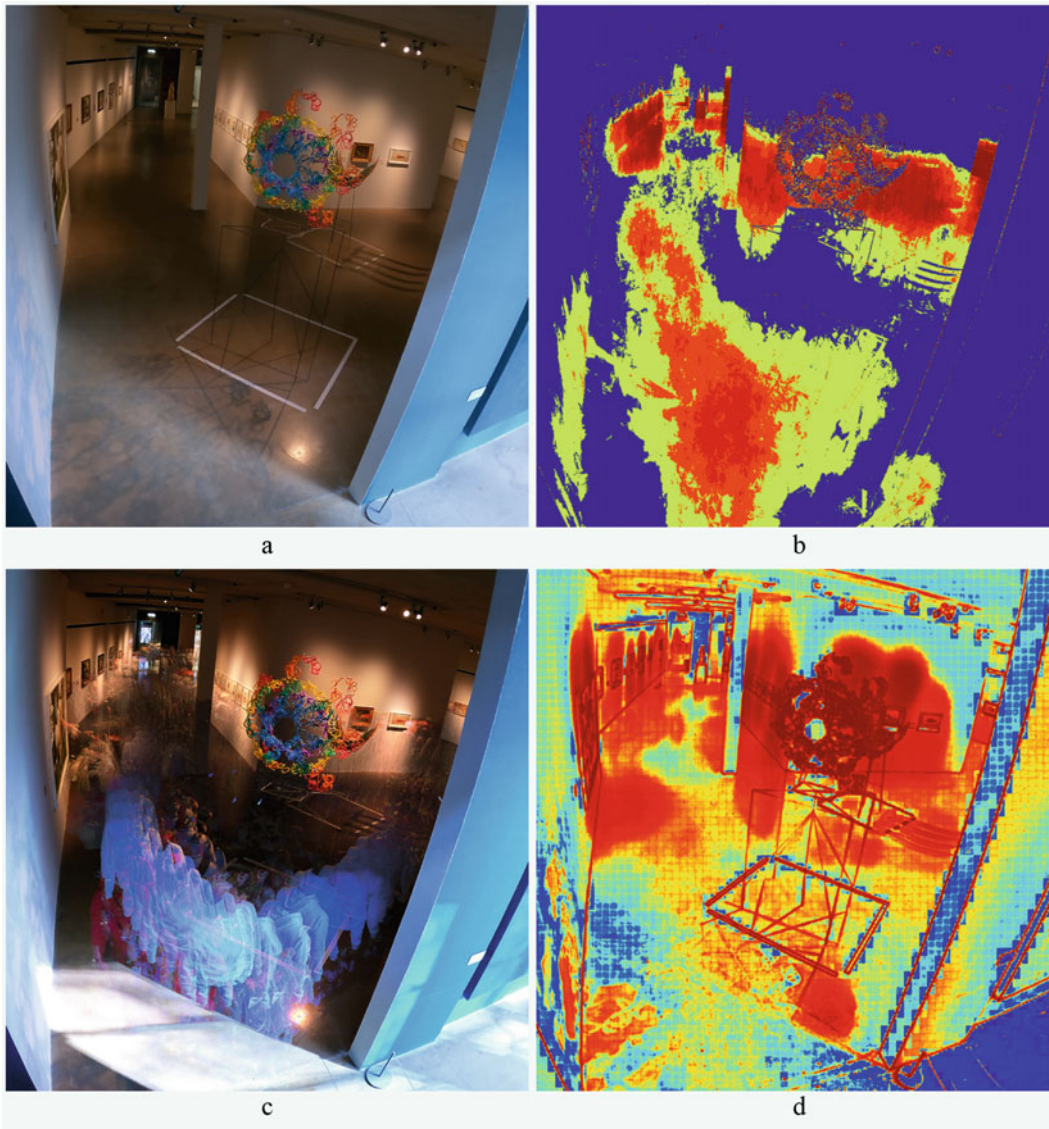

Fig. 25.4 The exhibition "*Meat and Potatoes*" at the Crawford Art Gallery with the sculpture "*Longevity/Apopostome*" by the artist Maria McKinney (2015, semen straws, glue, cable ties, 3D printed objects (PLA—polylactic acid), powder coated steel frame, 126 × 120 40 cm) in the centre of the frame (**a**), a heatmap displaying the paths by which visitors approach and view the works (**b**) and a motion composite of the paths as visitors connect the "*Sire Series*" photographic prints on the two walls with the related sculptures in the centre (**c**). Of particular note is the impact artificial light flicker (**d**). With no threshold to filter out continuous, small changes (**d**), the heatmap emphasizes spotlights and their reflections

Fig. 25.5 A "*less busy path*" identified by autistic students as a calming route between the high intensity movement of the Mall and rear access via a green public park. The highlight and lowlight details from a hand-held video walking the entire path are composited into a residual image portraying a memory of the ambience and the sensory experiences

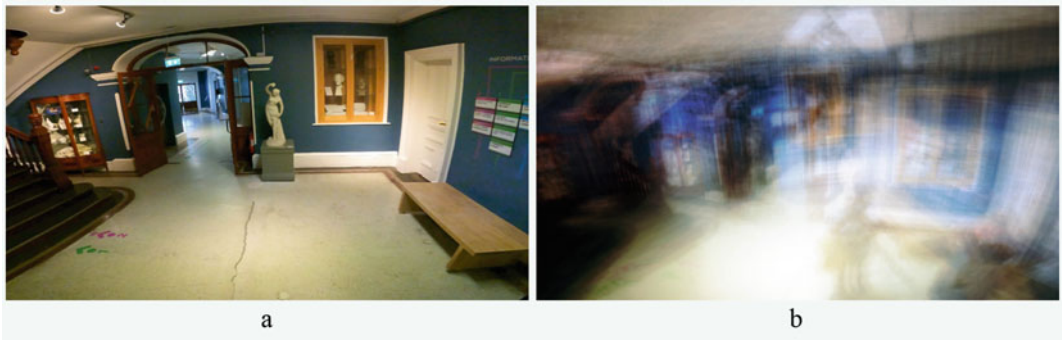

Fig. 25.6 The main lobby beyond the forbidding entrance to the Crawford Art Gallery, despite being the confluence of five sets of flow—the main staircase, offices, studio space, café and exit—provides calm refuges, if the corners are not yet occupied

Fig. 25.7 The "*Botanica*" exhibition in the Long Room of the Crawford Art Gallery contains precise, detailed images. A hard parquet floor, glass cabinets and high-contrast lighting contribute to the reflective, acoustic sensory experience of visiting this space

Fig. 25.8 The main gallery of the Crawford Art Gallery is divided by refuge walls into several calm spaces, with gentle exterior light from a ground floor window in a shaded street. The light accentuates the colours and textures in "*Sire Series*" by Maria McKinney and "*How to Butterfly a Leg of Lamb*" by Mary A Kelly and Abigail O'Brien (1999, Photographic, video and sculptural installation)

Fixed and moving slit-scans have the potential to expose **Spatial Sequences** and **Transitions**, whether designed, or the consequence of, sensory change.

25.4 Discussion

These images reflect one autistic person's impressions of two contrasting locations. DCU is an autism friendly campus with quiet zones and low arousal entry transitions, connected by a network of paths enhanced by an EscapeScape of less busy paths. The Crawford Art Gallery is a safe refuge in a busy city centre, harboured within nested transitions through a forbidding exterior, security and heavy gallery doors. My images help me make visible the conflicting sensory and emotional demands of, and locate myself effectively within, these shared public spaces.

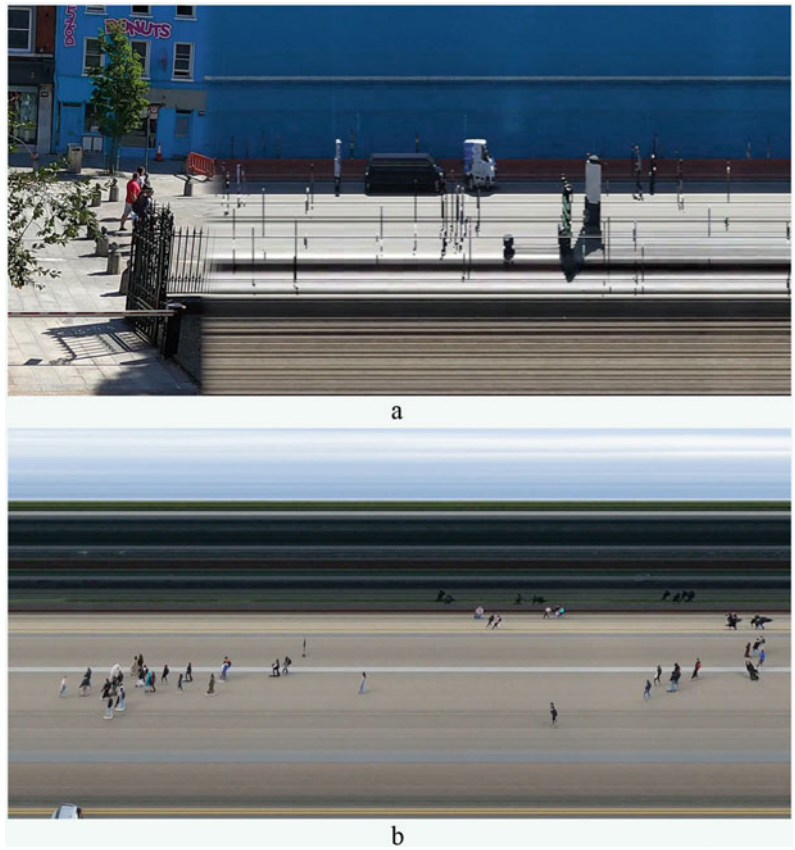

Fig. 25.9 A slit-scan photograph of walkers and food delivery vehicles between the Crawford Art Gallery and a café opposite (**a**). The traffic through at the entrance to the Mall in DCU is countable, amounting to 55 pedestrians and one vehicle in 2 min

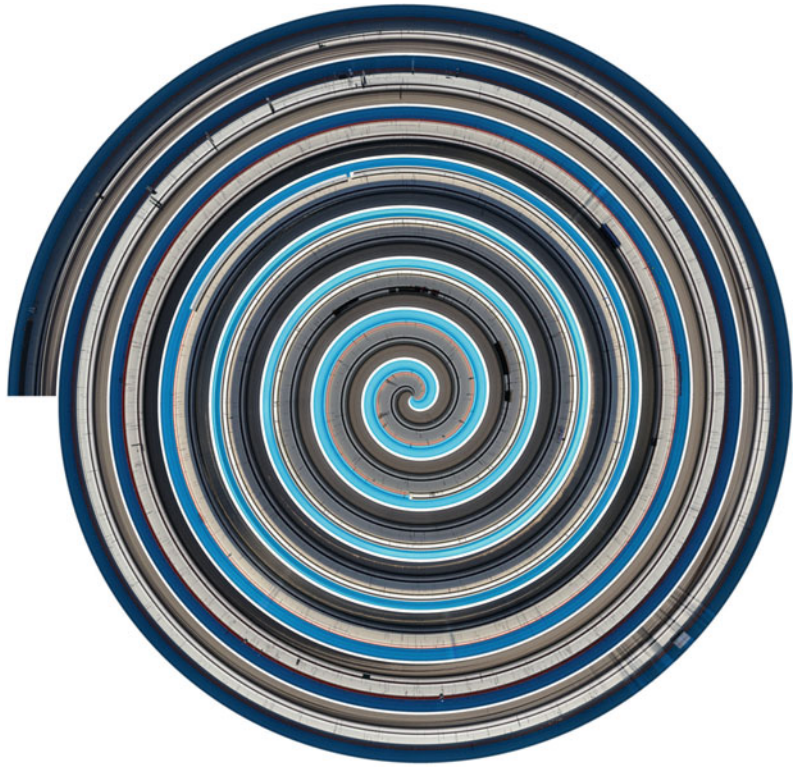

Fig. 25.10 A slit-scan photograph of the movement outside the Crawford Art Gallery over an 8 h day reveals a quiet morning, mid-morning delivery vehicles, a busy lunchtime, and evening rush. The movement of sunlight over a blue café façade suggests the dynamic sensory ambience

Fig. 25.11 A slit-scan journey by bicycle converts the 360° façade of the Crawford Art Gallery and Opera House into a linear journey punctuated by landmarks and apertures, with an embodied sense of the bicycle's balance on the sweeping curves at the four corners of the block

25.5 Conclusion

"*Cultivating strangeness*" is a vital stage in any design process. Inclusive design can be promoted by becoming estranged from yourself and your own designs, sufficiently to see your creations from the perspectives of their diverse users. Artistic visualisations and other experiential displays are one entry to cultivating strangeness.

Acknowledgements Cork-based artist Danielle Sheehy has been instrumental in guiding me from communicating in words to communicating in images, and has shared a deep vision of neurodivergent experiences in the neurotypical mainstream. I am especially grateful to the Crawford Art Gallery and Dublin City University for allowing me to showcase my experience of their venues, and assisting me in filming.

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Our Neurodivergent Narratives: Visual Storytelling Through a Prototypical Design Framework

26

Shannon McLain and Rachel Updegrove

Abstract

The inclusion of diverse representation of neurodiversity is lacking in the dialogue and methods of the built environment. Authors of disability theory, Tobin Siebers and M. Remi Yergeau, would agree with our frustrated sentiments. Neurotypicals are currently inscribing us as medicalized symptoms, stereotypes, and "non-human", whereas we neurodivergents are authoring our narrative identities in evolving, reflexive, contextual, communicative, and architectural space. By avoiding engaging diversity within neurodivergence, architectural discourse focuses on product design-oriented solutions and exclusive, unempathetic practices. Actively ignoring neurodivergent lived experience removes crucial context. As two neurodivergent women within built environment professions, we share this neurodivergent label, but our narratives, needs, and responses vary. This visual essay suggests an inclusive, co-creative, adaptive design framework, to guide the neurodivergent authoring "resonant" and "multiple embodi[ment]" of neurodivergent narratives. Our narrated experiences reflect on establishing trust, understanding the social context of our interactions, advocating for preferred forms of communication, discovering our sensory perceptions and needs, defining our comforts, and expanding our philosophy of empathy. This design framework is a "resonant" prototype that reflectively adapts to those who are there, by inviting modification. From this neurodivergent exchange of experiences, we hope to convey the importance of diverse neurodivergent inclusion within the design process, and beyond.

Keywords

Neurodiversity · Neurodivergent · Narrative · Inclusive design · Mental health · Co-creation · Design process · Multi-modal communication · Adaptable · Place-making · Human-centered design · Trust · Social · Communication · Sensory · Comfort · Empathy · Art therapy

Trigger warning: anxiety, depression, suicidal ideation, blood

UN Sustainable Development Goals applicable to visual essay:

3 – Good Health and Well Being

4 – Quality Education

5 – Gender Equality

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10 – Reduced Inequalities
11 – Sustainable Cities and Communities
16 – Peace, Justice and Strong Institutions

26.1 Background

This visual essay utilizes multi-media communication, to inspire empathy and convey emotion. With each page as an image, the prose and imagery tell their own stories' and co-narrate to account for the best-understood medium. Part of this framework is to illicit narratives, to inform an inclusive design process, and receive the rich information of lived experience from neurodivergents. The framework is an adaptable prototype intended for designers to guide conversation in deeper inquiry. Doing such requires the designers to re-evaluate their ego and revoke power found in the traditional design process. This visual essay follows a template of our established themes, encouraging neurodivergents to narrate through their preferred mediums. The imagery is edited AI visuals, in order to disassociate the authors from their personal experience, as well as suggest a medium that does not require extensive training. The frameworks proposed are a prototype. They should be used as a starting point, modified, added to, and personalized.

26.2 Introduction

Violet: OCD, autism, ADHD, depression.
Rose: sensory processing disorder, anxiety, depression.

Rose received these diagnoses as a child, while Violet received them as a young adult at significant moments of change; they met during the first year of architecture school. They live with invisible disorders confronted by a society not designed for them.

Our labels do not define us but rather provide context. Through our perspectives, we wish to advocate good design for neurodivergent and neurotypical people, in order to improve quality of life (Figs. 26.1, 26.2, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.9, 26.10, 26.11, 26.12, 26.13, 26.14, 26.15, 26.16, 26.17, 26.18, 26.19, 26.20, 26.21, 26.22, 26.23, 26.24, 26.25 and 26.26).

26.3 Violet and Rose's Empathy Narrative

See Fig. 26.27.

We view empathy as a powerful tool;
however, some confuse sympathy with empathy.

The neurodivergent community does not need coddling.
As a community that has historically adapted to our environments,
living in a world not designed for us takes resiliency and strength
and needs to be valued by the design community.

Our lived experience and community make us experts.
You do not know us better than we do.
You do not know what we need better than we do.
Empathy is not talking for us or talking about us.

Talk with us,
design with us,
include us.

26.4 Next Steps

The framework will be expanded from design process to include design principles, from resources such as listed here.

A multi-modal questionnaire will ask users of the spaces and co-creators. The goal is to gain a personal understanding of the design needs. The matrix is intended to be modified, added to and personalized based off of users and project typology.

This multi-modal questionnaire will then be adapted to a toolbox, utilizing modalities such as narratives, games, digital surveys, in-person interviews or phone applications.

This toolbox will provide great detail to co-creation and design feedback.

INTRODUCTION

[Background]
This visual essay utilizes multi-media communication, to inspire empathy and convey emotion. With each page as an image, the prose and imagery tell their own stories' and co-narrate to account for the best understood medium. Part of this framework is to illicit narratives, to inform an inclusive design process, and receive the rich information of lived experience from neurodivergents. The framework is an adaptable prototype intended for designers to guide conversation in deeper inquiry. Doing such requires the designers to re-evaluate their ego and revoke power found in the traditional design process. The visual essay follows a template of our established themes, encouraging neurodivergents to narrate through their preferred mediums. The imagery is edited AI visuals, in order to disassociate the authors from their personal experience, as well as suggest a medium that does not require extensive training. The frameworks proposed are a prototype. They should be used as a starting point, modified, added to, and personalized.

[Introduction]

Violet _ *OCD, autism, ADHD, depression.*
Rose _ *sensory processing disorder, anxiety, depression*

Rose received these diagnoses as a child, while Violet received them as a young adult at significant moments of change; they met during the first year of architecture school. They live with invisible disorders confronted by a society not designed for them.

Our labels do not define us but rather provide context. Through our perspectives, we wish to advocate good design for neurodivergent and neurotypical people, in order to improve quality of life.

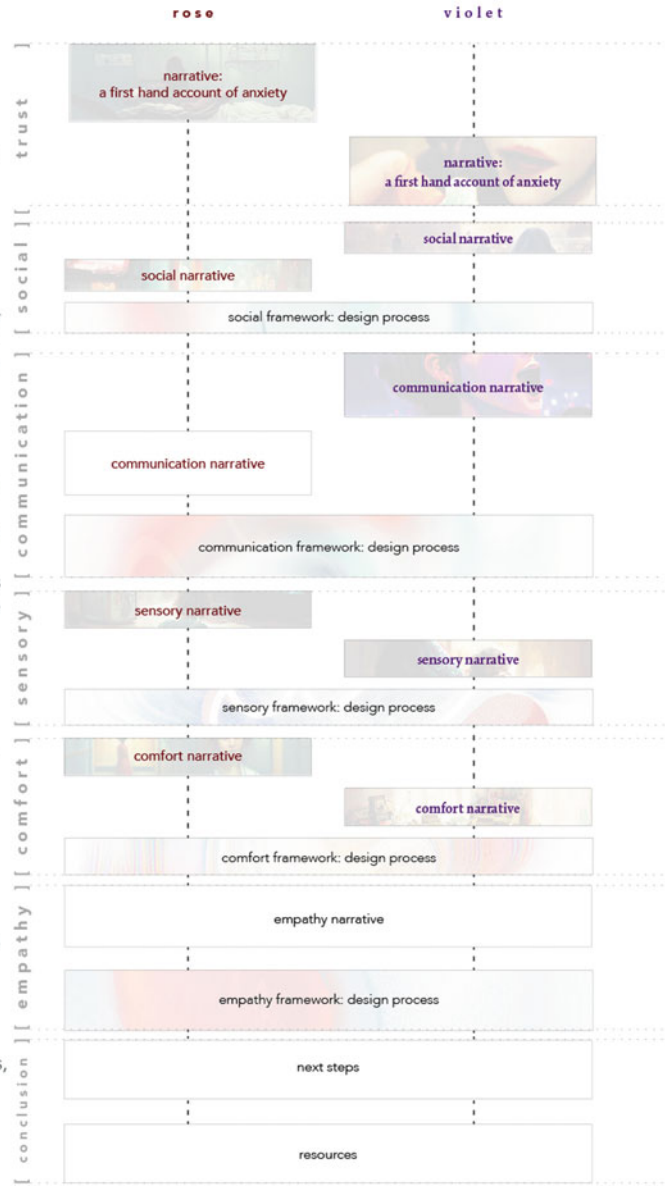


Fig. 26.1 Outline of the visual essay

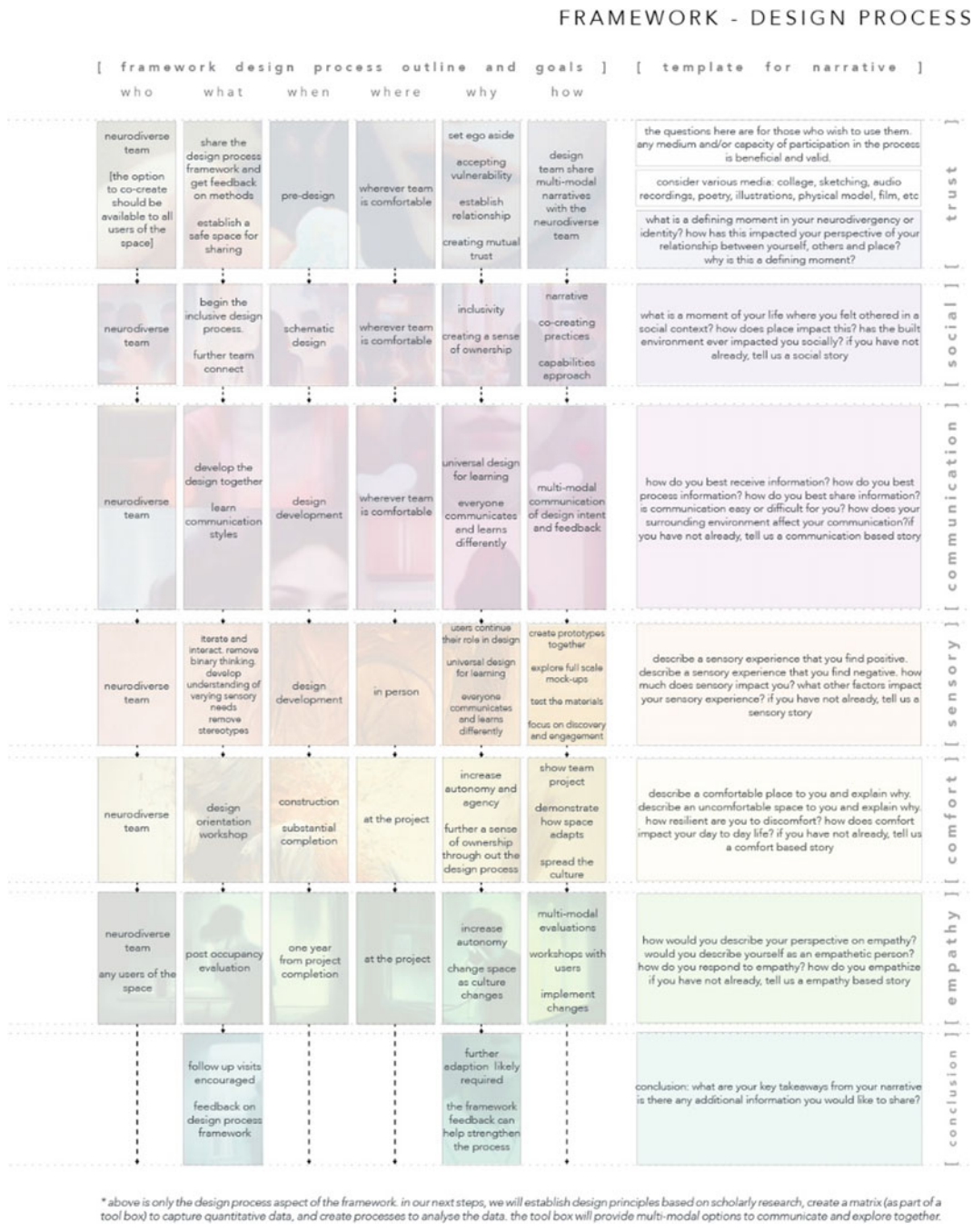


Fig. 26.2 Diagram of the framework's design process and visual essay template

Fig. 26.3 Image of Rose's firsthand account of anxiety 1 of 4

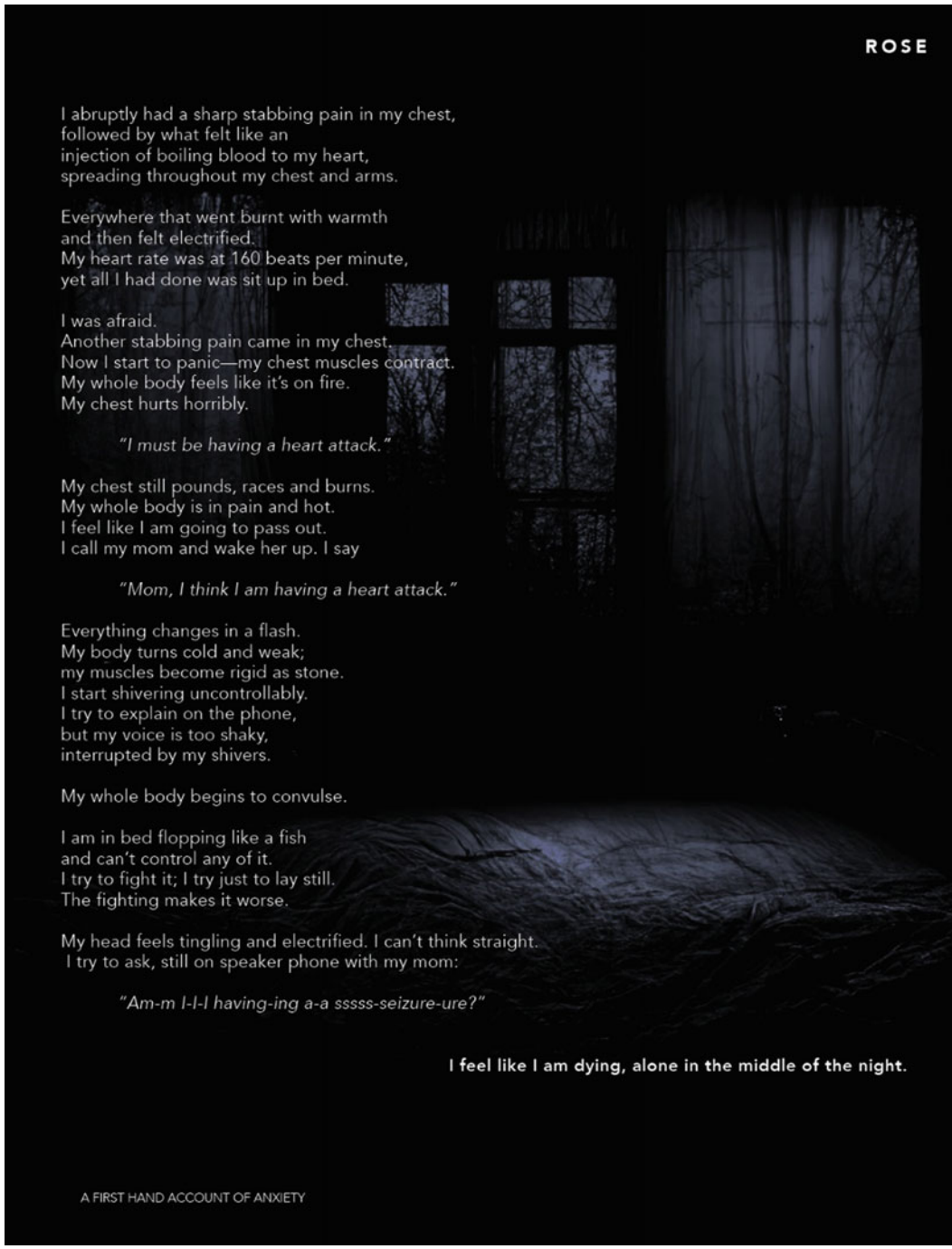


Fig. 26.4 Image of Rose's firsthand account of anxiety 2 of 4

ROSE

By the time the ambulance arrives,
the convulsions reverted to shivering.

I can't put sentences together;
I can hardly get a word out
to speak to the people trying to help me.

I tried to get out of bed with their help,
but my legs and left arm had a tremor.
Standing up is hard, why is standing up hard?

Am I going to die?
My head is killing me?
Why can't I hardly talk or walk?
Will I be like this for the rest of my life?
What has happened to me?

After hospital tests,
no one spoke to me.
I am still alone.
Something
awful must have happened.
Someone would
have spoken to me otherwise.

I try to reconcile my fate.

When my family was allowed back,
I tried to tell my brother:

"Words are hard."

He laughs.
I repeat it.

I need him to tell them I am not just being quiet
but incapable of speaking right.

I can't even muster the ability
to literally tell him that it is hard to talk.
"words are hard" is the best I can do.

My arms stayed electrified,
and my mouth felt like uncomfortable velvet.

Keeping my head up in the hospital bed is a chore.
My body is sore and stiff - my chest aches.

I feel like a pole stabbed through the back of my head.

A FIRST HAND ACCOUNT OF ANXIETY

Fig. 26.5 Image of Rose's firsthand account of anxiety 3 of 4

Fig. 26.6 Image of Rose's firsthand account of anxiety 4 of 4

Fig. 26.7 Image of Violet's firsthand account of anxiety 1 of 2

VIOLET

My mind jumped off the cliff's edge and imploded on itself.
The external world around me became silent: my inner world shrieked.

Dripping with sweat, I tried laughing to blend in with my friends,
but I couldn't fake it, and my face became a hot tomato.

My friends laughed as I tried to remove the taste of glue from my mouth.

My heart pulsated and throbbed as if
my blood wanted to escape the body that just ate glue fearfully.

My mind locked onto the glue as if it was sticking to my neurons,
pulling my thoughts closer to the glue. I asked my friends around for reassurance;

I won't die, right?
It's not toxic, is it?
What should I do?

Still laughing, they play along,
not understanding how serious this is to me,

"I don't know. It could be a killer glue."

Instantly, in another world,
I researched safety data sheets on Sobo glue,

What happens if you swallow glue?
What happens if your intestines glue shut?

I emailed health services,
but they had no idea what to say to me
besides drink water, and you will be fine.

I began to trust myself less and less.

I began worrying about
swallowing more things:

A FIRST HAND ACCOUNT OF ANXIETY

Fig. 26.8 Image of Violet's firsthand account of anxiety 2 of 2

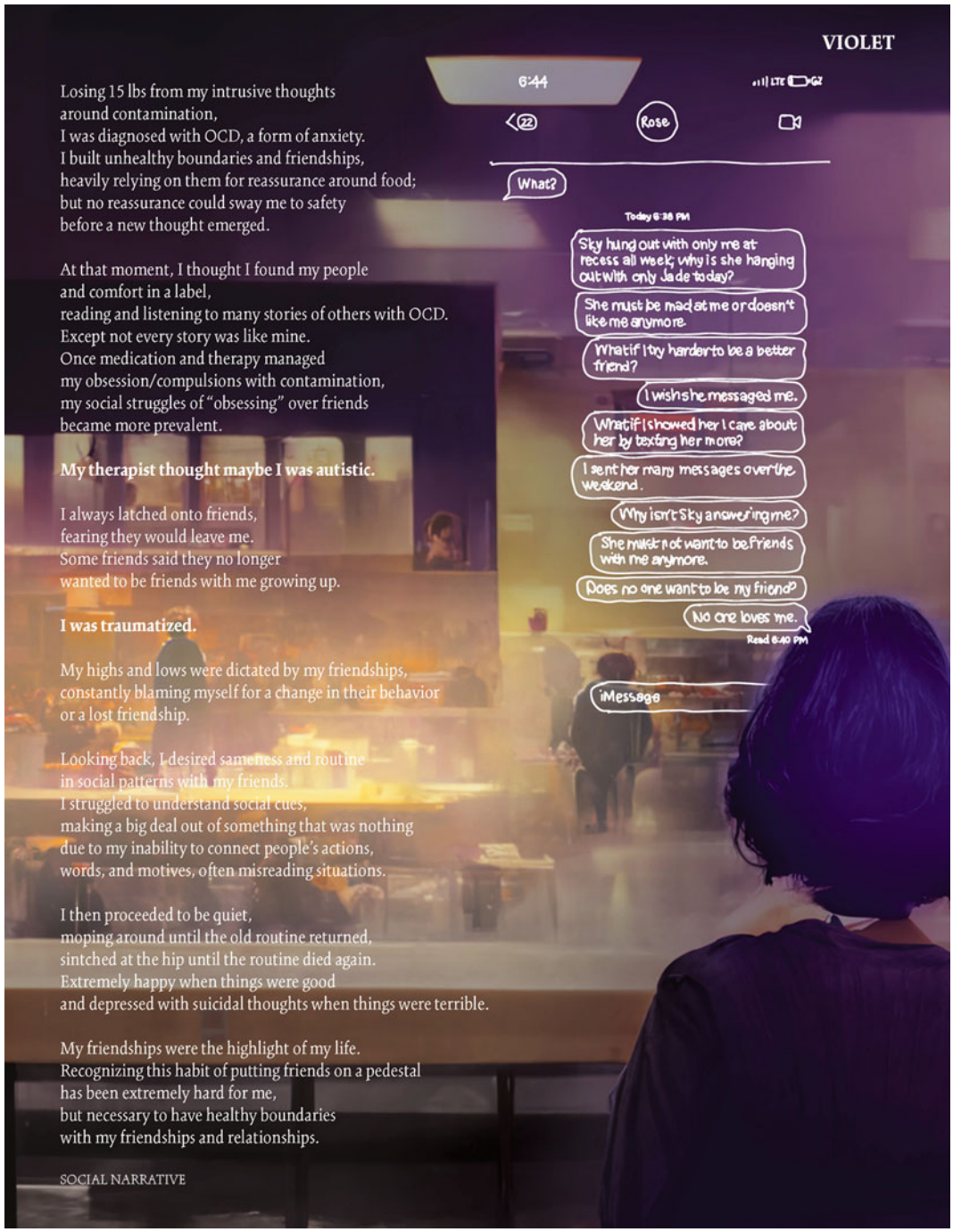


Fig. 26.9 Image of Violet's social narrative

Fig. 26.10 Image of Rose's social narrative

Fig. 26.11 Image of the framework's design process for social theme

Fig. 26.12 Image of violet's communication narrative

Fig. 26.13 Image of rose's communication narrative

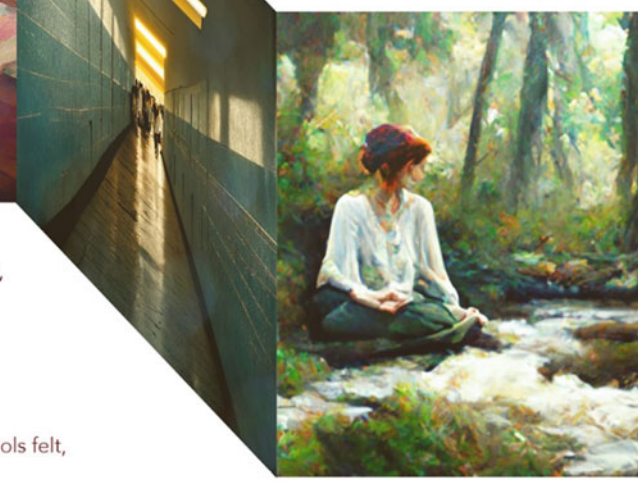
Fig. 26.14 Image of the framework's design process for communication theme

ROSE

As a child, I would come home from school
and lay on the carpet in the living room.

Roll around on the floor,
Do stretches
Position myself upside-down,
Often blocking the view of the tv
To decompress from the day.

Sitting in one classroom all day in elementary school was difficult. During this time, I was not a good student. My mom and a doctor brought me this weird pointy pillow to sit on at school to "help me focus" in second grade. But it just made me less comfortable, fidget more, and feel weird for having this stupid thing with me.



Once we began switching classrooms,
even just for one subject
or being allowed to roam the halls
by my fifth-grade teacher,
I turned into a straight-A student.

I was always sensitive to how the schools felt,

How noisy they were,
How smooth or dull they were,
How the painted cinderblock felt running my hand on it as I walked by,
How the fluorescent lighting made my eyes hurt,
How the doors would click when opened

I was sensitive to everything, but not what would usually trigger a child.
I wouldn't get my feelings hurt;
I had thick skin but would get upset by certain feelings and senses.

SENSORY NARRATIVE

Fig. 26.15 Image of Rose's sensory narrative 1 of 3

Fig. 26.16 Image of Rose's sensory narrative 2 of 3

Fig. 26.17 Image of Rose's sensory narrative 3 of 3

Fig. 26.18 Image of Violet's sensory narrative 1 of 2

Fig. 26.19 Image of Violet's sensory narrative 2 of 2

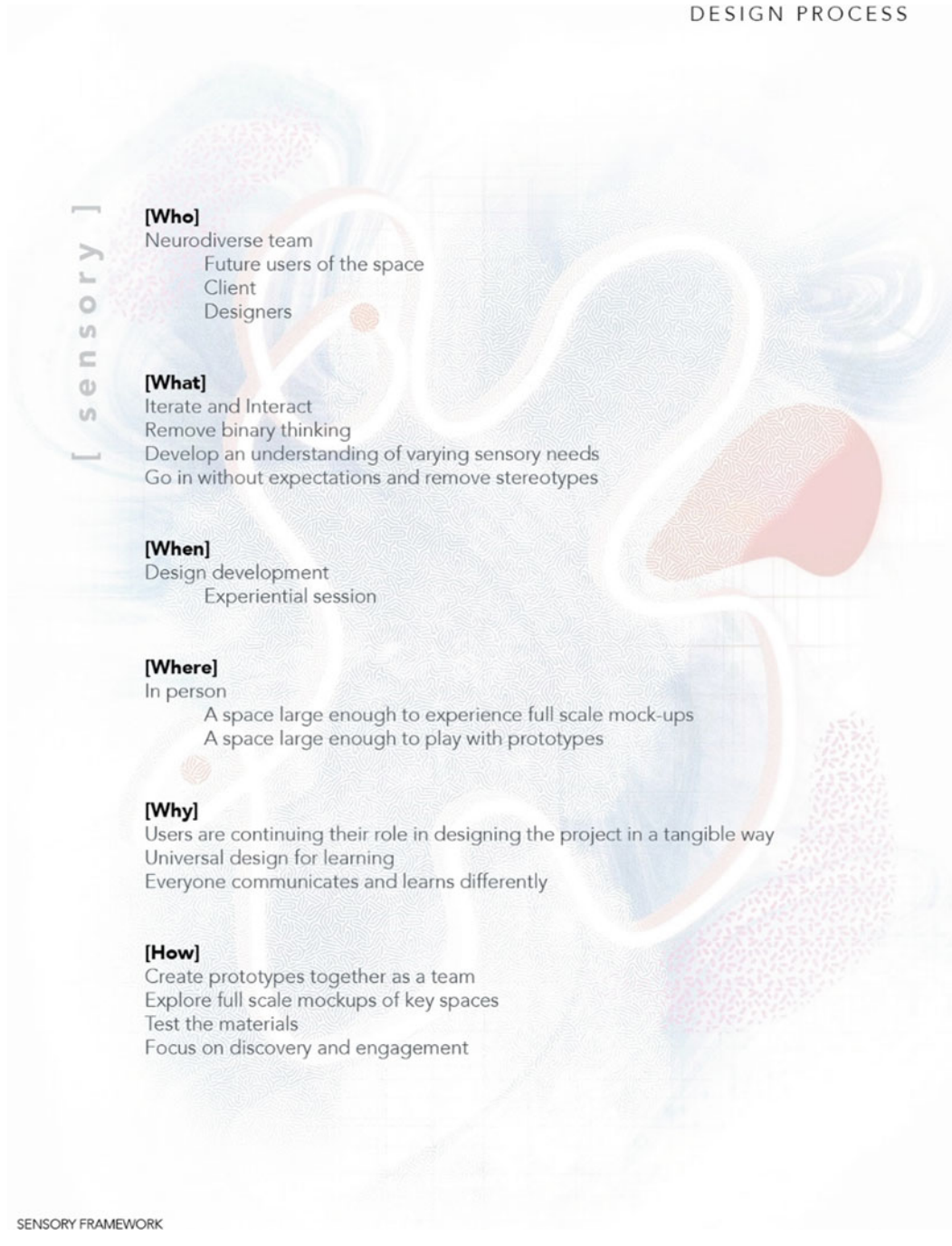


Fig. 26.20 Image of the framework's design process for sensory theme

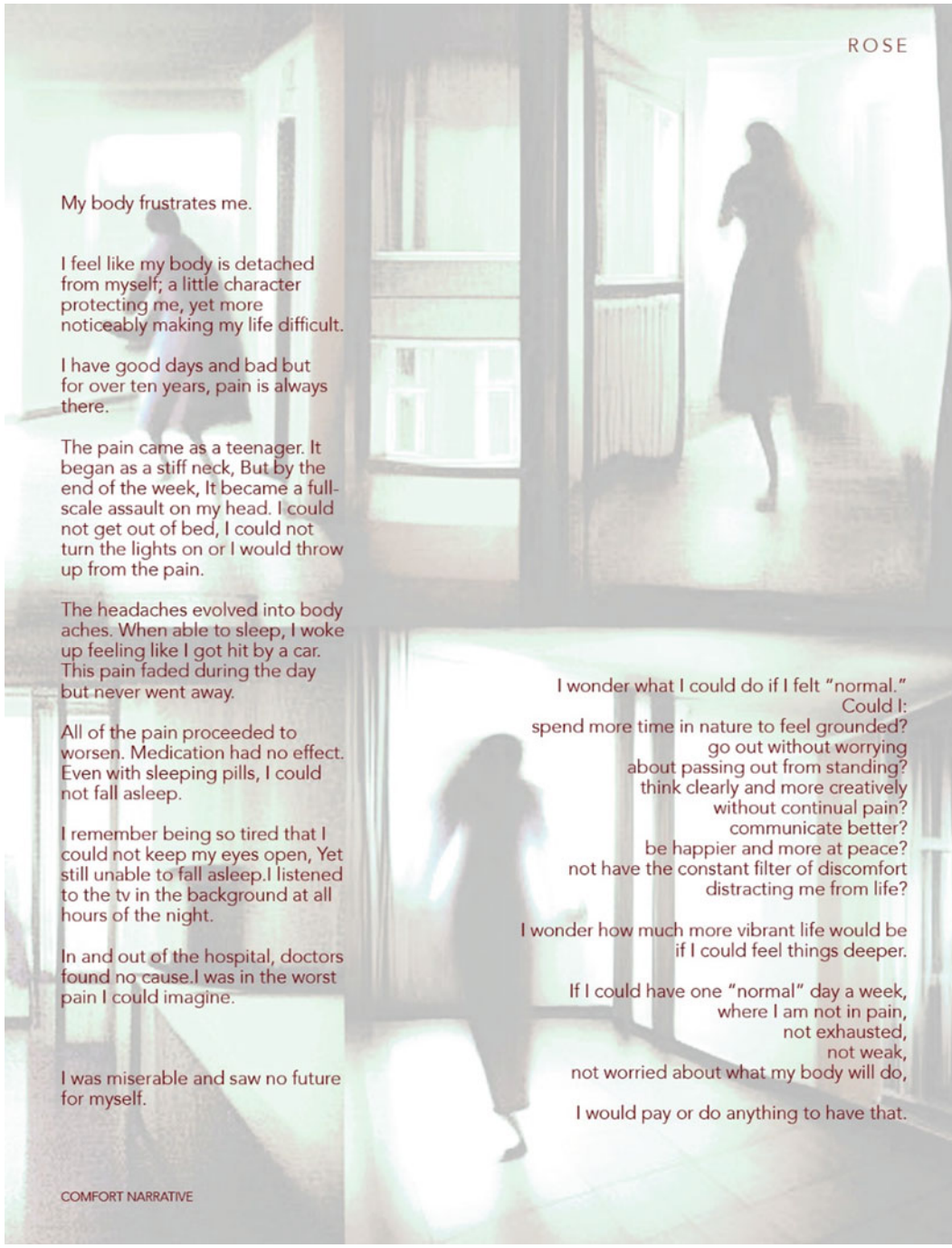


Fig. 26.21 Image of Rose's comfort narrative 1 of 4

Fig. 26.22 Image of Rose's comfort narrative 2 of 4

Fig. 26.23 Image of Rose's comfort narrative 3 of 4

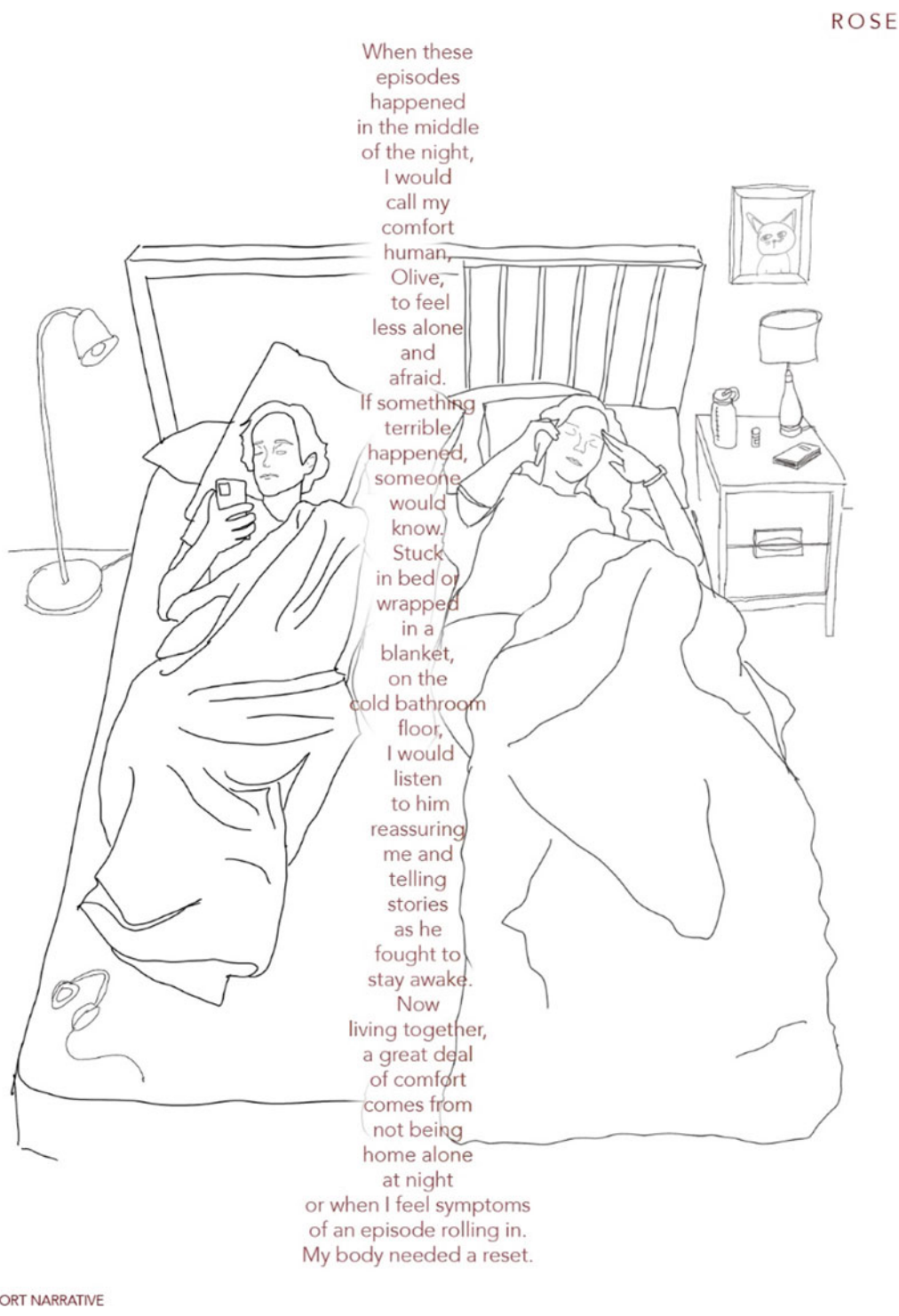


Fig. 26.24 Image of Rose's comfort narrative 4 of 4

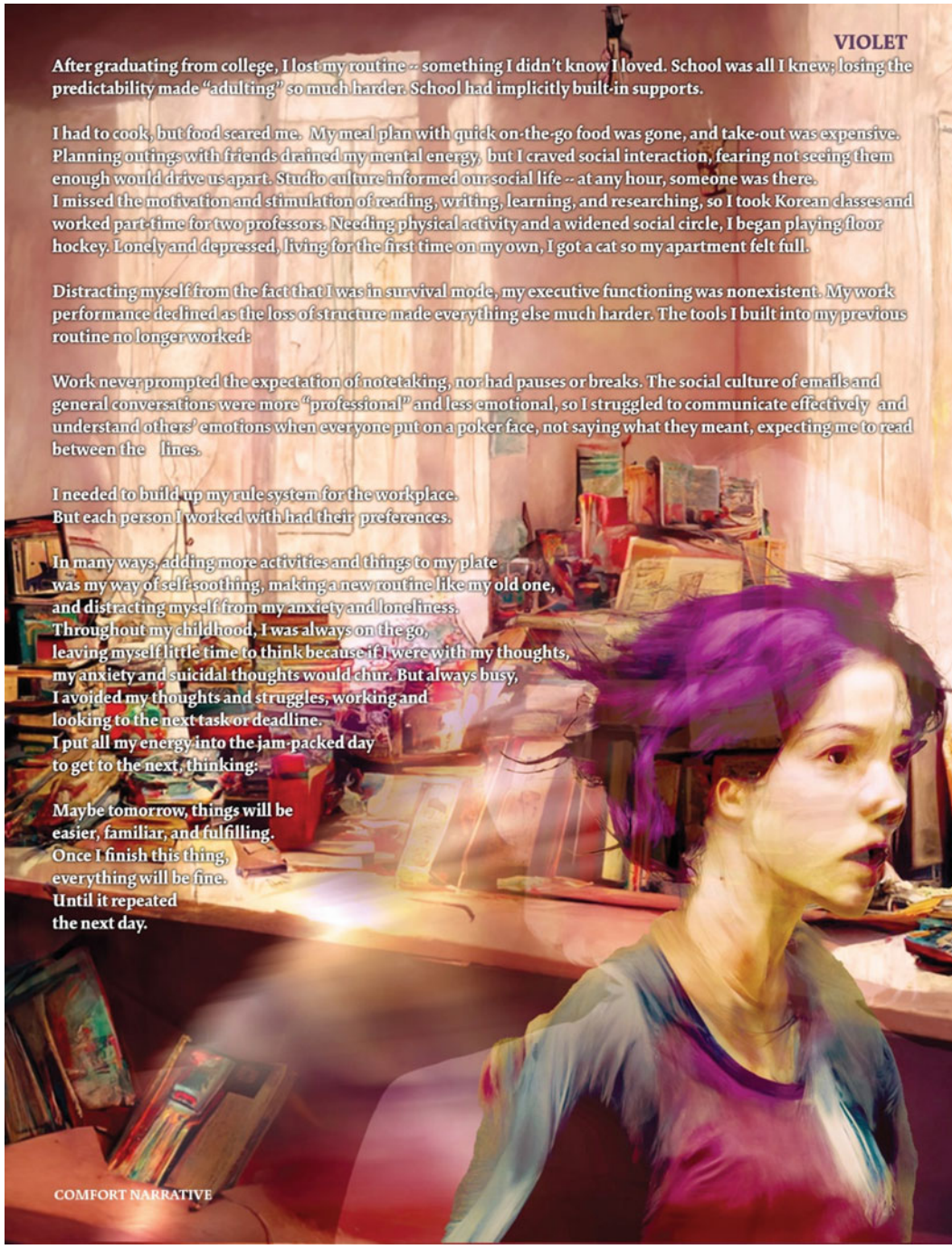


Fig. 26.25 Image of Violet's comfort narrative

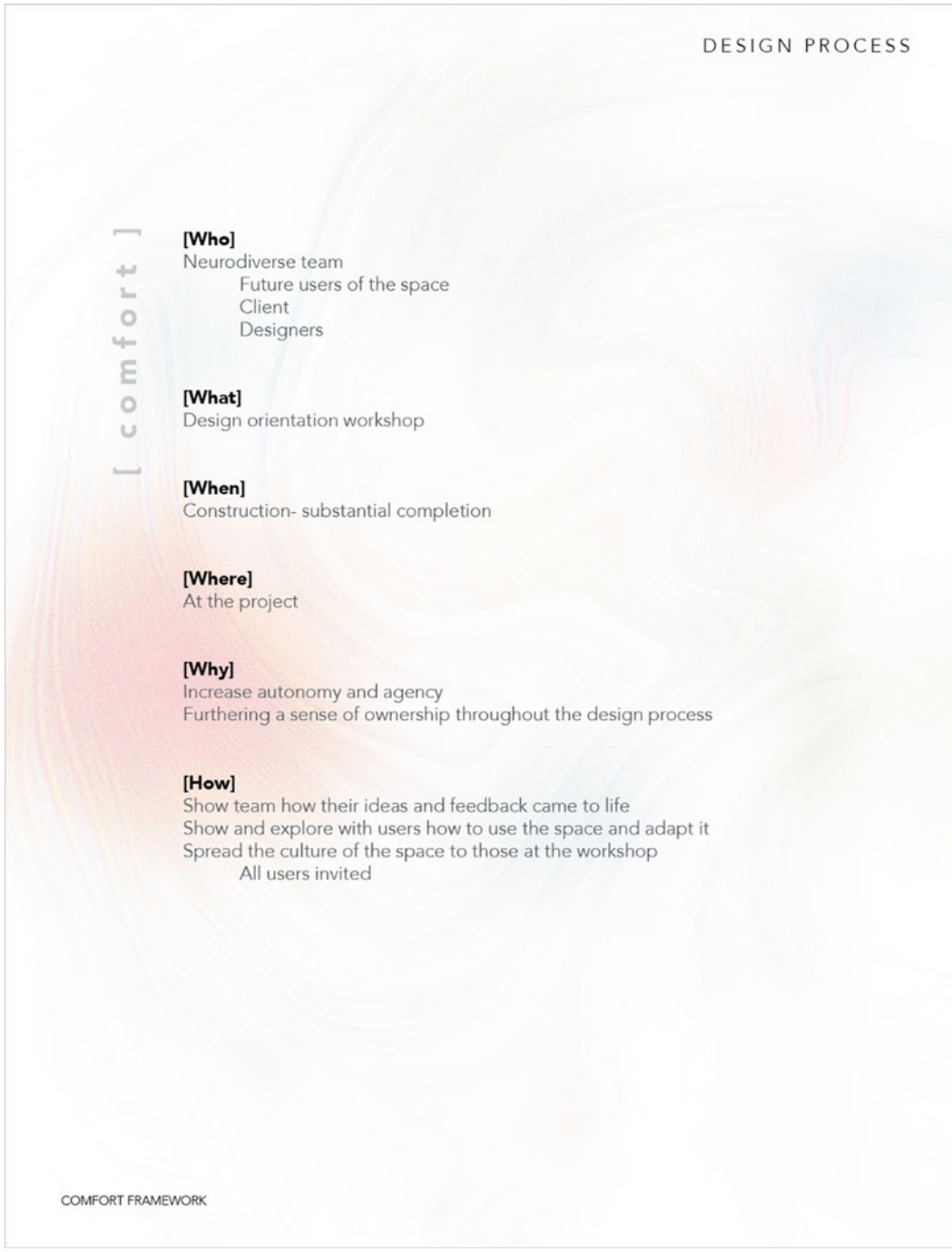


Fig. 26.26 Image of the framework's design process for comfort theme

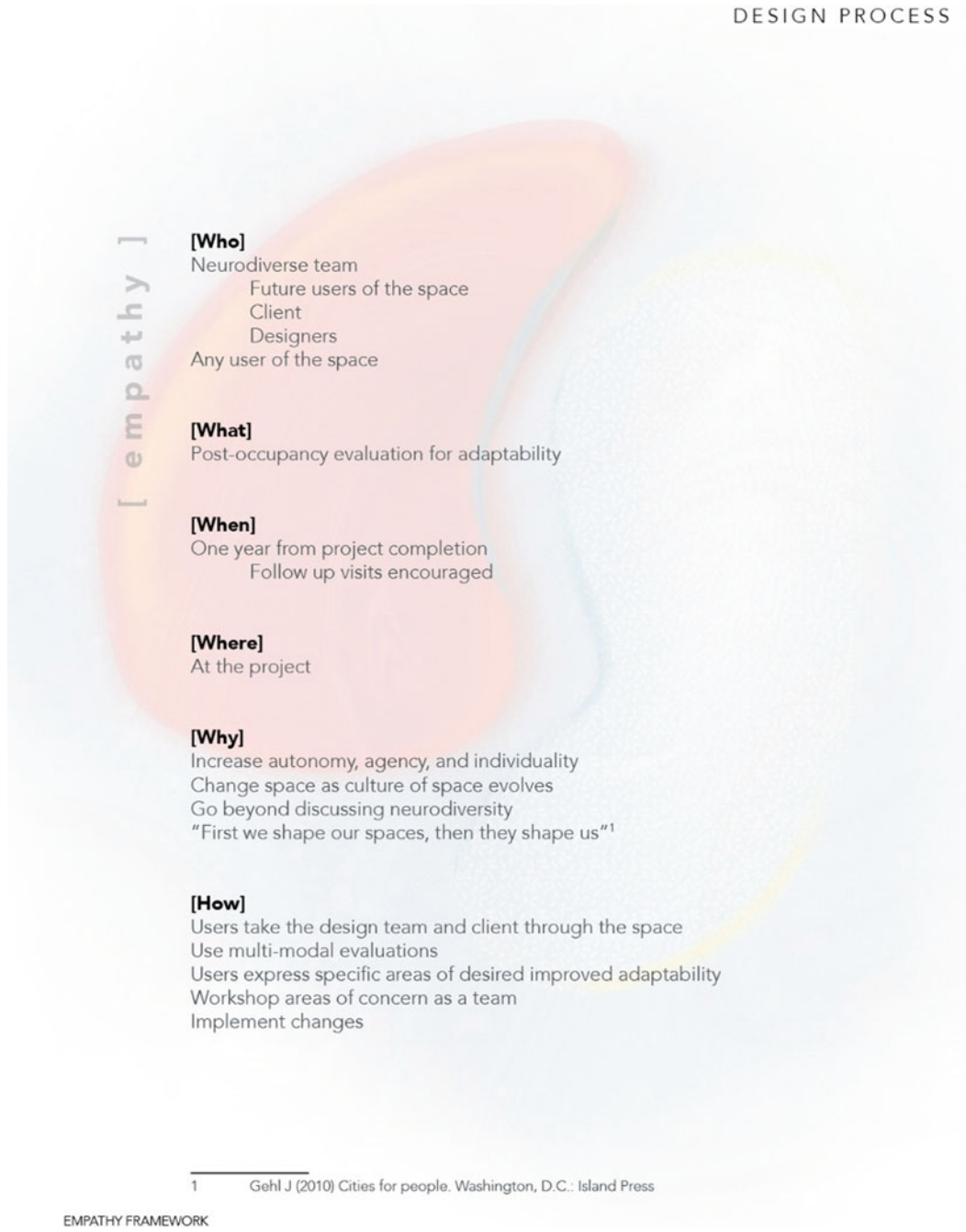


Fig. 26.27 Image of the framework's design process for empathy theme

The information learned from the toolbox will need a system of collection and visual analysis to create tangible, actionable design factors.

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Neurodiversity, Sustainability, and Inclusion: A Case for Redundancy in Architecture

27

Irina Verona and Jennifer Carpenter

Abstract

This essay explores the intersections between neurodiversity and sustainability, arguing that we must engage both to achieve broader spatial inclusion. Through the lens of neurodiversity, we can expand our understanding of sustainability to include abundance and redundancy. We argue for an environmental design approach where improving the efficiency of building systems and reducing consumption can coexist with a functional and sensory multiplicity, a productive repetition that benefits the building's occupants. Drawing on neurodiversity discourse, disability studies, and architectural phenomenology, we question the reliance on neurotypical assumptions about the nature of spatial experience, and the process by which our spaces should be designed. We present redundancy, with a focus on abundant sensory options, as fundamental to the project of social sustainability—grounded in goals of greater inclusion, equity, and spatial justice.

Keywords

Redundancy · Sustainability · Sensory design · Neurodiversity · Inclusion

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27.1 Introduction

What are the intersections between neurodiversity and sustainability? What can we learn from neurodiversity—the broad diversity in brain functioning that exists in our world—when we approach environmental concerns, economic development, and resource management? And conversely, how does sustainability reframe our consideration of the wide range of cognitive abilities that define our identities and our spatial experiences?

In this essay, we will argue that neurodiversity and sustainability are mutually dependent. We cannot be truly sustainable without designing for a wider range of bodies, abilities, and perspectives, and we must transform our understanding of sustainability to embrace diversity, abundance, and redundancy. We will argue for an environmental design approach where improving the efficiency of building systems and reducing consumption can coexist with a *functional and sensory redundancy*—a productive duplication and repetition—that benefits the building's occupants. This redundancy is as essential to our sustainable future as conservation and cutbacks.

According to the United Nations' 2017 Sustainable Development Goals (SDG), sustainability is both physical and social (United Nations 2022). Goals for clean water, sanitation, and energy coexist with those for quality education, eradication of poverty, and gender equality.

M. Mostafa et al. (eds.), *Design for Inclusivity*, Sustainable Development Goals Series,
https://doi.org/10.1007/978-3-031-36302-3_27

Goals for infrastructure coexist alongside peace, justice, and strong institutions. Though neurodiversity is not explicitly mentioned in any of the SDGs, the UN's 2030 agenda "recognizes disability as a cross-cutting issue" and "pledges to leave no one behind—including persons with disabilities and other disadvantaged groups" *(#Envision2030).* **Implicitly, the SDGs make a case for broader inclusion as a fundamental responsibility of our collective institutions and as a requirement for sustainability**. Because the characteristics of physical space can be key factors in excluding potential users, inclusion is a concern not just of global policy but also of architecture.

27.2 Neurodiversity and Spatial Experience

Neurodiversity refers to the idea that neurological differences are the result of natural variation within the human population (Robinson 2013). Neurodiversity encompasses individuals who are neurotypical as well as those who are neurodivergent—that is, those whose brain functioning is less typical, such as those with Autism, ADHD, Dyslexia, Dyspraxia, and Tourette's, among others. The concept of neurodiversity counters the medical model of disability with a social one, positing disability as politically and socially constructed—as "the outcome of disabling barriers and social practices" (Singer 1998, p. 34). Disability is thus not a problem with the individual, but rather the result of a disabling world. Blume (1998) noted that "neurodiversity may be every bit as crucial for the human race as biodiversity is for life in general." The comparison to biodiversity was intentional and, as Doyle (2020, p.109) notes, "primarily devised for political ends: to advocate for the conservation of all species, since a high level of biodiversity is considered desirable and necessary for a thriving ecosystem." By this reasoning, heterogeneity of neurotypes is not just acceptable but required to meet future challenges whose nature we cannot predict.

Design, in both academic and professional contexts, elevates normative bodies over others, favoring homogeneity. As Hamraie (2017) has shown, ideals such as Leonardo's Vitruvian Man and Le Corbusier's Modulor and professional handbooks like *Architectural Graphic Standards* have codified and perpetuated the fiction of a standardized architectural inhabitant. These ideas and images create what Hamraie (2017, p. 5) calls "access knowledge" and "regimes of legibility and illegibility" that privilege certain figures—typically male, white, youthful, and able ones—over others. The neurotypical brain wiring of this idealized person is understood. Even if unwittingly, these design standards, projects, and discourse create systemic inequality that, by excluding so many, are fundamentally unsustainable.

To recognize neurodiversity means to recognize the individual nature of spatial experience, dependent on both neurological and architectural processes. Our senses continually absorb information from the built environment, and our brains attempt to organize and prioritize it. This sensory integration process, different for everyone, determines how well our body will function in a given space (Dunn 2001, 2007). Many neurodivergent people face real challenges navigating environments designed by and for neurotypical processing (Chabot 2021). There is no such thing as a universal sensory response, a fiction perpetuated by the architectural discourse of phenomenology including writers such as Bachelard (1964), Rasmussen (1991), and Pallasmaa (2012).

While phenomenology falsely posits a universal experience, architectural design standards tend to ignore sensory experience altogether. Acknowledgment in building codes is limited to rules for thermal comfort and lighting control. The Americans with Disabilities Act (ADA) Standards focus on built requirements as they relate to movement and mobility. Even the promisingly titled *Inclusive Design Guidelines for New York City* (2010) reduces accessible design to dimensions and clearances; mentions of sensory experience are limited to recommen-

dations that signage be provided in multiple formats so that persons with sensory impairments can access information.

There are some notable exceptions. The 1997 *Principles of Universal Design* includes "Flexibility In Use" as one of seven key mandates, calling for "choice in methods of use" and "adaptability to the users' pace" to accommodate individual preferences and abilities (Mace, 1997). Mostafa's 2013 *ASPECTTS Architecture for Autism* index provides an evidence-based tool for assessing and designing space with the needs of autistic individuals at the fore, focusing on acoustics, spatial sequencing, escape, compartmentalization, transition, sensory zoning, and safety (Mostafa, 2008, 2014). The *WELL Building Standard* (International WELL Building Institute 2013) accounts for the variability of lived experience through "both physical and mental health: air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, community, and innovation," and provides multiple options for occupant choice and control. All of these guidelines are voluntary, however, and unfortunately are not widely referenced in education and practice.

Recognition of neurodiversity requires reconceptualizing spatial experience as heterogeneous and multivalent, beyond dimensional clearances and "archetypal responses" (Boys 2018).

27.3 Sustainability: Reduction and Redundancy

Definition. Redundancy

1. a: the quality or state of being redundant: SUPERFLUITY
   b: the use of redundant components
   c: chiefly British: dismissal from a job, especially by layoff
2. : PROFUSION, ABUNDANCE

[Merriam Webster dictionary]

The 1987 UN Brundtland Report introduced the word "sustainability" to refer to an idea of harmony between growth and resources. This harmony required both "[adopting] lifestyles within the planet's ecological means" and imposing "limitations […] on environmental resources and […] the ability of the biosphere to absorb the effects of human activities" (Brundtland 1987, p. 16). In the three and a half decades since, in part because of our failure to change consumption patterns, the project of sustainability has been focused on crafting and achieving these increasingly urgent limits.

As the building and construction sector accounts for almost 40% of annual emissions (United Nations 2022), it is not surprising to see that architectural sustainability mandates advocate reduction: cuts in emissions, in growth, in consumption, in waste, and in ecological and physical footprint. According to the nonprofit organization *Architecture 2030*, "a dramatic reduction in the energy consumption and CO_2 emissions of the built environment" is needed by 2030, with a complete phase-out of fossil fuel CO_2 emissions by 2040, to limit planetary warming to 1.5 degrees. The New York City Department of Education defines sustainable schools as those that achieve zero waste, conserve energy and water, and have access to green space (New York City Department of Education). The rating system included in the *NYC Green Schools Guide* (NYC SCA 2019) closely matches the *Leadership in Energy and Environmental Design* (US Green Building Council 2022) system in the United States, a rating system of points for markers such as water usage, energy consumption, and indoor air quality. Though LEED is an optional system, building codes such as the International Energy Conservation Code, the International Existing Building Code, or the New York City Energy Conservation Code mandate efficiency in the performance of building systems such as thermal envelope, ventilation, and lighting. New York City's Local Law 97 aims to cut building emissions by 40% by 2030 and by 80% by 2050 (Maldonado 2022), and noncompliant building owners will receive steep fines for every ton of emissions above the limit.

Sustainability as paring-down also applies to occupant behavior and experience, including recycling, composting, and participation in demand-response programs, where usage is reduced on peak days (New York City Department of Education).

When sustainability guidelines address occupant experience, they, like building codes, assume minimal user variability. Both the *NYC Green Schools Guide* and LEED assume that occupant comfort, well-being, and productivity will increase because of sustainable strategies—but the notion of comfort does not allow for the variability in occupants' lived experiences. ASHRAE Standard 55–2010 (ASHRAE 2010), required by most US building codes and by LEED, leaves 20% of the population behind by defining thermal comfort as the temperature range at which 80% of people will be comfortable (ASHRAE 2010, p.7). "Experience" as a term does not appear in the *Green Schools Guide* or in LEED except as a measure of professional qualifications and as a means to judge a student's familiarity with sustainability.

Some promising new sustainability guidelines relating specifically to variable occupant experience are gaining traction. WELL goes much farther than ASHRAE for thermal comfort, requiring "personal heating" options such as individual space heaters, heated chairs, or even blankets. But this voluntary standard requires a significant stakeholder commitment from an operations standpoint, in addition to the strict design team parameters. More influentially, stricter mandatory code requirements for daylighting and other lighting controls result in more zones and lighting-level options for occupants (New York City Energy Conservation Code). Recognition of user variability is by necessity accompanied by increased choice; when choices are expanded, some redundancy is inevitable and desirable.

Redundancy may seem to be at odds with sustainability. Redundancy typically has negative connotations, denoting something excessive, superfluous, no longer needed, or at best a duplication useful only in an emergency. Yet in technology, engineering, and ecology, redundancy is a strategy of resilience and adaptability. Safety factors are a redundancy strategy, ensuring performance in the case of overloading or an unanticipated condition—allowing systems to function beyond the confines of the norm. Functional redundancy allows ecological communities and species to thrive. As Naeem (1998, p. 39) notes in *Species Redundancy and Ecosystem Reliability,* redundancy is tied to ecosystem reliability: "Principles of reliability engineering demonstrate that the probability of reliable system performance is closely tied to the level of engineered redundancy in its design."

If reduction is fundamental to the technical project of sustainability, spatial and sensory redundancy is critical for the social project. This redundancy can enable flexibility and resilience, increase intensity of use, and allow more people, including neurodivergent people, to thrive.

27.4 Functional and Sensory Redundancy

How can we intentionally bring together neurodiversity and sustainability in design? How can we create environments that are sustainable, resilient, and healthy while also broadly inclusive of different bodies, neurotypes, abilities, and experiences? We propose to expand the notion of sustainability through an environmental design approach of ***functional and sensory redundancy***. Foregrounding the heterogeneity of user experience, this approach is about multiplying choices: when a space can afford more sensory options, and more user agency, that space can meet more people where they are. Through purposeful sensory redundancy, we can re-center our design priorities and process around inclusion while also achieving the urgent reductions and efficiencies of more traditional sustainability goals.

The concept of redundancy can inform different phases of design and work across disciplines and scales. It can play out in space planning, in building systems and infrastructure design, in finishes, signage, and furniture. While some projects may allow for redundancy from

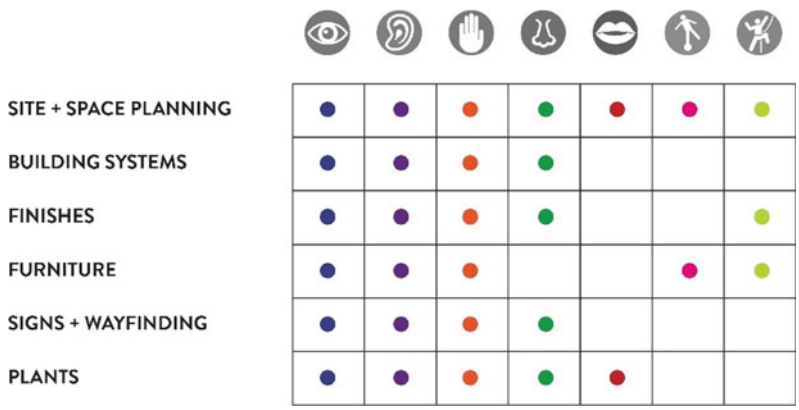

Fig. 27.1 Matrix developed to track design elements in relation to the senses, a crucial first step to an approach of functional and sensory redundancy. Across the top are seven senses: sight, sound, touch, smell, taste, balance (our vestibular sense, linked to our inner ear), and body sense (or proprioception, our recognition of where we are in space, and how much force to apply to a task, like say writing or opening a door.) On the left are the tools that we as architects have (Graphic by the authors)

the start, others may require tactical and creative responses of more limited scope. Regardless of scale, ***the strategy of sensory redundancy*** requires embracing the holistic nature of our sensory processing and overlaying sensory considerations onto design and engagement. It requires that architects and designers become forceful advocates for inclusion, willing to bring neurodiversity to the client when it may not be part of the brief and advocating for social sustainability alongside physical sustainability. The examples that follow are drawn from our design practice and represent incremental opportunities to broaden inclusion (Fig. 27.1).

27.4.1 Space Planning

With a focus on functional and sensory redundancy, we can rethink the "test fit" planning model that asks architects to create a one-to-one relationship between a client's program and the spaces provided. While we may label our spaces by function—conference room, classroom, lounge—we can propose a looser, less determinate fit, offering a range of sensory zones that allow spaces to be used as flexibly as possible, for uses beyond those we assume. So instead of the employee lounge (singular) we may have unprogrammed spaces (plural) with a variety of textures, acoustic characteristics, furniture choices, and relationship to the outside. Instead of designating spaces we intend for collaboration, we can realize that collaboration happens differently for different people, and allow neurodiverse teams to thrive by providing larger, smaller, louder, quieter, lofty, intimate, and in-between. Exterior spaces should provide a variety of options for experience—from protected to exposed, bustling to meditative. The in-between spaces are key: instead of flattening sensory processing to hyper vs. hypo, over-responsive vs. under-responsive, we can opt for a *both/and* model, recognizing that sensory needs change from person to person and from day to day.

We can think of circulation as more than spaces to get from A to B. Made larger than required by egress code, corridors can become extensions of the spaces that they link, providing recreation zones, movement-break opportunities, collaborative areas, and escape spaces. Providing more than one way to reach a door or adjacent space from a given point also makes spaces more welcoming to more people—a gathering space that forces a latecomer to enter at the front of the room only, for example, may keep that person from participating if they are uncomfortable interrupting.

This redundant approach requires thinking creatively about how program requirements can be met and about what activities need designated spaces. The resulting architecture does not necessarily result in more space and can increase short-term flexibility while also providing long-term sustainability. LEED design encourages an evaluation of "site conditions, environmental justice concerns, and cultural and social factors" for the Site Assessment Credit (LEED)—and we can expand these considerations to include the external and internal program planning from the point of view of inclusion.

27.4.2 Building Systems and Infrastructure

Infrastructure systems can also be purposefully redundant to achieve more sensory choice, and therefore more user agency. Increasing the number of temperature regulation zones provides greater control to building inhabitants and contributes to a resource-reduction strategy by preventing over-conditioning of lightly occupied spaces. Beyond the requirements of ASHRAE 55, cost-effective strategies like adding ceiling fans to supplement mechanical systems result in a wider range of comfort zones. Using a "mixed mode" approach that allows for both mechanical and natural ventilation through operable windows is proven to increase occupant comfort across a wider range of users. When integrated through a window switch or other automated control system, this approach can also save energy (Daly 2002).

Lighting can be layered so that some illumination zones are within the control of individual users and others respond to daylight conditions; basic versions of this strategy are required by most codes and can be expanded. Controls can go beyond simple dimming to allow for control of different fixture groupings, and with multiple combinations of direct and indirect within each fixture. Working within the requirements of the energy code, we can create both bright and dim zones in the same classroom, improving the chances that students and teachers will find the area in which they are happiest (Fig. 27.2).

Structural systems can be designed to allow for more flexible growth. Designing for future flexibility can lead to wasteful material use when systems are excessively over-designed, but providing structure that anticipates features like green roofs can permit high-value spaces that allow sensory variety to be added in the future even if they are not part of the budget today (Fig. 27.3).

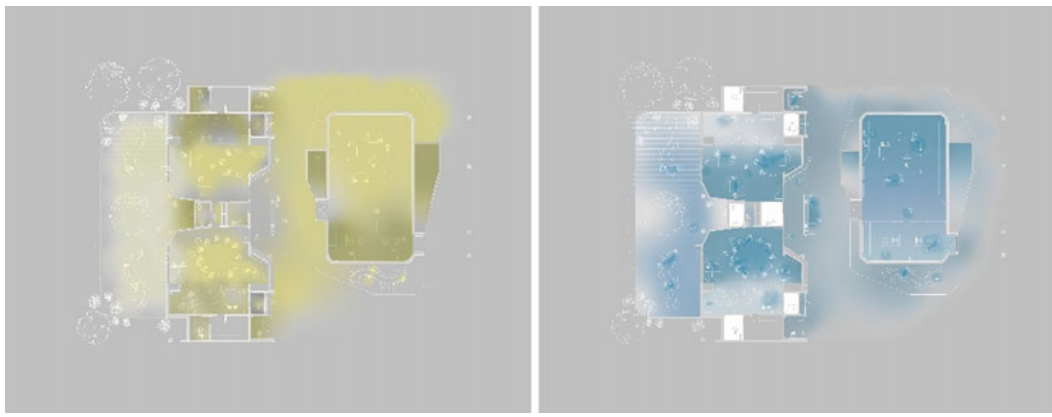

Fig. 27.2 Studies showing range of lighting (left) and acoustic (right) conditions in adjacent classrooms in a middle school (Graphic by the authors)

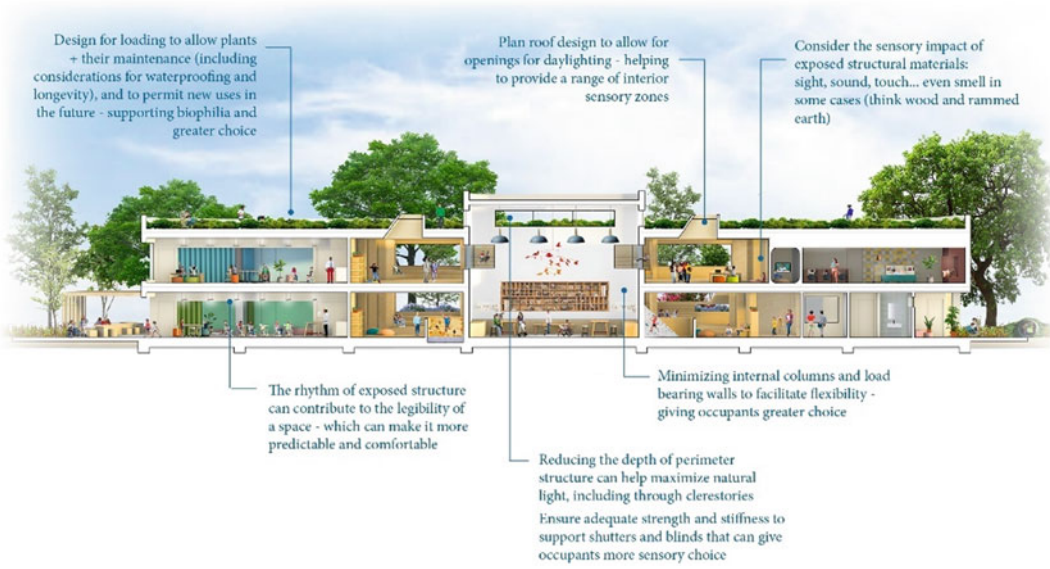

Fig. 27.3 Example of how structural systems can be conceptualized to support redundancy (Graphic by the authors)

27.4.3 Objects

In the same way that the functional and sensory redundancy strategy may yield more than one space for a proposed program, we may also have more than one piece of furniture for a given need. This approach makes specifying sustainably sourced and fabricated pieces critical. We will not have a one-to-one relationship between office workers and task chairs, or between students and desks. We will have seating options that allow for movement, for fidgeting, for textural sensory input. We will have tables that allow for standing, as well as for sitting. We can design spaces to allow for these choices to be easily accessed and easily stored.

These same spaces can incorporate mobile sensory aids that users can take advantage of when needed. While product-based solutions are sometimes used as quick band-aid fixes to achieve neurodivergent-friendly space, they can be valuable when integrated into the fabric of a space that is also employing more spatial strategies. Sensory rooms, for example, can be a productively redundant space, serving as a relief valve in the building system. And simply the act of providing such "safety valves" can sometimes be enough—as noted by Autistic advocate Ev Smith, knowing that such a space is available to them often obviates the need to escape to one (Smith 2022). These product-based solutions must be based on high-quality and long-lasting components to contribute to a sustainable project. The proliferation of throw-away "fidget" objects indicates wider understanding of sensory sensitivity but is concerning. Sustainably sourced and fabricated pieces and materials can be healthy and sustainable alternatives that can also earn LEED or WELL credits for Innovation.

27.4.4 Wayfinding

What if signage and wayfinding did more than just tell people what room they are in, where they should go, whether a space is occupied? A more expansive approach to signage could include graphic elements that explain the way a space can be used, and the behaviors that are allowable or encouraged, helping people take advantage of the choices a space offers. For example, if a conference room is outfitted so that sitting, standing, pacing, or stretching out on the floor are all possibilities during a meeting, those

Fig. 27.4 Signs and wayfinding are an important way to make the space legible and predictable. In this study for classroom signage, the sign includes not only the room name and number but also pictograms that tell students how they can occupy a space (Graphic by the authors)

affordances will be more relevant when people truly believe they can take advantage of them. The culture of the place can be made explicit through this sign-messaging that goes beyond naming and numbering. This strategy of redundancy can add almost nothing to the project budget and material usage, while expanding the recommendations of Accessible and Universal Design and the WELL guidelines for equity, improving the occupant experience and providing "buildings and spaces that are accessible, comfortable and usable for people of all backgrounds and abilities" (WELL) (Fig. 27.4).

27.4.5 The Design Process

The design process itself needs to be one of multiplicity. Borrowing from the ideals of Universal Design for Learning (UDL, Wakefield 2018), the act of conceiving and refining the built environment can allow architects and project stakeholders—including end users—to contribute to a project through multiple means of engagement, representation, and action. In the same way that designers assume that they will offer more than one design option to their clients before landing on a final scheme, we must offer more than one way for the process of designing to unfold. Early in a renovation project, for example, a sensory audit with the inhabitants of an existing space can yield critical information about what is working and what is not, from a multi-sensory perspective. If, however, the only input heard by the design team is from those most likely to speak up, or from those at the top of the hierarchy, the process is not robust, and the voices are too limited. Since most processes are designed by and for more neurotypical people, the eliminated voices will include those of neurodivergent stakeholders. The spaces resulting from this process can be more inclusive and more sustainable because they are conceived by and for a greater range of people.

It is important to remember that most design teams on a project of any complexity are, in fact, neurodiverse teams. Architects, engineers, and designers need workplaces and work processes that allow for this same UDL approach (Fig. 27.5).

27.5 Conclusion

Our intertwined health, justice, and climate crises throw into stark relief the inequities of access, participation, and resource distribution that disproportionately impact marginalized populations—including persons with disabilities. A design approach that considers social and physical sustainability as inextricably linked can be an impactful cross-cutting strategy to move us

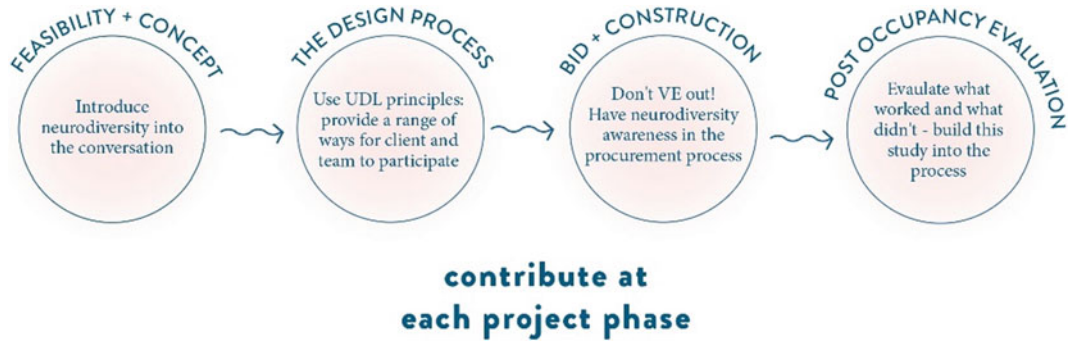

Fig. 27.5 Architects and designers have opportunities to advocate for neurodiversity at multiple stages of the design process (Graphic by the authors)

closer to the UN's Sustainable Development Goals of Reduced Inequality (Goal 10) and also to others related to "education, growth and employment, inequality, accessibility." *(#Envision2030).*

Our buildings must offer environments that are adaptable, resilient, and flexible in meeting the diverse needs of their stakeholders, and to design such buildings we need an approach to sustainability that embraces neurodiversity and recognizes spatial inclusion as a requirement. The model of sustainable reduction and efficiency can coexist with the model of functional and sensory redundancy. Redundant space can mean more usable space, more flexible space, more joyful space. Redundant space can be like a safety factor applied to a technological system, allowing it to serve its purpose across a wider range of conditions. Designing to enable varied sensory experiences is a means towards creating spatial agency, which, in concert with policy reform and cultural awareness, moves us towards spatial justice.

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Housing Design Strategies versus Users' Experiences: Lessons Learned from a Group Home for Autistic Residents

28

Phuong Nguyen, Viviana d'Auria, and Ann Heylighen

Abstract

Research has shown that the built environment holds the potential to offer autistic people something to hold on to or structure their reality. Nevertheless, designing for them remains challenging because concepts from design guidelines concerning autism can counteract each other and cannot be used straightforwardly. This study aims to gain insight into housing design for autistic people from two perspectives. From architects' perspective, we explored what design strategies they use when designing housing for autistic people. From autistic users' perspective, we explored the role of the built environment in their lived experience. From a group home targeting autistic residents, we interviewed three architects who designed the project and investigated the lived experience of eight autistic residents there. Results showed that architects' primary design strategies relate to the built environment's sensory aspects. This finding reflects the prominent focus of existing guidelines to design for autism. However, in autistic residents' lived experience, not only the sensory perception of the built environment is essential. Functional and intangible aspects of a space are important, too—the two latter aspects relate to how a space works and what space means for them. In gaining a better understanding of autistic residents' lived experience, the findings challenge the existing design guidelines and broaden the understanding of the role of the built environment in relation to autism.

28.1 Introduction

Autism refers to a neurodevelopmental condition characterized by challenges regarding social communication, restricted interests, and repetitive behavior patterns. Autistic people[1] show sensory perceptual differences (American

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[1] Although research suggests that identity-first language is preferred by the majority of autistic people in the UK (Kenny et al. 2016), we use multiple formulations. These include identity-first language (autistic person, autistic people), person-first language (a person with autism, people with autism), and a metaphor of the autism spectrum, which implies a wide range of conditions (a person on the spectrum, people on the spectrum). Our intention is to reflect the diverse perceptions in autism research and the autism community while accounting for recent language recommendations for autism research (Bottema-Beutel et al. 2020).

M. Mostafa et al. (eds.), *Design for Inclusivity*, Sustainable Development Goals Series,
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Psychiatric Association 2013), which may affect how they perceive and deal with their housing environment in a particular way (Gaudion et al. 2015; Kinnaer et al. 2016). Research has shown that the built environment holds the potential to offer autistic people something to hold on to or structure their reality (Baumers and Heylighen 2010).

There has been growing attention to the impact of housing design on the health and well-being of autistic people (e.g., Brand 2010; Whitehurst 2012; Lowe et al. 2014). Researchers found that providing a suitable living environment can enhance their well-being (e.g., Brand 2010). However, existing knowledge on architectural design for autistic people largely focuses on children and learning environments (Black et al. 2022). Often research is based on feedback studies from a third-person perspective (e.g., Beaver 2006; Whitehurst 2012; Mostafa 2010). Some researchers have created ways to include autistic first-person perspective (e.g., Gaudion et al. 2015). Nevertheless, involving their first-person perspectives in architecture-autism-research remains limited (Black et al. 2022).

Housing design for autistic adults remains challenging for several reasons. First, housing design guidelines and recommendations concerning autism exist. Nevertheless, the concepts from these design guidelines/recommendations can counteract each other and therefore cannot be used straightforwardly (Kinnaer et al. 2016). For example, whereas one autistic person prefers open spaces because the overview they offer makes things predictable, another autistic person prefers compartments, as they reduce sensory input and offer structure (Kinnaer et al. 2014). Second, autism is a wide-range condition that affects individuals differently. Housing design guidelines indicate that there is no 'one size fits all' solution (Ahrentzen and Steele 2009; Steele and Ahrentzen 2015). Third, the end-user is often unknown in the housing design process. The housing developers often are clients, but they are not end-users. The remaining challenge is how to design housing for autistic adults, concerning their sensory perceptual differences, who are often not involved in the design process.

This study aims to shed light on the relation between architects' strategies to design for autistic residents and autistic users' experiences. From architects' perspective, we explored the design strategies they used in designing for autistic people. From autistic residents' perspective, we explored their experiences in the resulting housing project. We seek to answer the following questions: what strategies did the architects use to design housing for autistic people? How do autistic residents experience the resulting environment? By confronting the architects' design strategies and autistic residents' experiences, we hope to contribute to bridging the gap between them and illustrate how autistic residents' lived experience can bring insights to inform housing design.

28.2 Methods

We report on a case study of a group home designed for 20 autistic residents with and without mild intellectual impairment living together under supervision of support staff. This case was chosen because it fits the aim of this exploratory study about architects' design strategies targeting autistic users. We contacted the person in charge of the project's development, henceforth the developer, through information provided by our professional network. From there, we contacted the architects. To gain insights into architects' design strategies and autistic residents' lived experience, we opted for a qualitative research approach that combines informal and semi-structured interviews, participant-made drawings, and participant observation.

This group home is a two-story building combining four houses. Each floor accommodates two connected houses (Fig. 28.1). Based on the ratio of one support staff to five residents, each house combines five resident units of around 49 m^2, a one-bedroom apartment (Fig. 28.2) or a studio (Fig. 28.3) with a private shower cabin, basin, and toilet. Additionally, depending on individual needs, the kitchen area can be equipped with facilities like a fridge, basin, and

Fig. 28.1 Plan of two connected houses on the ground floor. © The architects

microwave. In one house, an autistic resident rents a private unit. Five residents share one large living room and a kitchen. Apart from that, one bathroom, one laundry room, and one calm-down room are shared between the two houses (Fig. 28.1). For each house, the support staff has their working desk in the shared living room. During the night, support staff sleep in their sleeping room on the first floor.

As for architects' design strategies, the first author, henceforth the researcher, interviewed three architects from a design team of five architects who designed the housing project. She conducted a group interview with two architects and one separate interview with the interior architect. Each interview lasted for 1.5 h. Collected data included interview transcripts of the semi-structured interviews, and documents, including architectural drawings and two articles that architects consulted during the design process (Humphreys 2008; Mostafa 2008).

To study autistic residents' experiences, the researcher conducted 55 hours of participant observation focused on the daily activities of residents at different times within one month. The researcher's participation included talking to residents and support staff, cooking, having dinners, working in gardens, and going out (for walks, to the spa by car, or out dancing). Participant observation allowed the researcher to become acquainted with residents and support staff, the built environment, and daily activities. It helped to better understand and interpret interview data within their context. Informal interviews were conducted with eight of the 20 autistic residents. They were invited based on consultation with support staff and the researcher's informal contacts during participant observation. Autistic participants had been living in the group home for about two to four years. They were two women and six men, between 19 and 63 years old. To better disclose experiences that might be difficult to express, the researcher invited autistic residents to make drawings about their housing environment. Four of the eight residents made drawings about their private unit, the building, and the neighborhood. This made it easier to communicate their thoughts, allowing more time to reflect and think while offering an opportunity to avoid eye contact. In follow-up interviews, autistic users talked about their drawings, which helped in understanding their experiences. In order to gain insight into autistic users' experiences, we also asked four support staff and the developer about autistic residents' experiences, how it was for residents to live there, and what they consider essential for them. Collected data included interview transcripts, field notes from the participant observation, participant-made drawings, and photos made by the researcher.

The study was approved by KU Leuven's Social and Societal Ethics Committee. Participants were informed about the study orally and in

Fig. 28.2 One-bedroom unit. © The architects

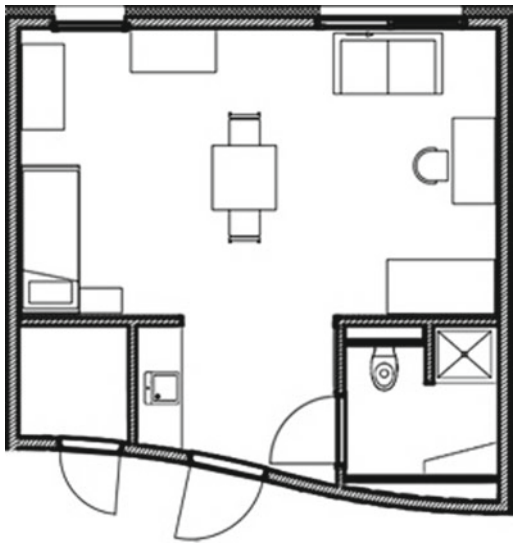

Fig. 28.3 Studio unit. © The architects

written form and given the opportunity to ask questions. The interviews with residents were adapted to their individual capacities regarding timing, length, and content. All interviewed residents said to feel comfortable doing the interview alone and gave written informed consent. Participants were free to choose the language to communicate with the researcher. Most of them preferred English, except for one resident who preferred French and another for whom an assistant translated between Flemish and English.

In a previous publication on the same housing project (Nguyen et al. 2020a), we focused on one specific design concept. For this study, we analyzed the data using a different framework that allows addressing the other design concepts architects used.

To analyze the data, we started from the different facets of user experience in architecture in terms of sensory perception, the activities afforded, and the meanings attributed (Van der Linden et al. 2019). This framework builds upon a description of human-product experiences following a similar framework of sensing, acting, and meaning in design disciplines (Krippendorff 2005; Vaes 2014). Unpacking the understanding of user experience in the context of architecture into perception, activity, and meaning provides a lens for studying knowledge about users. Accordingly, we analyzed the housing project in terms of how a space feels, how a space works, and what a space means, both in architects' design strategies and in the autistic residents' experiences.

To enhance the quality of the research, we organized two online expert panels. The expert panels brought a mixture of expertise from with different angles rooted in lived experience, offering more nuanced insights into experiences on the spectrum. The panels included autistic adults, family members, parents, architects, housing developers, care professionals, and academics/researchers. Among 13 panel members, six combine multiple roles, such as a parent of an autistic grown-up and a developer. The housing developer of the housing project studied also participated as a member of one panel. The panels were presented with a summary of preliminary findings from our analysis and asked to identify similarities and differences with their own experiences. The panel discussions largely confirmed the analyses and allowed us to refine them further.

28.3 Results

28.3.1 Architects' Knowing about Potential Autistic Users

For the architects, the housing project studied was their first experience with designing for autistic residents. The architects made efforts to acquire knowledge about the potential autistic users. Besides receiving the design brief, they consulted scientific articles and conference papers about autism and architecture (Humphreys 2008; Mostafa 2008), and they discussed with support staff. During the design process, two interviewed architects spent a day and talked with support staff to understand the experiences of potential users, but in another housing project, also for autistic residents, managed by the same developer. Several instances of unexpected behavior were considered during the design. Examples include someone who could count to hundred if he saw one hundred tiles, could hear a tapping pen from another room, could not sleep because of noise from the ventilation, or unscrewed his bed after one night. Examples of unexpected behavior from these accounts were used to question design decisions during the design process.

The architects were aware of the challenge in designing for autism, as no two persons on the spectrum are the same. The interior architect said, "There is so much diversity between people with autism […] Designing for people with autism is actually too broad; it's designing for everyone".

When we confront architects' design strategies with users' experiences, we find both commonalities and differences between them. In order to contribute to bridging the gap between both, the results focus on examples of differences rather than commonalities. The following sections describe for each of the facets of user experience first the architects' design strategies, followed by autistic residents' experiences.

28.3.2 How a Space Feels

Architects' design strategies focused mainly on the sensory sensitivities of potential autistic users. The primary design strategy was to create a low-stimulation environment by minimizing visual stimuli, and particular attention was paid to acoustics. Several solutions were used to minimize visual stimuli. For example, underfloor heating was used to avoid seeing radiators in residents' units. Using large-size (90 × 90 cm) bathroom tiles for walls and seamless, continuous floors and ceilings (incorporating lights) reduces the number of visual joints. Examples of acoustic solutions were situating the building centrally on the site, creating a buffering area that reduces noise from the surroundings; installing double walls between units and sand-lime brick to absorb sounds, a green roof to absorb noise from rain, and an extra layer to buffer sound from the roof; ensuring that ventilation shafts run separately to the basement to avoid sound traveling between units; and (again) using of underfloor heating to avoid sounds from running water inside radiators.

Autistic residents' experiences in terms of sensory perception primarily concerned the noise inside the building. The robust material in the corridor caused much echo. The locks on all doors created a loud sound each time a door was (un)locked, and residents tended to check the look multiple times. A resident said, "Some inhabitants have very highly sensitive hearing, so, if, they are also afraid of the door. If one of the doors closes, some […] inhabitants here can hear it. They are very nervous, very angry. It is, almost, noise cannot escape". The second major aspect of autistic residents' sensory perception was the temperature. The support staff mentioned that some residents always complained about the perceived temperature; it was either too hot or too cold. Because neither the residents nor support staff could control the temperature by themselves, they leaned on the technical service to adjust it. In their units, autistic residents

needed to wear their clothes to adapt their perceived temperature to their comfort while the standard room temperature was set at 21°.

28.3.3 How a Space Works

The designed architects applied several design solutions from design guidelines for autism. Some examples are compartmentalization, zoning spaces into specific activity sections, providing calm-down rooms, safety, and flexibility. At the entrance of the building, one of the architects' design strategies was to compartmentalize the space and define a single function per space at a time by dividing the main entrance into two smaller rooms, first entering a hall, then opening the door to enter the waiting and coats storing area, then opening the door to enter the main corridor. Calm-down rooms were aimed to help residents escape and relax when they wanted. All interior surfaces of these rooms (floors, walls, and ceilings) were covered with thick foam mats for safety. The ceilings were equipped with many little lightings, like stars, these rooms had no window. For safety reasons, the water temperature was controlled, and water flow stopped after six seconds, and the showerhead was fixed on the wall. For flexibility and individualization, removable walls were designed. The studio can be turned into a one-bedroom apartment when the removable wall is used. However, the architects admitted that although individualization is one of the essential design strategies, making the removable walls from blocks was expensive. At the same time, the studio/one-bedroom apartment could be set up from the start when the resident arrives. Then the construction cost could be reduced.

The autistic residents ended up adapting certain functions to their needs. For example, the coat storing area in the main common entrance is not used. The residents put their coats and shoes directly in their units. Interestingly, a "reception room" was formed in the first shared living room on the ground floor (Fig. 28.1). Because this living room is accessible and directly open to the pathway, the working desk of support staff became the main desk. Support staff said "In the beginning, we are not allowed to go through the window (laughing) because it is a window, not a door. But everyone uses it as the door now". Residents pass by this living room to say "Hi. I arrived", or when they leave, or to claim something. This living room is also a gathering room before daily group activities. The two calm-down rooms are never used. Some safety measures, such as the fixed showerheads, proved inconvenient as residents did not have options to wash part of their bodies. Support staff confirmed that the design is not suitable for the autistic residents living there. They said the design is more suitable for autistic people who need more support, like those living in another housing project. During the expert panel discussion, the housing developer confirmed that although the design was tailored from the start for autistic residents, there was a need for adaptations after the end-users moved in. This was confirmed by support staff in the expert panels. In a group home, there are specific changes of newcomers arriving and old residents leaving throughout the years. According to them, user-directed adaptations are essential.

28.3.4 What a Space Means

Architects tried to foster the meaning of home for potential autistic users in multiple ways. One of their main design strategies relates to homelikeness. For example, the building consists of staggering volumes suggesting small houses rather than institutional care. The first-floor units are articulated by alternating roof heights, like the pitched roofs of many Belgian townhouses, and town-house windows (Figs. 28.4 and 28.5). Natural stones were used for roofs and external

Fig. 28.4 Northern facade. © The architects

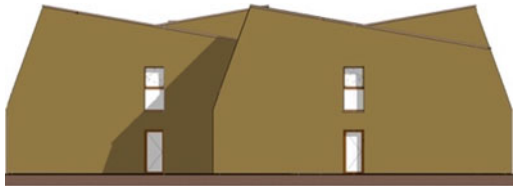

Fig. 28.5 Eastern facade. © The architects

walls to create a homelike atmosphere. The architects wanted each unit to have its own house number, and residents on the ground floor could directly enter their unit using their private entrance. However, the idea of having individual house numbers and entrances was not implemented because of safety reasons.

Residents expressed the meaning of their home in very different ways according to their unique and special interests. For example, Emily is happy living in her unit because she can watch movies whenever she wants, even until midnight (Fig. 28.6). She loves Pokémon and watching movies, especially horror movies. Emily proudly expressed that she decorated her unit by herself, e.g., choosing colors for the wall and decorating walls with posters of Pokémon characters. Emily remembered by heart more than 800 names of Pokémon characters. For Antoine, home is for relaxing after a hard-working day (Fig. 28.7). Antoine loves gardening, and he planted flowers in his small garden. He has different personal collections of music CD-ROMs and football posters all over his sleeping room.

For Dan, the support staff stated that "he is the only one who doesn't like the building. He dislikes the appearance of the kitchen counter, for example". Dan is very sensitive to noise and pays special attention to little visual details. Dan speaks like whispering. During the interview with the researcher, the least noise from the corridor or the sound of the wind from outside

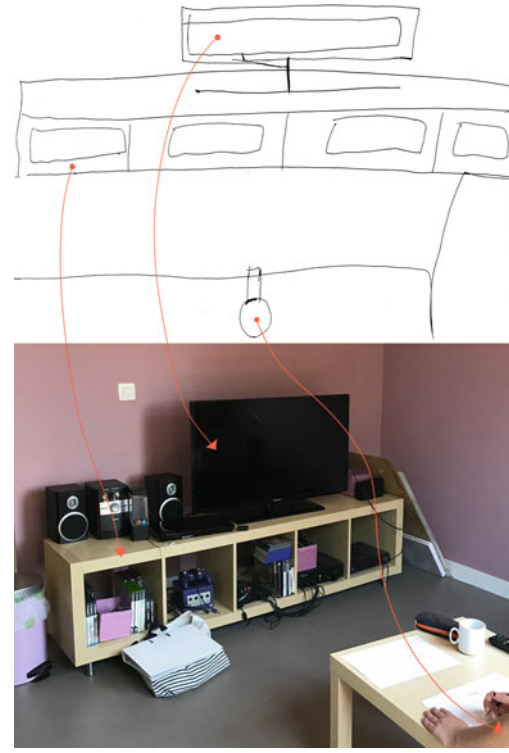

Fig. 28.6 Emily presented her one-bedroom apartment as an image of herself sitting in front of a television. She emphasized that she would not live in a group home that limits time for watching movies. *Drawing* © Emily. *Photo* © The researcher

caught his attention quickly and interrupted the conversations easily. In addition to sound, Dan also has outspoken attention to visual display. Every visual thing seems equally crucial for him: near or far, inside or outside. Dan preferred a studio rather than a one-bedroom apartment to have an overview of his living space. In his unit, Dan displayed many different collections of stuff on tables and walls (Fig. 28.8). Moreover, he stored different collections of tea tags and candy wrappers in drawers.

Fig. 28.7 Antoine presented his home as a relaxing place after a hard-working day and a place for doing his hobbies. *Drawing* © Antoine, *Photos* © The researcher

28.4 Discussion

Our analysis suggests that the architects' primary design strategy concerns the built environment's sensory qualities, reflecting the prominent focus in existing housing design guidelines for autism (e.g., in Brand 2010; Steele and Ahrentzen 2015; Gaines et al. 2016). The design concept of homelikeness is expected to be perceived by visual features and the use of materials. Our study shows that besides sensory qualities, other aspects of housing design, such as how a space works and what a space means, are essential for users' experiences. This is in line with another study in which we investigated the lived experience of autistic adults living independently in different housing types and contexts (Nguyen et al. 2020b).

The findings confirm that several conflicts arise between housing design considerations for

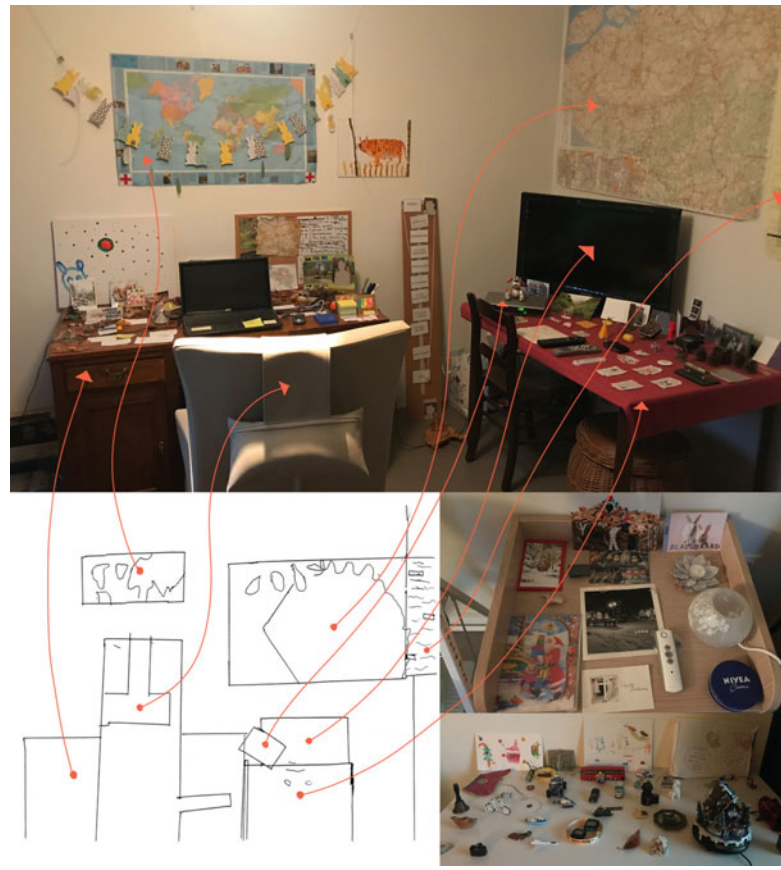

Fig. 28.8 Dan proudly presented to the researcher different personal collections of stuff all over his studio. Some collections are displayed visibly on the tables or the walls. Others are stored in different drawers. *Drawing* © Dan. *Photo* © The researcher

autism (Kinnaer et al. 2016) in two ways. First, some design considerations counter each other. For example, using robust materials for safety caused serious noise problems inside the building despite the architects' efforts to diminish noise from outside in various ways. Using floor heating caused disappointment with the perceived room temperature. Second, some design considerations do not meet the needs of autistic end-users. For example, the compartmentalization and single function of each space applied for the entrance are irrelevant for this group home. Another example is that the calm-down rooms are never used, either. Therefore, the findings support Baumers (2012) suggestion to use existing design guidelines for questioning the design context rather than using them straightforwardly.

The analysis suggests, and the expert panel discussions confirm, that only when an autistic person uses a space, they begin to know what could be adapted for their needs. Knowing by experiencing what works for them is recognizable in other contexts, e.g., an autistic designer who designed his own spaces (Baumers and Heylighen 2015) or in the workplace (Gaudion 2016). Therefore, future architectural research concerning autism should look for ways to design that allow user-directed adaptations.

Concerning autism, rather than seeing unexpected behavior as a problem that architecture is expected to solve, future research should take a step back and ask fundamental questions about how autistic people occupy space, which may be very different from non-autistic people. How can this different way of occupying space inform a better design for them? This fundamental question is in line with Boys' (2014) question in the context of disability: "what would it mean to start from users, including disabled people, that do not fit norms, recognizing the expertise this enables

in creatively negotiating both physical space and everyday routines?". Architects may reduce autism to medical and stereotypical notions that may fail to capture the diversity and complexity of autistic people's experiences. Future research is required to understand better the experiences and perspectives of autistic individuals in relation to how they occupy space and develop ways to inform architectural designers about autistic users' experiences through, e.g., personas and scenarios.

As for limitations, the architects' design strategies were identified through a retrospective study, which could not fully discover thoughts and events during the actual design process. We suggest future research look for a way to study more in depth how autistic user experience is currently addressed in architectural design practice.

In conclusion, the results suggest that architects' primary design strategies relate to the built environment's sensory aspects. This reflects the prominent part of existing design guidelines for autism. In autistic residents' lived experience, not only is the sensory perception of the built environment is essential but functional and intangible aspects of a space are also important—the two latter aspects relate to how a space works and what space means for them. In gaining a better understanding of autistic residents' lived experience, the findings challenge the existing design guidelines and broaden the understanding of the role of the built environment concerning autism.

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Analysis of Differences in Perception of Social Support in Public Spaces in the Neighborhood

29

Ziyi Yang, Shuyang Dong, and Fei Lian

Abstract

The physical environment characteristics of public spaces in neighborhood have different influences on community communication among different generations or genders, which have an important impact on social support and well-being. The aim of this study is to explore the factors of social support for different types of public spaces in neighborhood and to reveal variance in perception of the factors from different groups of people to guide spatial design. Four types of open public spaces and 20 adjective pairs are summarized from literature review and pre-survey. Semantic Differential Method is applied to design questionnaires, which are distributed to 218 people of different generations (14–91 years old) and genders in different provinces of China. The results show that the environment features that influence social support can be summarized as governance and comfort, facility satisfaction and suitability for sport, openness of space, and environmental identity and accessibility. Dissatisfaction with the flexible boundary space is great, and the evaluation on open space is relatively high. There is a large variance in spatial perception between young and middle-aged people and the elderly, while different age groups of older population do not differ significantly. People's needs and preferences for spatial environments are not only closely related to their physical functioning but also more related to the type and scale of activities, with the latter (type and scale of activities) differing more by age group than by gender.

Keywords

Public space · Neighborhood · Physical environment characteristic · Social interaction · Perception of environment · Generational variance · Gender variance

29.1 Introduction

According to the UN Sustainable Development Goals (SDGs), physical environment should "ensure healthy lives and promote well-being for all at all ages". Social interaction is beneficial to individual mental health and the sound development of social relations. All kinds of public

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spaces in the neighborhood are the occasion of social communication for residents, and there is a significant correlation between public space and forms of social communication. Empirical evidence indicates that spatial characteristics can influence the occurrence of communication behaviors, and that different public spaces in the neighborhood differ in their engagement with social behaviors. People of different ages and genders have different psychological needs and social behaviors and perceive public spaces in the neighborhood differently.

Norwegian researcher (Mouratidis and Poortinga 2020) suggests that communities lacking adequate amenities may lack leisure social interaction, and that factors such as community amenities and services, a clean and pleasant environment, and security are crucial for community open spaces (Yung et al. 2016). At the same time, a community's walkability can contribute to a vibrant community space with higher social interaction (Iroz-Elardo et al. 2021). The number of seats also has a certain impact on the frequency of social interaction, and participants will have more social interaction on the greenbelt with more seats (Chang 2020). The increase in seating, block diversity and other factors in the commercial areas as well as in the public areas has significantly increased the vitality of the public space and consequently the local social relationships (Mehta and Bosson 2018). In addition to this, the presence of a higher proportion of green space in public spaces in the neighborhood will lead to better social interaction (Hami and Abdi 2019), and pedestrian-friendly design as well as good greenery is particularly considered to help create interaction and enhance neighborhood relations. Besides, the sense of security is also the key to encouraging social interaction (Abass et al. 2020), and the security assurance and management maintenance of open public spaces affects the social activities of residents to some extent (Salih et al. 2020).

The aim of this study is to propose and summarize the factors of social support for different types of public spaces in the neighborhood such as squares, parks, and streets, and to reveal the differences in the perception of the factors by different groups of people, in order to guide future spatial design and improve the social support for different groups of people.

29.2 Methods

29.2.1 Sites

In terms of the selection of open public spaces in representative communities, we divided the open public spaces into the following four categories through literature review.

Open Space People usually choose to engage in small-group activities like dancing or singing in public squares or gardens, while in other smaller sites, they tend to engage in fitness exercises, chatting with others or just sitting alone (Bo et al. 2020). In this study, three scenes of open space are selected for survey: a square at the entrance of a park, a waterfront site of a park, and a compact site with fitness facilities besides residential buildings. They are all belonged to open spaces in different hierarchies and scales.

Flexible Boundary Space Flexible boundary spaces refer to multiple informal sites for relaxation, which usually are formed by people gathering spontaneously. They could be the site among residential buildings or the boundary areas of a square (Bo et al. 2020). They usually cannot be distinguished clearly both by function and boundary. In this study, four types of flexible boundary space are selected for survey, including a small-size sitting area surrounded by trees besides residential buildings, a path along with fitness facilities on the edge of a park, a sidewalk of a street, and a sitting area on the edge of a park. The selection is tried to cover all of the representative flexible boundary spaces in neighborhood.

Linear Pedestrian Space Linear pedestrian spaces include slow-traffic streets for city life and multiple walking paths, where people can have short breaks or stops. This kind of space is generally more vibrant since traffic function makes it necessary in daily life (Bo et al. 2020).

Four scenes were selected for survey, which are a waterfront trail in a park, a walkway of a park, a large-scale commercial street and a street with small shops and restaurants on one side in neighborhood. They cover pedestrian spaces with different functions, including daily life, excise and fitness and commerce, which are also in varying scales.

Diversified Node Space Node spaces refer to intersections of people from different directions. It could also refer to transitional space such as the site out of the entrance of a residential building or the area of a residential block exit (Bo et al. 2020). In this study, three scenes, including a open square at the road intersection, a site at the exit of a residential block and a space under a porch, are selected to present different types of node space.

29.2.2 Variable Description

According to the environment characteristics extracted from the literature review and the feedback from the participants in the pre-survey, the following 20 adjective pairs were selected to describe social-support environment characteristics in the questionnaire:

Pedestrian-friendly–pedestrian-unfriendly, sufficient local amenities–insufficient local amenities, lush greenery–scant greenery, convenient transportation–inconvenient transportation, good management–poor management, having a sense of security–having a sense of insecurity, busy–unbusy, a characterful environment–a featureless environment, shady–insolate, clean–dirty, orderly–disorderly, closed–open, comfortable–uncomfortable, sufficient seats–insufficient seats, wide–narrow, high-density neighborhood–low-density neighborhood, short path–long path, suitable for solitude–not suitable for solitude, suitable for exercise–not suitable for exercise, relaxed–oppressive.

In addition, explanations are added to some of the adjective pairs according to the subjects' queries in the pre-survey. Regarding to "sufficient local amenities–insufficient local amenities", amenities include handrails, lighting, vending machines, rubbish bins, fitness equipment, etc., but excluding seating. For "convenient transportation–inconvenient transportation", the transportation refers to the transportation around the space. And "a characterful environment" means a public space that is different from others, such as having a regional or cultural characteristics or a distinctive design, etc. "comfortable–uncomfortable" refers to the overall feeling of an environment.

29.2.3 Participants

In terms of the division of generations, the United Nations World Health Organization (WHO) defines a new criterion that divides human age as follows: under the age of 44: young people, 45–59 years old: the middle-aged, 60–74 years old: the young old, 75–89 years old: elderly/senior, and over the age of 90: long-lived elderly (Dyussenbayev 2017). In this study, participants (14–91 years old) are divided into four groups based on WHO criterion and actual subject age distribution. They are 14–44 years old: young people, 45–59 years old: the middle-aged, 60–74 years old: the young old, 75–91 years old: elderly. As there is only quite a few subjects over 89 years old, they are classified as elderly (Figs. 29.1 and 29.2).

29.2.4 Data Collection

The questionnaire was first distributed to a small sample of people of different ages and genders who had actually visited the survey spaces. Pre-survey was delivered as following steps: Firstly, descriptions were given to the subjects to recall specific spatial scenes. Secondly, the subjects were asked to browse the adjectives in the questionnaire and explain the ones that were difficult to understand. Thirdly, the subjects were asked to fill in the questionnaire. Fourthly, feedbacks were asked from the subjects including repetitive adjectives and questionnaire capacity. Fifthly, the participants were asked to

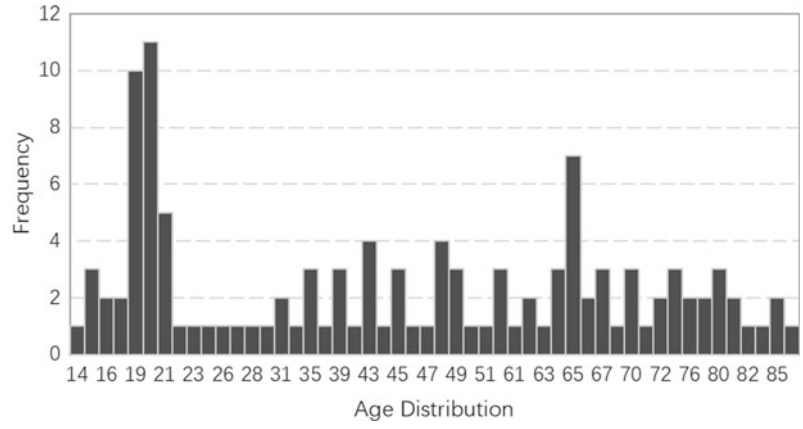

Fig. 29.1 Age distribution of the questionnaire about open space and flexible boundary space

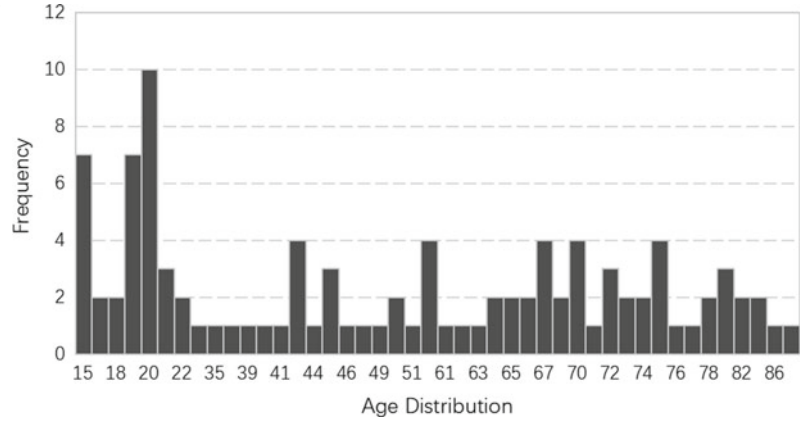

Fig. 29.2 Age distribution of the questionnaire about linear pedestrian space and diversified node space

describe each space with other adjectives and what their feelings when filling in the questionnaire.

According to the pre-survey results, we polished the adjectives to make them easier to understand and added textual explanations to the adjectives that are ambiguous. Then adjective pairs frequently mentioned by the subjects were supplemented; moreover, time-consuming for filling in the questionnaire was recorded to determine the capacity of the final questionnaire. After the questionnaire was revised, a small trial distribution was conducted again with the previous subjects as well as with the new subjects. The above-mentioned process was repeated until the subjects felt that the previous questions had been addressed.

As 14 spatial scenes and 20 adjective pairs were brought into survey, the questionnaire was too long to decrease the will to be completed. So the survey was split into two questionnaires, each of which contains seven scenes. In order to avoid deviation in results due to questionnaire splitting, both questionnaires were identical in structure, format, ways of display and distribution, and taken care of balancing the sample size and age and gender distribution during the distribution process.

In the formal distribution, the two questionnaires were distributed online to middle-aged and young people, with 117 and 122 questionnaires collected for the two questionnaires, respectively. For the elderly, questionnaires were distributed to them on site. At the same time, the elder people were interviewed during the filling process about their reasons for their choice. The survey on the elderly were proceeded over 7 days, with 55 and 53 questionnaires collected

for the two questionnaires, respectively. In final, a total of 117 and 101 questionnaires of the whole age groups were left after scanning out those unqualified samples such as short answering time, more than 30 consecutive identical answers and uncompleted questionnaires.

29.2.5 Data Analysis

At first, this study adopts Python software and imports the scipy.stats for correlation analysis of scoring data from different populations. Scipy is a high-end scientific computing toolkit that can be used in mathematics, science, engineering, and other fields, where the scipy.stats module is mainly used for statistics. Pearson Correlation Coefficients on the average score of different population groups for each adjective pair of the 14 photographs were calculated. Then whether the correlations were significant can be found by calculating significance (Sig.) values.

Next, through Python software and Excel software, this study imports xlrd and xlwt modules installed in Python to extract the scores of specific age, gender, or specific types of public space and calculates the average value to draw semantic differential (SD) comprehensive evaluation line chart. Among them, xlrt and xlwt modules are efficient tools for processing Excel documents (*.xls) in Python. By drawing the average line chart of the scores of different types of public spaces or different generations on each adjective pair, it is possible to observe the adjective pairs or spaces where population differences occur.

Finally, Excel software and Python software were used again. On the basis of data reconstruction, factor analysis was carried out through IBM SPSS software. Before factor analysis, the samples of seven scenes in each questionnaire were reconstituted into 1,526 samples. After verifying the effectiveness of the factor analysis through Bartlett's Test of Sphericity and KMO test analysis, the number of factors extracted was judged according to the cumulative contribution rate, and due to the scattered data in the component matrix table, it was used the Varimax with Kaiser Normalization Method to make the factors in the table concentrated load.

29.3 Results

29.3.1 Categories of Public Space and Intergenerational Perception

We used Python software to conduct Pearson Correlation Coefficients on the SD comprehensive evaluation in different age groups, where Sig. <0.05 is significant, excluding the two groups with Sig. >0.05. The rest of the data are greater than 0.05, where data between 0.4 and 0.6 are moderate correlation, 0.6–0.8 is strong correlation, and 0.8–1.0 is very strong correlation. The correlations between young people and middle-aged people, young people and the young old, young people and the elderly, and middle-aged people and the young old on the suitability of the environment for exercise all have correlation coefficients greater than 0.9, with very strong correlations. Among them, the correlations are not significant for the middle-aged and the young old on whether the site is convenient for transportation, and also not significant for the middle-aged and the elderly on whether the environment was narrow or wide (Table 29.1).

29.3.1.1 Intergenerational Variance in the Perception of Different Types of Public Space

Flexible boundary spaces, linear pedestrian spaces, and diversified node spaces—all show significant differences in different aspects between different age groups, while open spaces present relatively slight differences.

Open spaces are rated lower by young and middle-aged people versus the elderly in terms of good management and having a sense of security and clean (Fig. 29.3). Flexible boundary spaces are rated lower by the elderly and the young old versus young and middle-aged people in terms of adequate seating, openness, low crowd density and suitability for solitude (Fig. 29.4). Linear

Table 29.1 Person correlation coefficients of intergenerational perception

Environmental feature variables	Young and mid	Young and old	Young and old–old	Mid and old	Mid and old–old	Old and old–old
Pedestrian friendly–pedestrian unfriendly	0.858	0.827	0.844	0.815	0.797	0.958
Insufficient local amenities–sufficient local amenities	0.824	0.806	0.719	0.795	0.799	0.917
Scant greenery–lush greenery	0.824	0.882	0.924	0.887	0.735	0.896
Inconvenient transportation–convenient transportation	0.775	0.609	0.689	Sig. >0.05	0.602	0.643
Poor management–good management	0.733	0.867	0.839	0.74	0.789	0.873
Having a sense of insecurity–having a sense of security	0.675	0.81	0.866	0.731	0.719	0.939
Unbusy–busy	0.727	0.826	0.652	0.9	0.836	0.834
Featureless environment–characterful environment	0.951	0.932	0.943	0.913	0.865	0.931
Insolate–shady	0.911	0.875	0.944	0.959	0.938	0.927
Dirty–clean	0.842	0.712	0.831	0.682	0.888	0.78
Disorderly–orderly	0.84	0.89	0.94	0.832	0.777	0.866
Closed–open	0.724	0.871	0.713	0.614	0.76	0.655
Uncomfortable–comfortable	0.792	0.782	0.82	0.615	0.658	0.835
Insufficient seats–sufficient seats	0.761	0.826	0.822	0.776	0.544	0.83
Narrow–wide	0.772	0.814	0.841	0.634	Sig. >0.05	0.88
High-density neighborhood–low density neighborhood	0.679	0.883	0.841	0.558	0.583	0.884
Not suitable for solitude–suitable for solitude	0.882	0.789	0.778	0.694	0.706	0.802
Not suitable for exercise–suitable for exercise	0.93	0.918	0.912	0.94	0.898	0.958
Oppressive–relaxed	0.764	0.868	0.884	0.631	0.816	0.873

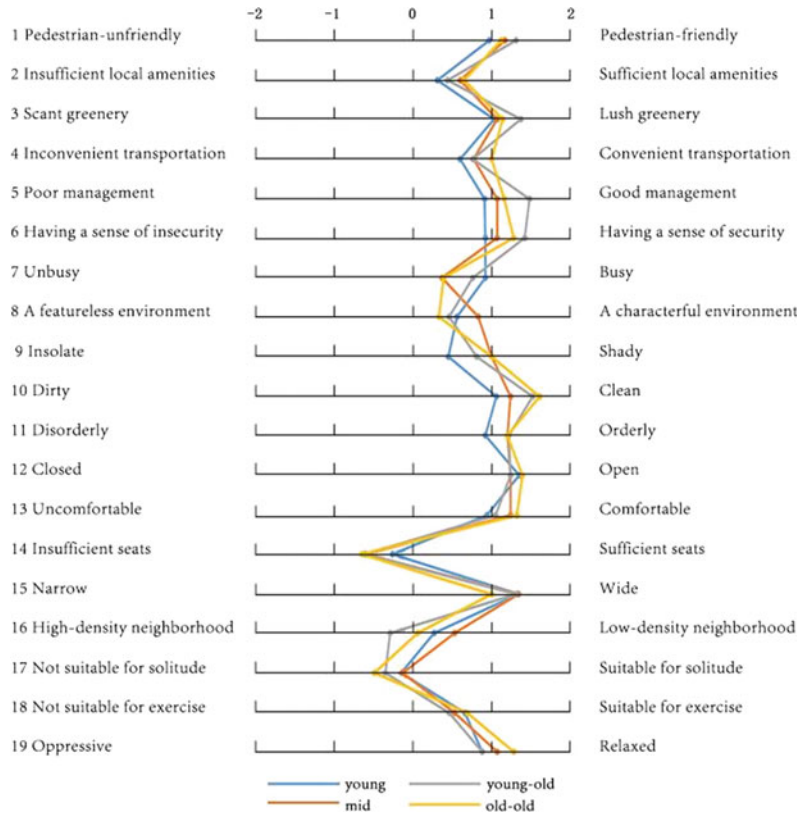

Fig. 29.3 SD comprehensive evaluation curve chart of intergenerational perception open space

pedestrian spaces are rated higher by young people versus the other three groups in terms of vitality (Fig. 29.5). Diversified node spaces are rated significantly lower by the young old versus the other three groups in terms of suitability for exercise (Fig. 29.6).

29.3.1.2 Variance in the Perception of Public Space Types Among Different Generations

The variance in perception of different space types across generations is greater than the differences in perception of the same space type between generations. Among them, the differences in perceptions of different types of space are slightly smaller for the elderly.

For young people, linear pedestrian space is evaluated significantly higher than other three types of public space on suitability for solitude and sports (Fig. 29.7). As for the middle-aged people, their evaluation of the diversified node space is low in terms of the abundance of greenery, and their evaluation of the linear pedestrian space is significantly lower than the other three types of space on the shade degree (Fig. 29.8). As for the young old, their overall evaluation of flexible boundary space is low, especially the evaluation of walkability is significantly lower than the other three types of space (Fig. 29.9). For the elderly, their evaluation curves were similar to those of the young old, and their evaluation of the walkability of the flexible boundary space is also low (Fig. 29.10).

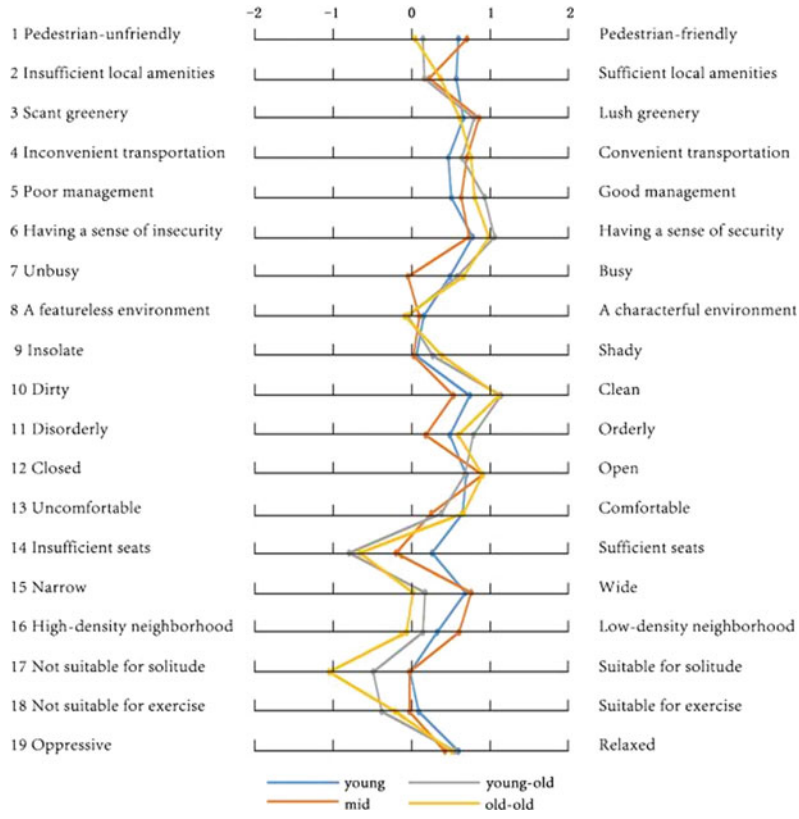

Fig. 29.4 SD comprehensive evaluation curve chart of intergenerational perception flexible boundary space

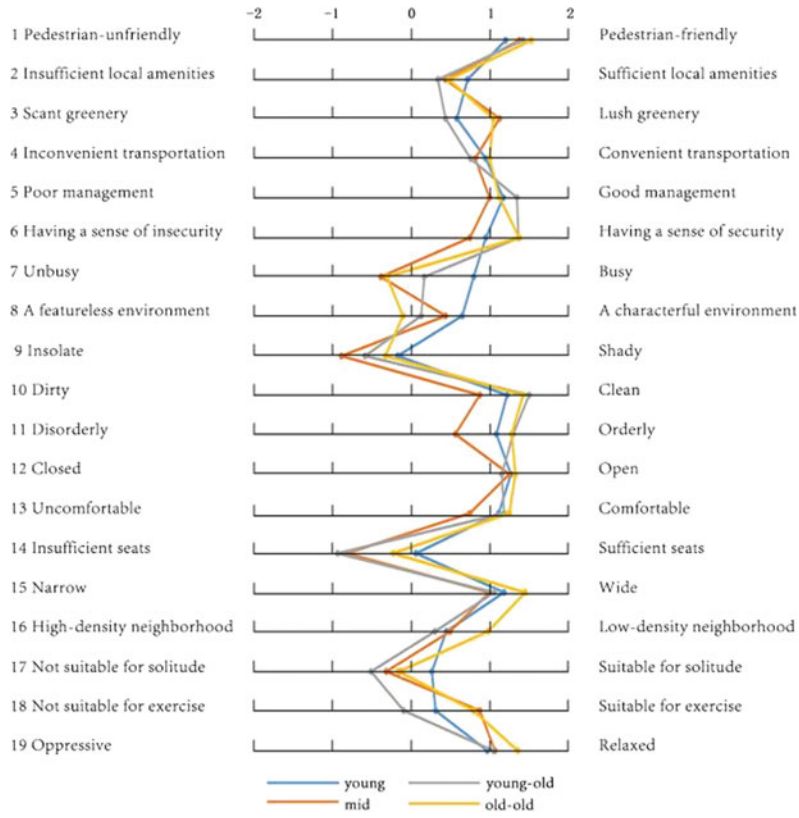

Fig. 29.5 SD comprehensive evaluation curve chart of intergenerational perception linear pedestrian space

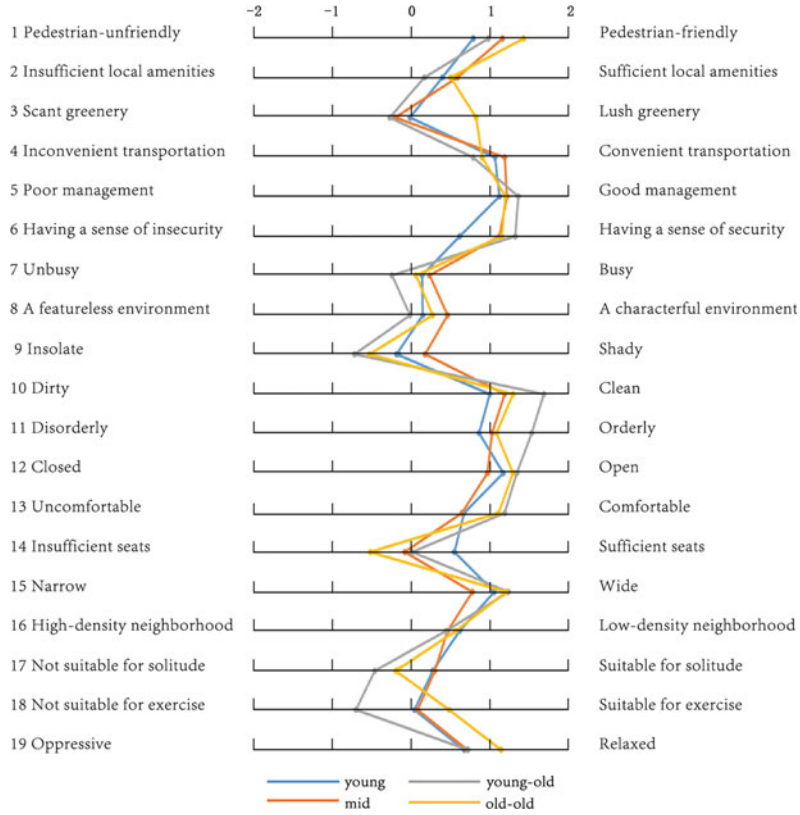

Fig. 29.6 SD comprehensive evaluation curve chart of intergenerational perception diversified node space

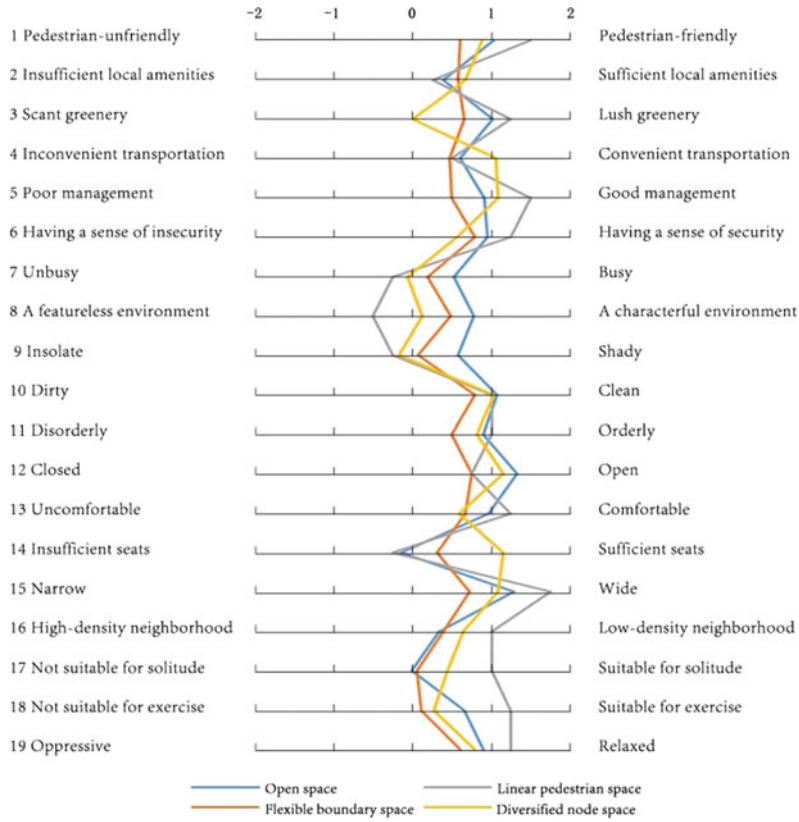

Fig. 29.7 SD comprehensive evaluation curve chart of young people

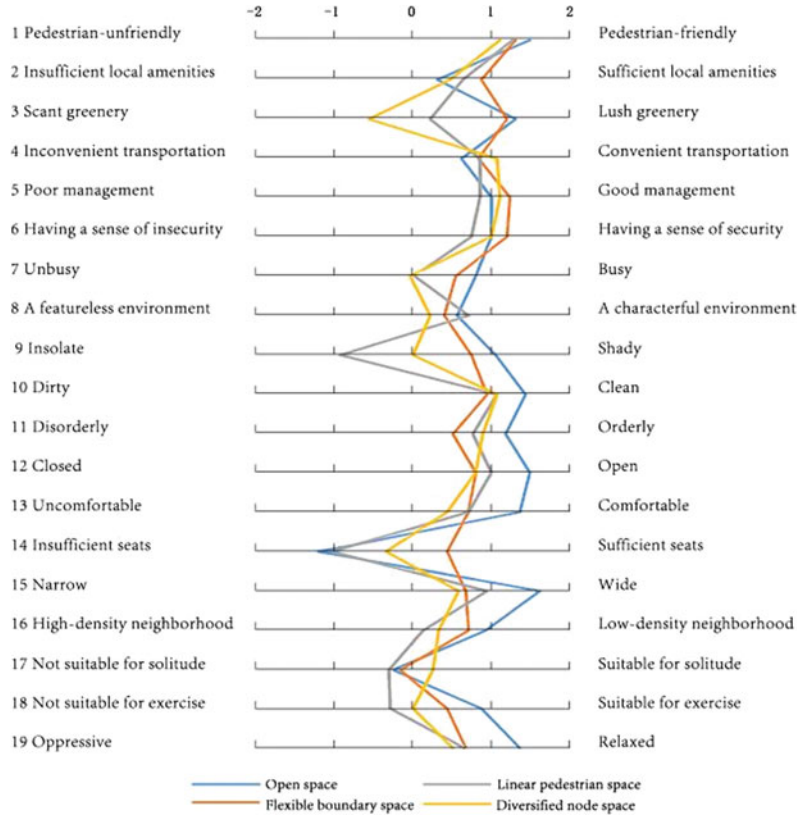

Fig. 29.8 SD comprehensive evaluation curve chart of middle-aged people

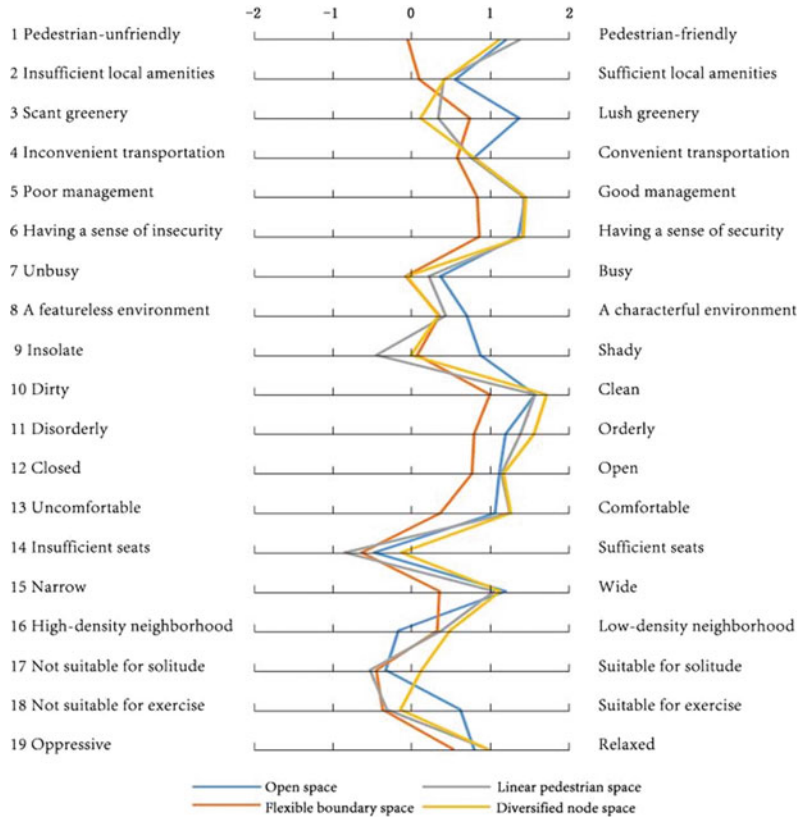

Fig. 29.9 SD comprehensive evaluation curve chart of the young old

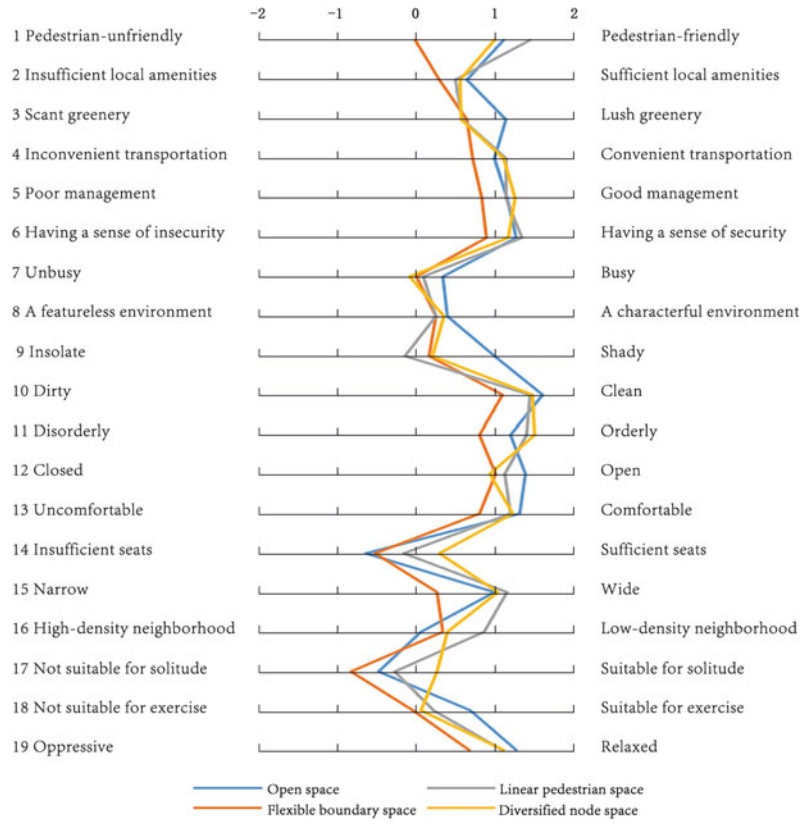

Fig. 29.10 SD comprehensive evaluation curve chart of the elder

29.3.2 Categories of Public Space and Gender Perception

We used Python software to conduct a Pearson Correlation Coefficients on the SD comprehensive evaluation of the different gender groups, with all Sig. values greater than 0.05, which is significant. The correlation coefficients are all between 0.8 and 1.0, with very strong correlations. The correlations are weaker for male and female in perception of the degree of closure–openness of the environment (Table 29.2).

29.3.2.1 Gender Variance in the Perception of Different Types of Public Space

In terms of the perception of different types of public spaces, the gender variance is smaller versus the generational variance. Among them, the gender differences are relatively larger in perception of diversified node spaces and slightly smaller in perception of flexible boundary spaces. For the open space, men evaluated lower on suitability for solitude; for linear pedestrian

Table 29.2 Person correlation coefficients of gender perception

Environmental features	Correlation coefficient (r)	Sig.
Pedestrian-friendly–pedestrian-unfriendly	0.923	0.000003
Insufficient local amenities–sufficient local amenities	0.904	0.000009
Scant greenery–lush greenery	0.943	0.000000
Inconvenient transportation–convenient transportation	0.855	0.000097
Poor management–good management	0.950	0.000000
Having a sense of insecurity–having a sense of security	0.870	0.000052
Unbusy–busy	0.920	0.000003
A featureless environment–a characterful environment	0.921	0.000003
Insolate–shady	0.892	0.000018
Dirty–clean	0.972	0.000000
Disorderly–orderly	0.978	0.000000
Closed–open	0.806	0.000501
Uncomfortable–comfortable	0.942	0.000001
Insufficient seats–sufficient seats	0.948	0.000000
Narrow–wide	0.931	0.000001
High-density neighborhood–low-density neighborhood	0.948	0.000000
Not suitable for solitude–suitable for solitude	0.902	0.000010
Not suitable for exercise–suitable for exercise	0.969	0.000000
Oppressive–relaxed	0.876	0.000040

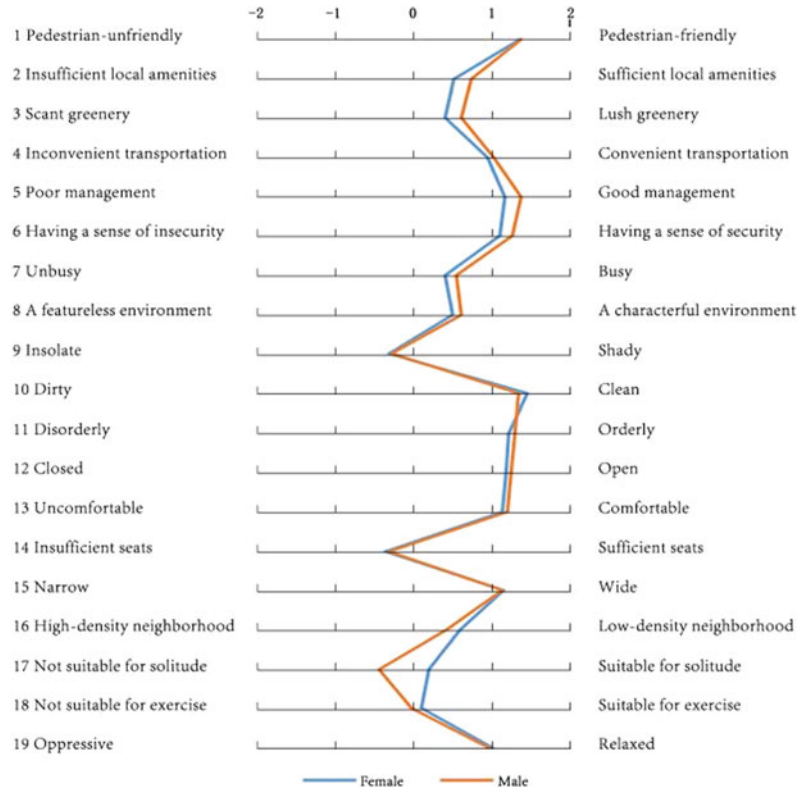

Fig. 29.11 SD comprehensive evaluation curve chart of gender perception linear pedestrian space

space, there are certain differences on the evaluation of openness and crowd density among different genders (Fig. 29.11). For the diversified node space, men also have a lower evaluation on suitability for solitude (Fig. 29.12).

29.3.2.2 Variance in the Perception of Public Space Types Among Different Genders

Compared to the variance on the perception of public space types among people of different ages, the evaluation graphs for men and women have more similarity. The variance on perceptions of space types from men is greater than from women. For the evaluation on the walkability by gender, the flexible boundary space is lower than the other three types of public space (Fig. 29.13). For the evaluation on the shade degree, the linear pedestrian space and the open space are rated, respectively, the lowest and the highest (Fig. 29.14).

29.3.3 Evaluation of the Social Support of Specific Public Spaces

Based on the results of the questionnaire, we selected a number of adjective pairs that were rated differently by people of different ages, and drew a SD comprehensive evaluation curve chart for 14 specific spatial scenes in four types of spaces by people of different ages, in order to determine which specific scenes in the different types of spaces caused differences in people's perceptions, and which environment features in the scenes caused differences in perceptions.

29.3.3.1 Evaluation of Public Spaces in the Neighborhood by Different Generations

Regarding to tidiness, people of different ages have great variance in the evaluation on waterfront trails, strip parks, large commercial street,

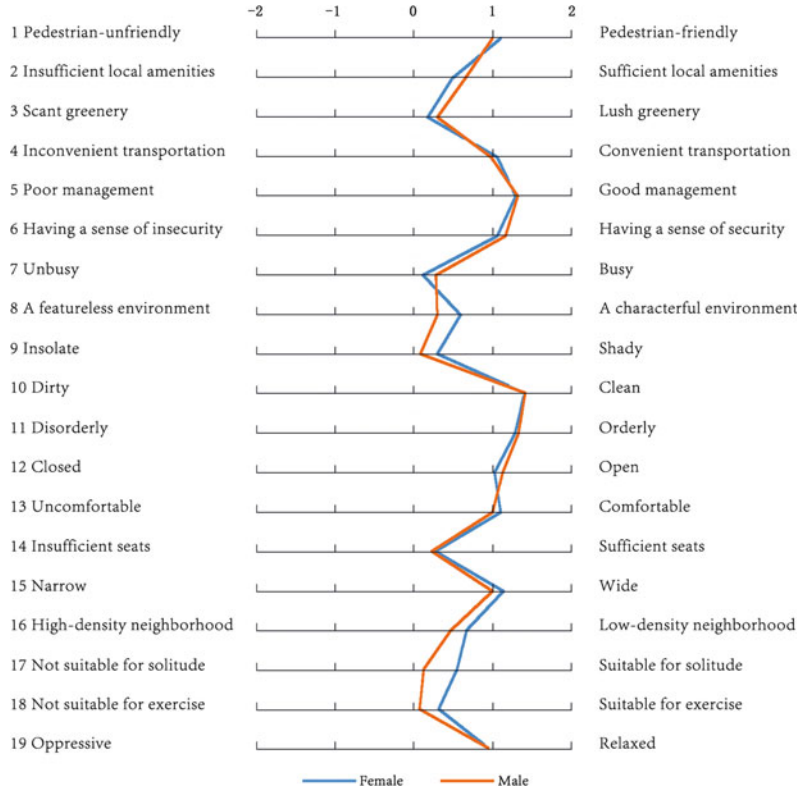

Fig. 29.12 SD comprehensive evaluation curve chart of gender perception diversified node space

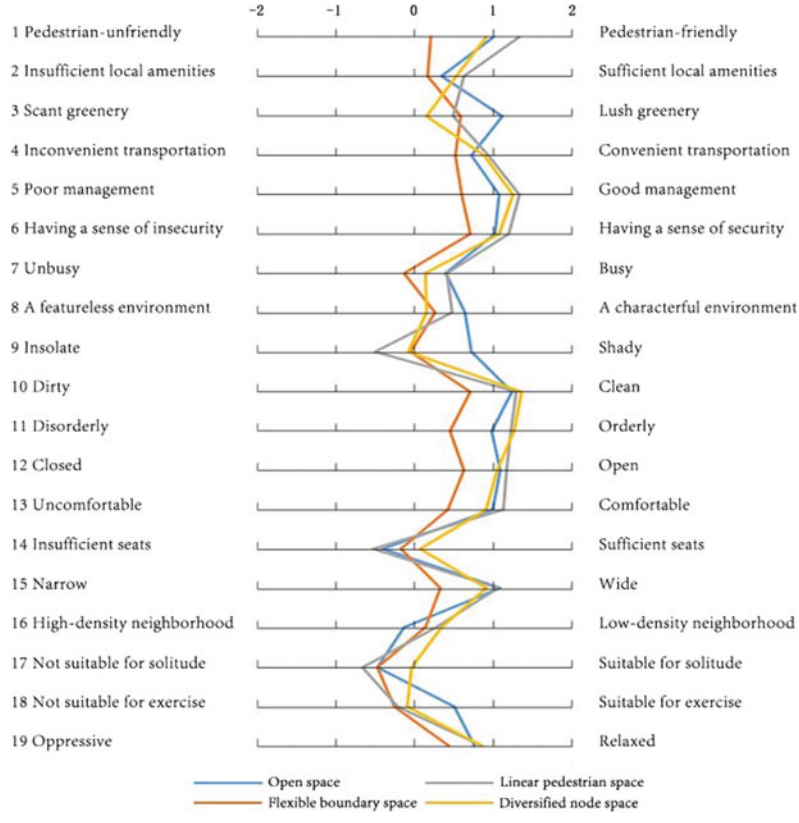

Fig. 29.13 SD comprehensive evaluation curve chart of males

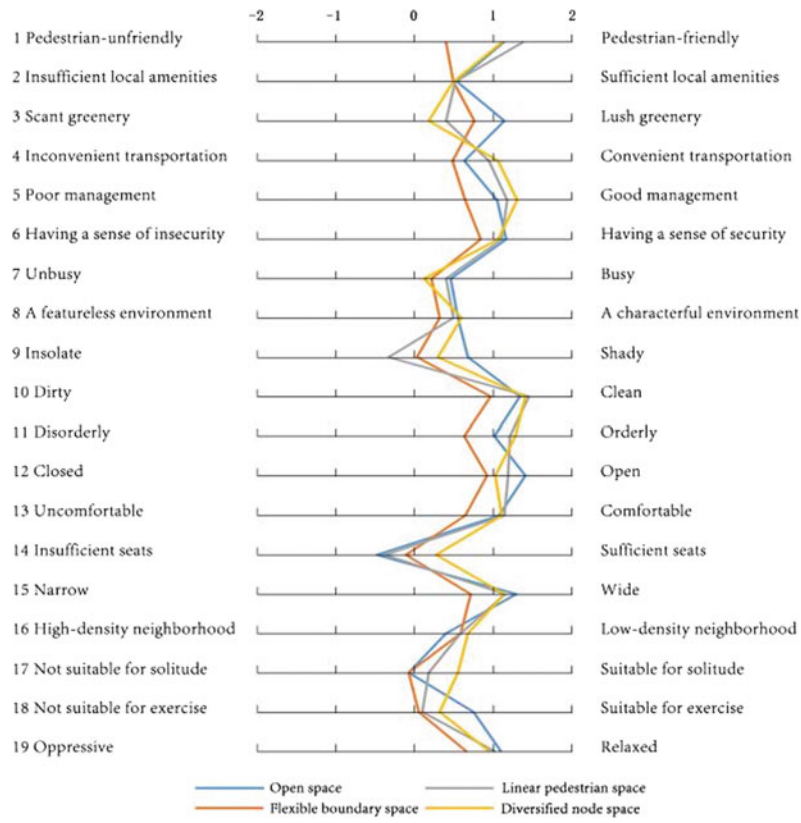

Fig. 29.14 SD comprehensive evaluation curve chart of females

and open space at road intersection, and middle-aged people gave the lowest evaluation (Fig. 29.15). For the suitability of solitude, the overall evaluation from young people is high, and from the young old and the elderly is low. Significant differences are shown on the small green space between houses, small rest places in parks, waterfront trails in parks, and open spaces at road crossings (Fig. 29.16). For whether it is suitable for exercise, people of different ages have significant variance in the evaluation on small green rest places between houses, large commercial streets, roads with shops on the side, and open spaces at road crossings. For cleanliness, the evaluation variance is relatively small. In terms of the adequacy of seats, young people gave the highest overall evaluation.

29.3.3.2 Evaluation of Public Spaces in the Neighborhood by Different Genders

For the degree of shade, there are significant differences between different genders in the evaluation on waterfront trails, strip park, large commercial street and open space at road intersection (Fig. 29.17). For the convenience of transportation, there is little difference between them, only a little different between the waterfront open space in the park and the park waterfront trails (Fig. 29.18). In terms of crowd density, men's evaluation is generally lower than that of women, especially in waterfront open space in the park, both sides of green paths, large commercial streets, and open space at the entrance of neighborhood. On the whole, men's

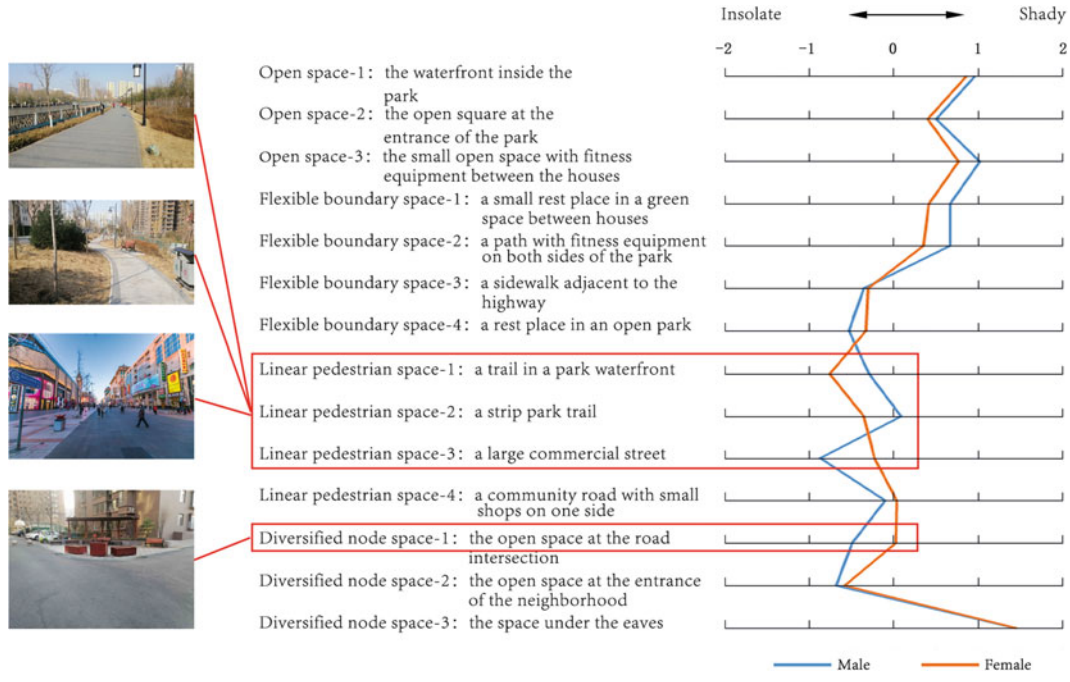

Fig. 29.15 Generational differences: messy–tidy

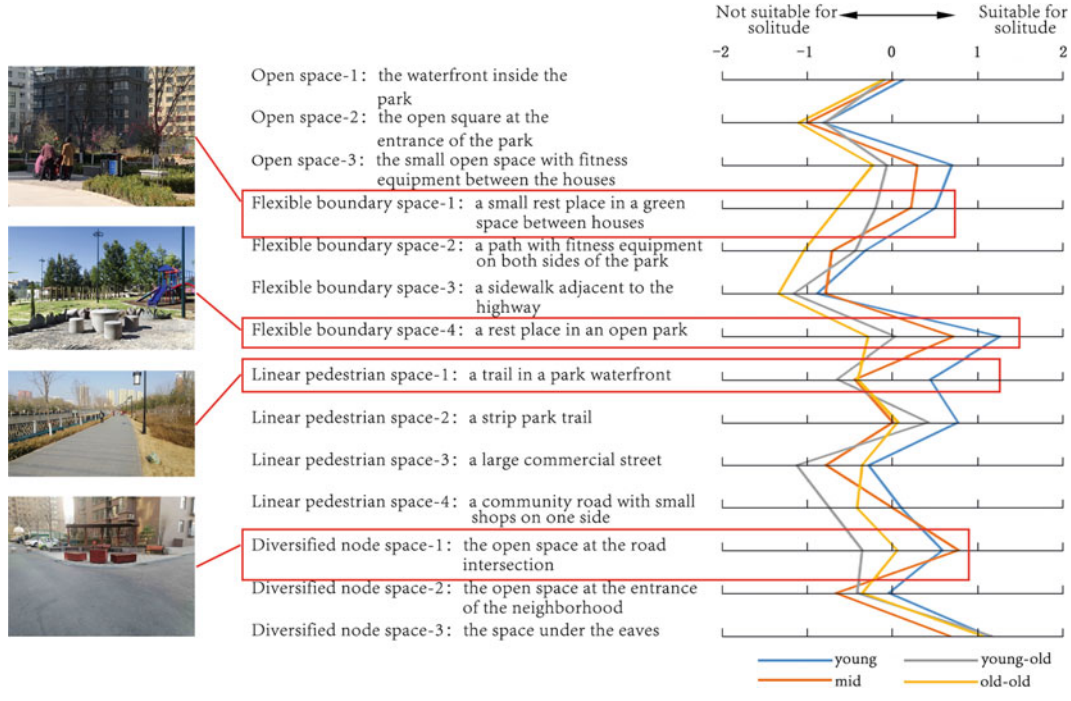

Fig. 29.16 Generational differences: suitable for solitude–not suitable for solitude

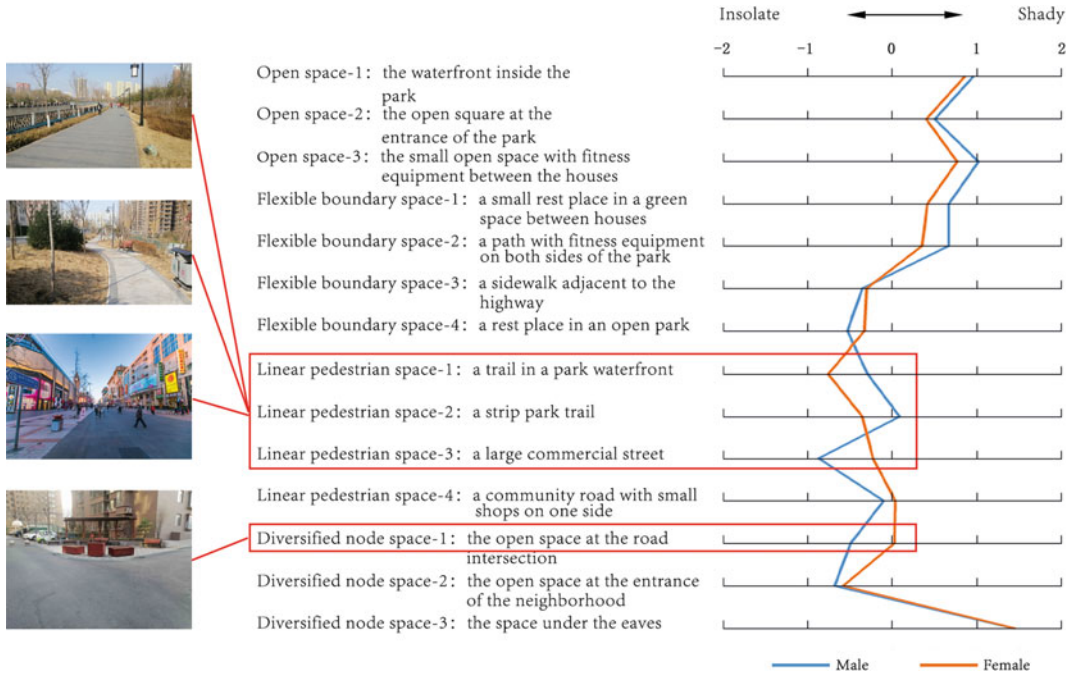

Fig. 29.17 Gender differences: insolate–shady

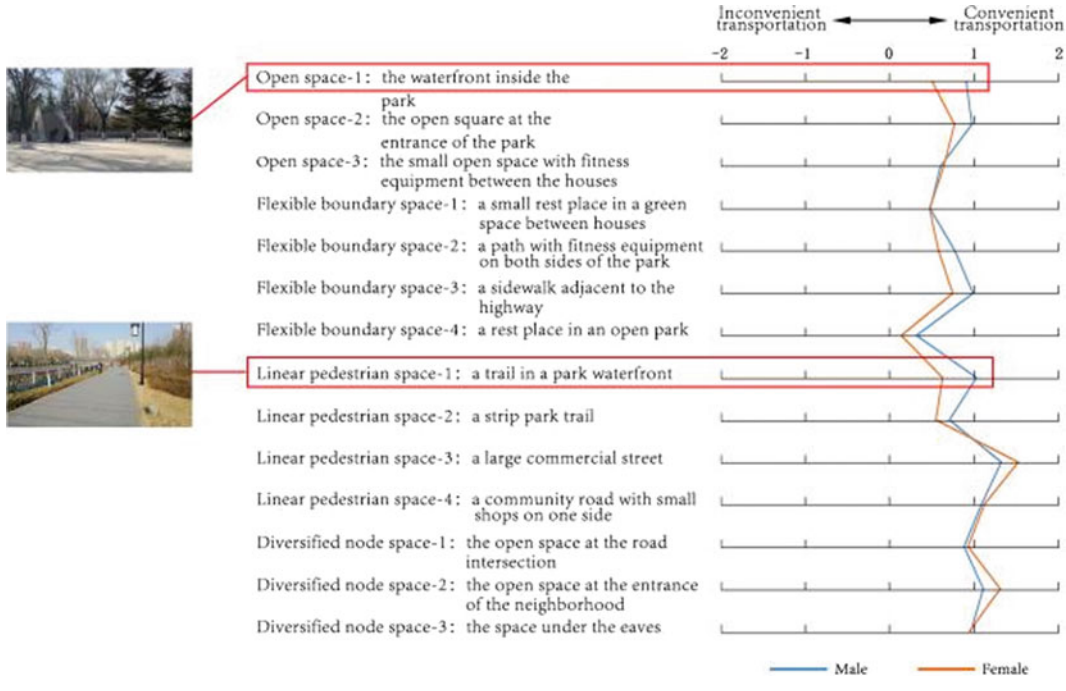

Fig. 29.18 Gender differences: inconvenient transportation–convenient transportation

evaluation is lower than that of women, especially for spacious sidewalks, large commercial streets, roads with shops on the side, and open spaces at road crossings.

29.3.4 Evaluation Indicators for the Social Support of Public Spaces in the Neighborhood Based on Factor Analysis

29.3.4.1 Factor Analysis for Adjective Pairs

Firstly, the 218 data are reconstructed into 1526 samples and then the dimension reduction method is performed to calculate the KMO and Bartlett's Test values. The KMO value (close to 1) indicates that the data are suitable for factor analysis. The significance of 0.000 ($p < 5$) indicates that the data is spherically distributed and has structural validity (Table 29.3).

Next, the rotated component matrix is calculated. As the unrotated factor analysis data load distribution is not concentrated and is difficult to analyze, the data are rotated by the Varimax with Kaiser Normalization Method to obtain the rotated component matrix (Table 29.4).

29.3.4.2 Indicators for the Social Support of Public Spaces in the Neighborhood

The data are further sorted out and the final four evaluation factors were obtained as shown in Table 29.5.

Table 29.3 KMO and Bartlett's test table

Kaiser–Meyer–Olkin measure of sampling adequacy		0.907
Bartlett's test of sphericity	Approximate chi-square	10,512.445
	Degrees of freedom	171
	Significance	**0**

Factor 1 is summarized as governance and comfort, which contains the variables such as dirty–clean, messy–tidy, poor management–good management, having a sense of insecurity–having a sense of security, uncomfortable–comfortable, oppressive–relaxed, pedestrian-unfriendly–pedestrian-friendly.

Factor 2 is summarized as facility satisfaction and sport suitability, which contains the variables such as unsuitable for exercise–suitable for exercise, suitable for solitude–unsuitable for solitude, insufficient seating–sufficient seating, scant greenery–lush greenery, high-density neighborhood–low-density neighborhood, insolate–shady, and insufficient local amenities–sufficient local amenities.

Factor 3 is summarized as spatial openness, which contains the variables such as narrow-wide and closed-open.

Factor 4 is summarized as environmental recognition and accessibility, which contains variables such as a featureless environment–a characterful environment, inconvenient transportation–convenient transportation, unbusy–busy.

Finally, three groups of factors can be derived from the rotated squares and loaded data to influence the quality of semantic evaluation of waiting spaces. According to the rotated squares and loaded data (Table 29.6), among the three groups of factors, the governance and comfort factor and the facility satisfaction and sport suitability factor have the highest contribution, at 20.81 and 16.58%, respectively, indicating that the functional comfort and good governance of public spaces in the neighborhood dominate and are the most intuitive feelings of people towards the space. The spatial openness factor and the environmental recognition and accessibility factor have similar contributions, at 10.28 and 9.58%, respectively, indicating that in addition to improving the physical feeling of space and meeting the functional needs of space, it is also important to improve the openness and characteristics of space, traffic conditions, and atmosphere.

Table 29.4 Rotated component matrix

Environmental-feature variables	Component			
	1	2	3	4
Dirty–clean	0.825			
Disorderly–orderly	0.816			
Poor management–good management	0.773			
Having a sense of insecurity–having a sense of security	0.746			
Uncomfortable–comfortable	0.65	0.351	0.347	
Oppressive–relaxed	0.479	0.471	0.314	
Pedestrian-friendly–pedestrian-unfriendly	0.454	0.308		
Not suitable for exercise–suitable for exercise		0.745		
Not suitable for solitude–suitable for solitude		0.72		
Insufficient seats–sufficient seats		0.64		
Scant greenery–lush greenery		0.551		
High-density neighborhood–low-density neighborhood		0.53		0.389
Insolate–shady		0.51		0.484
Insufficient local amenities–sufficient local amenities	0.364	0.437		0.412
Narrow–wide			0.813	
Closed–open			0.809	
A featureless environment–a characterful environment				0.758
Inconvenient transportation–convenient transportation	0.381			0.479
Unbusy–busy			0.397	0.453

Extraction method: principal component analysis
Rotation method: varimax with Kaiser normalization
Rotation converged in 7 iterations

Table 29.5 Representative spatial factors for each category

Factor D1	Factor D2	Factor D3	Factor D4
Dirty–clean	Not suitable for exercise–suitable for exercise	Narrow–wide	A featureless environment–a characterful environment
Disorderly–orderly	Not suitable for solitude–suitable for solitude	Inconvenient transportation–convenient transportation	Inconvenient transportation–convenient transportation
Poor management–good management		Insufficient seats–sufficient seats	Unbusy–busy
Having a sense of insecurity–having a sense of security		Scant greenery–lush greenery	
Uncomfortable–comfortable		High-density neighborhood–low-density neighborhood	
Oppressive–relaxed		Insolate–shady	
Pedestrian-friendly–pedestrian-unfriendly		Insufficient local amenities–sufficient local amenities	

Table 29.6 Rotation Sums of Squared Loadings

Total	% of variance	Cumulative %
3.954	20.811	20.811
3.149	16.575	37.386
1.954	10.283	47.669
1.821	9.582	57.25

29.4 Discussion

From the comprehensive view of the four space types, there are great dissatisfactions with the flexible boundary space, and the evaluation on open space is relatively high. Flexible boundary spaces are generally considered pedestrian-unfriendly by various groups, mainly due to their small size, which also indicates that they are more suitable for solitude. For the evaluation of shade degree, linear pedestrian space gains the lowest evaluation and open space gains the highest evaluation.

The environment features that influence social support of spaces in the neighborhood can be divided into four categories: governance and comfort, facility satisfaction and suitability for sport, openness of space, and environmental identity and accessibility. Among these, the governance and comfort of the environment plays a dominant role and is key to the willingness of people to stay and move around. In addition, the availability of a wide range of facilities and the satisfaction of fitness and sporting needs are second impact factor and are also important features for attracting all types of people. The contribution of spatial openness, recognition, and accessibility factors is roughly the same. Although the impact is lower than the first two factors, it is also the main feature effect environmental assessment. This suggests that, in addition to improving the physical comfort and satisfaction of the space, it is also important to improve the openness, identifiability, atmosphere, and accessibility of the space.

29.4.1 Intergenerational Perception Conflicts

The results of the study show that there is a large difference in spatial perception between young and middle-aged people and the elderly, while the older population, both the young old aged 60–74 and those elderly aged 75 and over, do not differ significantly in their spatial perception results.

Young and middle-aged people are more demanding than older people in terms of environmental governance, comfort, and facilities. So a clean, safe, and well-managed spatial environment with shade plants or facilities is an important factor in attracting the young and middle-aged population. In this regard, middle-aged people care more about the abundance of greenery and shade in the environment than any other group, especially in terms of shade for linear pedestrian spaces. This suggests that young and middle-aged people prefer an environment with abundant greenery, while older people prefer an environment with sufficient daylight. In addition, the evaluation of the adequacy of seating also indicates that the elderly population does have a higher need for resting facilities such as seating than the middle-aged and young people.

In terms of spatial adaptation, older people are less able to adapt themselves than young and middle-aged people, as shown by the fact that both groups of older people are less likely than young and middle-aged people to enjoy spaces with more variable environmental characteristics, such as flexible boundary spaces. This result may

also be due to the close proximity of these spaces to homes, where elderly people with limited mobility often gather for activities such as chess, mahjong, and chatting, making them more sensitive to the quality of the spatial environment. As a result, spaces with small sites, highly variable surroundings and a strong transitional character, such as the open spaces in front of houses and the borders of open squares, are less attractive to older people. However, such spaces are the most common spaces in the community, and if they are fully utilized, they will greatly enhance the supply of community space for activities. The key to optimizing the environment of flexible boundary spaces is to improve the stability of the environment by combining the concave and convexity of the space with the use of plants or seating to enhance the local spatial confines and avoid excessive pedestrian traffic, in order to allow older people to stay and move around more comfortably.

The perception of liveliness differs significantly between young people and other groups. For example, young people rate the liveliness of the linear pedestrian space environment significantly higher than the other three groups, suggesting that they have higher requirements and expectations for the quietness of the linear space, probably because young people's activities in the linear space are mostly relatively vigorous sports (e.g. running), while middle-aged and elderly people are mostly walking and chatting at the same time. This suggests that it is important to design linear pedestrian spaces in such a way that route zones are divided horizontally according to different pace speeds. For example, some pavements are divided into a plastic running track and a brick surface for general walking, with planting in between, so that the activity needs and environmental requirements of different groups of people are met.

29.4.2 Gender Perception Conflict

The variance in perception of public spaces in the neighborhood by different genders is relatively smaller than those by generation, suggesting that people's needs and preferences for spatial environments are closely related to their physical functioning, but also more related to the type and scale of activities, with the latter (type and scale of activities) differing more by age group than by gender.

The variance in the ratings of the various types of spaces was more significant and relatively lower for men. This is because men compare public spaces in the community to the high-quality spaces they have been exposed to, and thus dissatisfaction can rise. In addition, men are more demanding of spaces that are suitable for solitude and are more sensitive to crowd density, rating them lower than women in terms of being suitable for solitude in both open spaces and diversified node spaces. This suggests that there is a significant lack of privacy in public spaces in the community, with many sites having a single spatial level and lacking a variety of spatial levels to provide options for different activity needs.

29.5 Conclusion and Limitations

This study provides new evidence on the perception of public spaces in the neighborhood by different groups of people, reveals the differences in the perception of influencing factors by different age and gender groups, summarizes the factors that influence the social support of public spaces in the neighborhood, and also reveals the strength of the influence of each type of factor, which has implications for the future design of public spaces in the neighborhood in terms of improving the social support of different groups of people. The conclusions drawn from this study are as follows:

(1) The environment features that influence social support of spaces in the neighborhood can be divided into four categories: governance and comfort, facility satisfaction and suitability for sport, openness of space, and environmental identity and accessibility.
(2) From the comprehensive view of the four space types, there are great dissatisfactions

with the flexible boundary space, and the evaluation on open space is relatively high.

(3) There is a large variance in spatial perception between young and middle-aged people and the elderly, while different age groups of older population do not differ significantly.

(4) People's needs and preferences for spatial environments are not only closely related to their physical functioning but also more related to the type and scale of activities, with the latter (type and scale of activities) differing more by age group than by gender.

One limitation of this study is that, in order to distribute the questionnaire in the community as much as possible, the researchers did not limit the sample size to the same number of people of each age group during the distribution of the questionnaire. Due to the small range of middle-aged people (aged 44–60 years), and the relatively even age distribution of the collected questionnaire online, consequently, the sample size of people aged 44–60 is relatively small compared with other age groups, which causes some interference with the study results.

In addition, another limitation of this study is that, since most of the questionnaires are issued and all of the photos in the questionnaires were taken in China, the results obtained may be bound by Chinese culture. Therefore, the conclusions drawn in this study can reflect the conditions very well in China. However, whether they are relatively consistent with the conditions in other culture districts needs to be explored further in the future research. Even so, it's still believed that the conclusions can be a reference for other countries.

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The Micro-Renewal of Urban Public Green Space Environment in Severe Cold Area of China Based on Activity Capacity

30

Zheng Sui and Jingyi Mu

Abstract

Urban public green space is an important place for citizens' daily activities. The types and characteristics of activities of children, adults, and the elderly are different, so the demand for public urban green space is also different. This paper takes Harbin urban public green space park as an example and finds out the impact mechanism of public green space on activities by comparing and analyzing the characteristics of activity space in different seasons. Through the method of micro-renewal, improve the space environment of public green space, add necessary functional facilities, meet the conversion of activity types in different seasons, and reflect the inclusiveness of public green space to people with different activity abilities and activities in different seasons. And then put forward the micro-renewal strategy of urban public green space.

Keywords

Difference in activity capacity · Micro-renewal · Inclusiveness of public green space · Severe cold areas

30.1 Introduction

30.1.1 Cold Cities

Cold region city is usually defined according to the winter climate characteristics of the region where the city is located, which is a relatively general concept. There are different interpretations in different periods and countries. For example, in the 1980s, the concept of a cold city abroad refers to a city where the highest daytime temperature is below zero for 60 days or more in a year. In European and American countries, it is customary to call cities that have adverse effects on urban life due to the long winter and harsh climate as winter cities, while Japan calls them northern cities.

30.1.2 Difference in Activity Ability of Different Age Groups

The activity ability in this paper refers to the ability to complete a series of basic activities in the daily public green space. This paper compares and combs the differences of children's,

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adults' and the elderly's activity abilities from three aspects (Wen 2015; Wentao et al. 2017; Yong et al. 2021).

A. Aggregative Differences

According to the survey, outdoor public green park activities for children and the elderly mainly focus on gathering activities, while adults include some personal activities as well as some gathering activities. The aggregation of children is the most obvious, followed by the elderly, and the aggregation of adults is relatively weak. Among them, part of the aggregation of the elderly and adults is reflected in accompanying children to carry out aggregation activities.

B. **Persistent Differences**

Activity persistence is closely related to physical strength and concentration. The stronger the physical strength, the stronger the persistence, and the stronger the concentration, the stronger the persistence. Among the three groups, the physical strength of the elderly is relatively weak, while that of children and adults is relatively abundant. While children's concentration is relatively weak, adults and the elderly have relatively strong concentration. Therefore, the activity persistence of adults is the strongest, while that of children and the elderly is relatively weak. As children are stronger than the elderly, they often turn to other activities after finishing one activity, while the elderly will choose to go home to rest after finishing one activity.

C. **Regular Difference**

Regularity is intrinsically related to aggregation and persistence. The regularity of activities is a description of the stable and repeated occurrence of activities in a place. First of all, the regularity of children's activities is relatively less obvious, because the content of children's activities is relatively rich and diverse, and children's concentration is not very stable, their interests are more random and easy to change, so the regularity reflected is relatively weak. However, there are relatively few types of activities that the elderly can carry out, and the people who work with them are relatively stable, and their interests are relatively clear and stable, so the activities they carry out show a strong regularity. The types of activities of adults are rich between children and the elderly, and the sustainability is also between the elderly and children. Therefore, the activity regularity of adults is also between children and the elderly. There are both regular and stable habitual activities and random activities that change according to changes in interest.

30.1.3 Definition of Urban Green Space

The concept of green space in China is not uniform. Green space is defined as "a certain range of green ground or area formed by matching the environment and creating natural conditions to make it suitable for planting arbors, shrubs, and herbaceous vegetation. Public green space includes parks, street green space and other public green spaces; collective green space includes affiliated green space or residential green space in factories, hospitals, schools and other internal areas". Or "All land with plants can become green land, and agricultural, forestry and animal husbandry production land and garden lands are included in this category", which is the broadest definition of green space (Boxin 2012).

30.1.4 Characteristics of Urban Green Space

Publicity

Because of the main function of urban green space is to serve the public, publicity is the primary feature. According to different scales and functions, urban green space is distributed in different locations of the city with different service radius and different service population. It will be integrated to cover the entire urban space and serve the citizens.

Functionality

Generally, urban green space has certain functions, either single function or multiple functions, which include combination with the service facilities in the green space, provide the citizens with activity sites, facilities and corresponding service guarantees, to meet the needs of all people for rest, fitness, entertainment and so on.

Landscape

Urban green space forms a certain landscape through terrain, planting, architecture, sketch, and other elements. The use of different landscapes not only provides people with a sense of physical and mental pleasure but also adds a certain degree of interest to the activities.

30.1.5 Influence of Urban Green Space on Behavior

Because of the above characteristics of urban green space, it can play a positive role in outdoor activities, so it has become an important place for outdoor activities. The daily social, fitness, leisure, and other activities of citizens tend to be carried out in green space. Therefore, the environment and facilities provided by green space directly affect the quality and satisfaction of citizens' outdoor activities. The citizens' satisfaction with the use of green space also directly affects the elderly's willingness and frequency of travel.

30.2 Method

This paper uses data collection and field investigation as the main research methods. On the basis of data collection and analysis, the research and analysis of urban activity space in cold cities in different seasons are carried out. During the investigation, observe and record the number of different groups of people at the activity site. The activity form and the activity time were all recorded in different venues.

30.3 Urban Public Green Space

30.3.1 Classification of Urban Public Green Space

At present, there is no unified classification standard for urban green space, and the laws and regulations issued according to urban construction in China are more consistent with the classification principles used in the current research. According to the Classification of Urban Land and Standards for Planning and Construction Land, the classification of urban green space is shown in Fig. 30.1.

The green space in some residential areas is also open to the outside world, which has become an important public activity space in residents' lives; the protective green space does not assume the function of residents' daily activities. Therefore, the urban public green

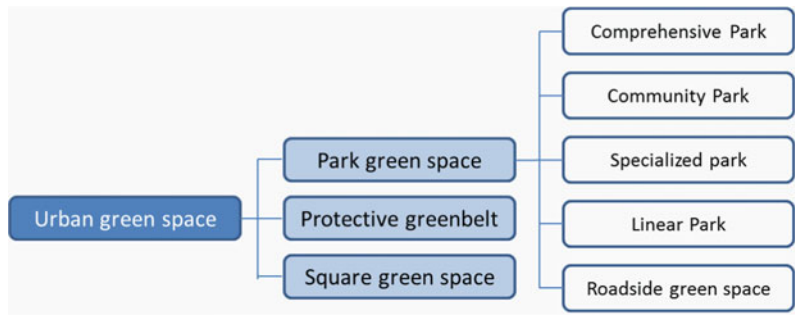


Fig. 30.1 Classification of urban green space in China

space referred to in this study includes all kinds of park green space, square green space, open affiliated green space and open residential green space (Boxin 2012).

30.3.2 Features of Public Green Space in Cold Cities

The public green space in cold cities is heavily affected by climate, ecological environment, and lifestyle. In the unique natural and cultural environment of cold cities, public green space with regional characteristics has been formed. There are different characteristics in selection, landscape, accessibility, and utilization.

30.3.2.1 Site Selection

In order to provide a good activity environment for the citizens, the public green space in cold cities is generally located in a place where cold wind can be effectively prevented in winter and natural ventilation can be effectively introduced in summer. Try to use the building layout and urban streets to create a good wind environment. At the same time, there is also a higher requirement for sunshine conditions, especially in winter, sunshine can bring great promotion to people's body and mind.

30.3.2.2 Landscape

Because there are relatively few varieties of green plants in cold cities, especially in winter, there are few evergreen plants left. It is difficult for a few evergreen plants to form a rich green landscape. In winter, it is easy to bring depression and loneliness to people. At the same time, it will also reduce the enthusiasm of citizens to participate in outdoor activities.

30.3.2.3 Accessibility

Due to frequent snowfall in winter in cold cities, ice, and snow roads are easy to form, causing traffic inconvenience. It is more difficult for citizens to reach the public green space, and the mode of transportation for public space activities may be changed from walking to taking a bus. A large number of vehicles are congested around, it also increases the risk factors for people to reach the public green space.

30.3.2.4 Utilization Rate

In winter, the night is long and the day is short in cold cities. It gets dark early and the temperature is low at night. Nightlife time is greatly affected. Therefore, most people will not carry out activities in public green space in winter evenings. Only a few people insist on some fitness activities that can keep their bodies warm. Most activities are carried out in the daytime, so the utilization rate of public green space in winter will be greatly reduced.

30.4 Requirements of Outdoor Activities with Different Activity Abilities on the Site

30.4.1 Differences and Characteristics of Activity Ability of Different Groups

30.4.1.1 Types and Characteristics of children's Activities

The types of children's activities mainly include sports activities, constructive activities, intellectual activities, and social activities, and children in different ages normally have different activities, shown in Table 30.1.

Table 30.1 Types of children's activities

Age	Activity type	Activity characteristics
3–6 years old (preschool children)	Mainly imitation games are	Need parents' company, low activity intensity, and weak regularity
7–12 years old (preschool children)	Mainly creative games	Increased autonomy, increased activity intensity, and strong regularity

Children mainly practice walking, running, jumping, climbing, throwing, and other movements in activities, mainly to exercise their bodies, improve their physical strength, flexibility, and coordination. Promote children's growth and development. In the activity space, the materials such as sand, stone, brick, and wood mostly used to build buildings, mainly to exercise their spatial imagination and building ability. The activity that children achieve the purpose of play by observing, reasoning, thinking, and judging under certain rules, these sports mainly train children's intellectual development and are carried out by children through communication or social games simulating identity, mainly used to develop children's ability to observe life, imitate behavior and communicate (Haitao et al. 2019).

In summary, children's activities mainly have the following characteristics:

(1) Accumulative: When children see other children playing, they especially want to participate in and join the other party's game. Especially for children of similar age, the accumulation is more obvious. I like playing games or playing games together.
(2) Initiative: Children play games with initiative. They experience various elements that may bring happiness in the process of play, which also stimulates children to constantly explore in the game to express their emotions and develop their own abilities.
(3) Variability: Children's activity makes them not be fixed in a certain place for a long time for a certain activity. The venue or game items are often changed.
(4) Periodicity: Children at different ages have different activity time. Infants under 3 years old are still young, so they need parents to accompany them during activities. Most of them go out during the day when parents have time; preschool children and other school-age children and adolescents are mostly engaged in after-school activities. In holidays, winter and summer vacations, the number of people participating in activities increased significantly, and most of them were concentrated from 9:00 a.m. to 11:00 a.m. and from 3:00 p.m. to 5:00 p.m.
(5) Exploratory: Children have strong curiosity, which makes them more likely to be interested in something that adults don't care about. It is easy to take risks with them and like to explore some quiet places.
(6) Attention: Once children are involved in the game, they will be very focused, but at the same time, they will also ignore some potential safety hazards.
(7) Close to nature: children like to get close to the grass, pool and mud; they like to run on the grass and play games; they like to play in the water; I like to play games with sand, wood, and stone.

30.4.1.2 Types and Characteristics of Adult Activities

Compared with the elderly and children, adults have strong activity ability they have a wider range of activities, they have more choice of activities, and have relatively tolerant of environmental needs.

The activities of adults mainly fall into the following categories, parent–child activities: recreational activities that focus on accompanying children with the core family or daily activities; recreational activities include cultural and entertainment activities spontaneously conducted by adults in leisure time; fitness-based activities normally mean leisure activities dominated by various sports, including competitive and non-competitive sports, details of adult activities are shown in Table 30.2.

Table 30.2 Types of adult activities

Activity type	Activity content	Activity characteristics
Parent–child activities	Play with children	Need to be close to children's playground
Fitness activities	Walking (walking pets), sports, etc	Long duration, requiring large space
Recreational activities	Chat, chess, rest, etc	Sunshade required

Table 30.3 Types of elderly activities

Activity type	Activity content	Activity characteristics
Leisure activities	Chat, chess, rest, etc	Long duration, no need for large space
Fitness activities	Walking (walking pets), sports, etc	Short duration, requiring large space
Cultural activities	Singing and dancing, opera, instrument playing, etc	Short duration, requiring large space

30.4.1.3 Types and Characteristics of Activities of the Elderly

The activity ability of the elderly gradually weakens with the deterioration of the ability of the perceptual system. The deterioration of the ability of the elderly's perception system is mainly manifested in the decline of the ability of vision, hearing, and touch. The decline of visual ability is manifested in the difficulty in identifying small things. Visual judgment is affected by the intensity of light. The decline of eye regulation leads to "presbyopia" and the decline of lens light transmission leads to "night blindness". The adaptability to light and dark changes is reduced, and it is difficult to recover from glare stimulation; The decline of hearing ability shows that it is difficult to hear the whispering conversation around, and it is easy to misunderstand the meaning of others or even cause traffic accidents; The decrease of tactile ability is shown as insensitivity to cold, heat, and other sensations. In view of the above physiological changes, the indoor and outdoor venues for the elderly need to adopt corresponding physical environment and facility design to help the elderly solve the environmental discomfort and insecurity caused by their physiological decline (Xiang 2014; Guanghua 2013).

The degeneration of the nervous system in the elderly reduces their ability of reaction and memory. This will lead to problems such as insufficient emergency response capacity, difficulty in remembering and adapting to unfamiliar environments, difficulty in remembering circuitous routes, difficulty in identifying complex logo information and easy to forget their belongings. It is necessary to take account of their vulnerability in environmental design and improve the guidance system to give targeted indication information (Xiang 2014).

The degradation of the ability of the elderly's sports system is manifested in the lack of mobility, difficulty in continuing long-time sports, and unfitness to participate in a series of intense activities such as squatting and jumping. The decrease in flexibility and coordination ability is prone to accidental falls, and most elderly people are more prone to fracture due to calcium loss. This puts forward corresponding requirements for the special settings of barrier-free environment, fall prevention function, and fitness function, shown in Table 30.3.

30.4.2 Site Requirements for Different Types of Activities

30.4.2.1 Requirements for Fitness Activities

The requirements of fitness activities for venues include good ventilation, sports venues designated according to the requirements of the rules, and corresponding sports facilities; The floor material meets the needs of fitness activities; corresponding rest facilities shall be provided (Ying).

30.4.2.2 Leisure Activities

Leisure activities need flat ground and well-proportioned space size to adapt to various leisure activities of different number of people; sufficient rest facilities are needed around the site so that citizens can rest at any time.

30.4.2.3 Cultural Activities

The requirements of cultural activities for venues are often to have a relatively large size, without affecting the main traffic flow lines, and to be able to provide rest seats around the venue to provide a place to watch cultural activities, forming a space similar to an outdoor performance venue.

30.4.2.4 Children's Construction Activities

The demand for children's construction activities is that space and facilities should be closely combined to form colorful space changes combined with amusement facilities to provide children with interesting amusement experiences. At the same time, there should be site facilities suitable for construction activities, such as sandpits, platforms, etc. It is better to have clean water facilities can be provided to facilitate children's cleaning after playing.

30.4.3 Demand for Urban Public Green Space in Different Seasons

30.4.3.1 Demand for Urban Public Green Space in General Seasons

In cold cities, the general season refers to other seasons except winter. In the general season of cold cities, the weather is relatively warm, the wind is small, and the environment is suitable for outdoor activities. Therefore, the site space needs more greening to improve the ambient air and improve the aesthetic quality of the environment.

30.4.3.2 Demand for Urban Public Green Space in Winter

The winter in a cold city is the longest in four seasons. It usually lasts for 5–6 months, accounting for about half of the whole year. Therefore, the demand for urban public green space in winter occupies a pivotal position. In winter, because the weather is cold and the wind is strong, the space's ability to block wind and snow and good sunlight and lighting conditions are important means to improve the use experience of outdoor activity sites. Therefore, the space should try to reduce the blocking in the south direction and strive for more sunshine; in the north direction, try to shelter evergreen plants at different heights to reduce the impact of cold wind (Guan et al. 2017; Shuang et al. 2014).

In addition, the use of the seasonal resources in winter to provide more venues suitable for winter activities should be fully considered. For example, large areas of activity sites are used for temporary reconstruction, and winter activity sites such as skating rinks and ski resorts are built for skating, snow ploughing, ski slopes, snow slides and other activities suitable for people of different ages.

30.4.4 Demand of Different Groups for Urban Public Green Space

30.4.4.1 Children's Space Demand for Urban Public Green Space

It needs to be close to nature and sunny in children's playground. The diversified terrain, rich elevation difference, and certain fluctuation, which can be used by children in various games, should be used in activities space. Close to the adult activity area, with unobstructed vision for parents to take care of; there are venues for simple sports activities and games; there are places and materials for children to construct.

30.4.4.2 Space Demand of Adults for Urban Public Green Space

The green space needs to be close to nature and have sufficient sunlight. And it is necessary to meet the requirements of sports venues, such as ball games, fitness equipment, circular track, etc. The space for adults should be close to the children's activity area to take care of children.

30.4.4.3 Space Demand of the Elderly for Urban Public Green Space

Beside of nature and sunny, a certain scale of flat ground is required for singing and dancing for the elderly people. It is necessary to meet the requirements of sports venues such as ball games, fitness equipment, circular track, etc.

30.5 Impact Mechanism of Urban Public Green Space on Activities

30.5.1 Impact of Openness on Activities

The openness of public green space also has an impact on activities. First of all, spaces with different degrees of openness are suitable for different types of activities, fitness, and cultural activities are relatively suitable for spaces with strong openness, and open spaces can provide viewing space for the above activities; Leisure activities, on the other hand, needless open spaces, because such activities often require a relatively quiet environment and isolation from outside interference. Therefore, a space that is too open will have an impact on activities.

30.5.2 Impact of Accessibility on Activities

The accessibility of public green space refers to the convenience of public green space from the starting place by overcoming the space resistance, and the accessibility of green space is measured by the transportation cost, space distance, and arrival time to reach the public green space. Affected by the decline of their own mobility, the elderly usually choose parks and green spaces that are close to their homes and easy to reach to participate in outdoor activities. Therefore, the location of parks and green spaces should consider the distribution of the elderly population within the administrative divisions of each city. The location of urban parks and green spaces should be located in the densely populated areas of the elderly, so as to facilitate the travel of the elderly and ensure that their needs for daily outdoor leisure activities can be met. Secondly, the distribution of urban parks and green spaces should also be coordinated with the urban public transport system, and urban transport authorities can also be called on to increase bus routes and train numbers to meet the travel needs of older people who are far away.

The planning and site selection of urban park green space is also one aspect of improving the accessibility of external traffic, which should be reasonably determined according to the service radius of the park's own type. The service radius of the green space in the comprehensive park is usually about 2 km. The main service object of the community park is the elderly in the community. The service radius should be controlled at about 500 m to ensure that the elderly living in the surrounding community can arrive in the shortest time. The special park has specific functions. It should provide services for the elderly according to different functions. The service radius is usually limited to 1 km. Garden is a common patchy green space in the city, with a service radius of about 300 m.

First of all, ensure the smoothness of the park green space road. The choice of pavement materials should be smooth, anti-skid, and well-drained to prevent the road from ponding or freezing after rain and snow. It can also be used to pave the pavement of pedestrian roads with a variety of materials, such as laying pebbles in the middle of the road and laying bluestone slabs on both sides. Secondly, the square of the park and other main activity sites should be as close as possible to the main entrance of the park and the main park road, so as to reduce the physical barriers between sites. The physical barriers between sites are caused by unreasonable landscape design. On the basis of meeting the use habits of the elderly, we can pursue the curve beauty of the landscape, reduce the use of steps and ramps with large slope angles, and also take into account the needs of some special elderly

groups. Barrier-free passages should be set up at the steps and slopes to facilitate the travel of the elderly in wheelchairs.

30.5.3 Impact of Spatial Richness on Activities

Spatial richness includes the richness of space type, size, function, combination relationship, etc. The richness of space type determines the richness of activities that can be carried out in the space. More space types can host more types of activities.

Space types include open space, enclosed space, and enclosed space. Different types of spaces are suitable for different types of activities. The combination of different types of space can also form a composite space.

The richness of space functions refers to the extent to which space can be satisfied among the functions of leisure space, sports space, game space, and entertainment space. There are many ways of spatial combination, such as adjacent type, enclosed type, tandem type, etc. Different spatial combination relations are suitable for different intergenerational relations. Adjacent type is suitable for intergenerational relationships with self-care ability, such as adult children and parents acting separately at the same time; Enclosing type is suitable for intergenerational care, as shown in Fig. 30.2.

30.5.4 Impact of Landscape Diversity on Activities

Due to the influence of climate, there are relatively few plant varieties that can grow in cold cities, and the amount and richness of landscape greening in winter are much lower than those in southern regions. The winter in cold cities is long and the outdoor temperature is very low, so the diversity of landscape has become one of the few factors that can attract people to outdoor activities. The various forms of outdoor landscape can improve the citizens' willingness to participate in outdoor activities to a certain extent (Haitao et al. 2019).

The landscape can also improve the microenvironment of public green space through the allocation of green plants and facilities, such as temperature, humidity, brightness, illumination, sound pressure level, and air quality. Therefore, a variety of landscapes and facilities suitable for the environment can be set up according to the space in different locations, which can improve the comfort of the activity, thus improving the space quality, and indirectly improving the enthusiasm of participating in the activity.

30.6 Micro-Renewal Strategy of Urban Public Green Space

30.6.1 Micro-Renewal Trend Based on Climate in Severe Cold Regions

(1) **Windproof Measures**

As the cold wind force in winter is relatively strong in severe cold areas, and the windbreak effect of tall trees after falling leaves in winter has been weakened to varying degrees, the cold wind in winter has a significant impact on the activities of public green space than in other seasons. It brings inconvenience to outdoor public activities in winter. It further affects the enthusiasm of

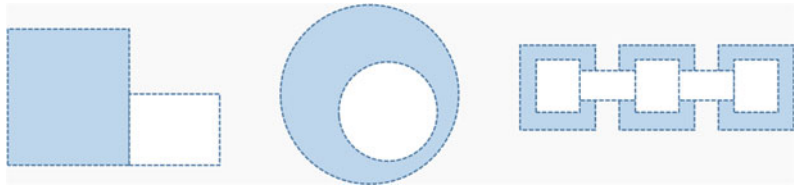


Fig. 30.2 Schematic diagram of spatial combination relationship

people to use public green space in winter. Therefore, certain winter wind protection facilities should be added to the public green space.

Wind protection facilities are mainly divided into two categories: natural wind protection and artificial wind protection. Natural windbreak mainly refers to the use of terrain, trees, rocks, and other shelters in the natural landscape to provide windbreak measures for the activity site. Artificial wind protection facilities mainly refer to providing wind protection and shelter for the activity site through manually constructed buildings and structures. Whether it is artificial or natural windbreak, it should be implemented in combination with architectural design and landscape design.

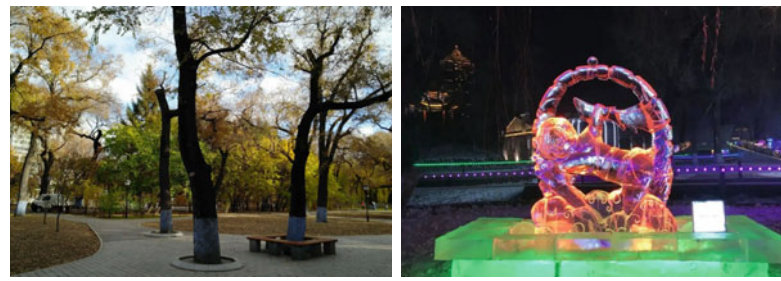
(2) **Rest Facilities**

The rest facilities are important auxiliary facilities in the public green space, and they are an integral part of activities. Perfect rest facilities can effectively enhance the experience of activities, help extend the time of people's activities, and also ensure the healthy conduct of activities. Therefore, people's enthusiasm for activities has been greatly improved. At the same time, different spaces can be separated and connected by using the rest area, so the setting of rest facilities is also the node of space combination.

(3) **Convert Activity Types Based on Season**

Due to the low temperature in winter, frequent snowfall, and short sunshine in cold cities. If we want to maintain the utilization rate of public green space, we need to convert the content of activities in winter. It is necessary to make full use of the climate conditions in winter to convert urban green space into white space, which meets the requirements of winter activities and meets people's physiological and psychological needs for activities.

In cold cities, the snowfall in winter itself is a negative factor for outdoor activities, but people living in cold areas for a long time gradually learn to use ice and snow to carry out various winter sports activities. Gradually transform it into winter-featured activities and favorable factors. It not only forms a good winter landscape to make up for the lack of green plants but also provides many types of winter outdoor activities. For example, Harbin Zhaolin Park uses the park space to hold ice lantern fairs in winter, as shown in Fig. 30.3. While providing ice and snow landscape to show the art of ice and snow, ice and snow fitness activities such as ice slides, snow plowing, and ice rafting are also provided. As shown in the figure. For another example, Harbin Xiangjiang Park uses the slopes in the park as different activity sites in different seasons. In winter, it can be used as a snow slope for children's play of snow ploughing and snow slide. In other seasons, you can plant grass on the slope for different outdoor green activities. As shown in Fig. 30.4. Qunli Sports Park will use the park site to build professional ice rink, ice rink, youth skating rink, snow football field, ice and snow entertainment field and other areas in winter. After completion, they will be open to the public free of charge, as shown in Fig. 30.5.



(a) Summer (b) Winter

Fig. 30.3 Function conversion of Harbin Zhaolin Park in summer and winter

(a) Autumn (b) Winter

Fig. 30.4 Function conversion of Harbin Xiangjiang Park in autumn and winter

30.6.2 Inclusive Micro-Renewal Countermeasures of Urban Public Green Space

30.6.2.1 Overall Planning

We should grasp the overall layout of public green space according to the upper level planning in the region. As a whole, different types of public green spaces have different functional priorities, and the functional priorities of each public green space should be improved and transformed.

30.6.2.2 Moderate Reconstruction and Local Renewal

Try to save money and reduce the impact on the surrounding environment. Get more support for outdoor activities at the minimum cost, improve the microenvironment, enrich the types and functions of activities, and use microtransformation to improve the inclusiveness of the environment.

30.6.2.3 Adjust Measures to Local Conditions and Combine Regional Characteristics

Make use of the existing conditions, make necessary changes according to the characteristics of the environment, give full play to the inherent attribute advantages of public green space, and create value for the environment through microtransformation. In combination with the environment and climatic characteristics of cold cities, provide a suitable environment for different seasons, and use the landscape and.

30.6.2.4 People-Oriented and Resource Sharing

To study the needs of different groups, provide an environment, resources, and settings that can be shared and used by different groups according to the characteristics and differences of needs, so that resources can give full play to their effectiveness and serve more people, so that space can accommodate more people for activities, and

(a) Summer

(b) Winter

Fig. 30.5 Function conversion of Qunli Sports Park in summer and winter

limited resources can play a role in promoting intergenerational integration.

30.6.2.5 Diversified Functions to Stimulate Community Vitality

Functional diversification is also an important countermeasure to improve inclusiveness. The functions of the public green space correspond to different groups of people. The diversity of functions means the diversity of the service groups and also means that it carries more intergenerational and neighborhood exchanges.

30.6.2.6 Inherit Culture and Place Spirit

In the actual survey and interview, it is found that many elderly people usually take the responsibility of taking care of young children for their children when they play in the green space of urban parks. Therefore, under the conditions of hardware conditions and facilities, the park should add an old and young composite shared space. This kind of old and young composite activity space can reduce the pressure of the elderly to take care of children, on the other hand, it can enhance the emotional communication between the two generations. It is beneficial to the physical and mental health of the elderly. The

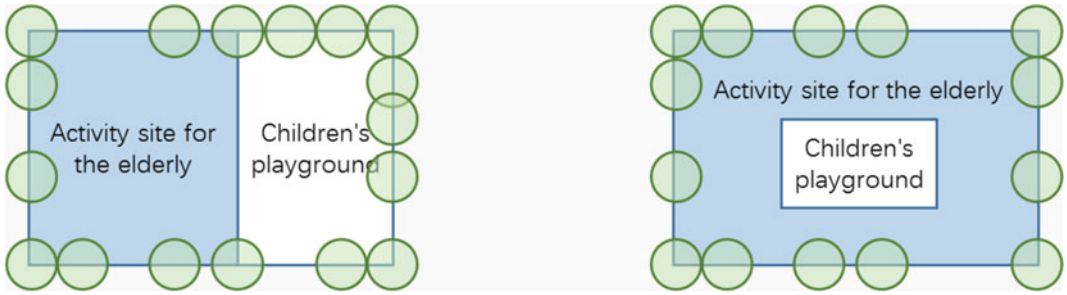


Fig. 30.6 The relationship between the elderly's activity space and children's activity space

park can be a combination of multiple spatial layout forms and a node space of the old and young. The one-way space is located on one side of the park road. Some seating facilities can be set at the edge of the children's entertainment area or the children's entertainment area can be arranged near the elderly's activity area to facilitate the elderly to take care of children's activities or the interaction between the two. In this form of space, the elderly's activity area and the children's activity area present a parallel or overlapping relationship. The multi-directional or mixed space is located at the intersection of roads in the park. The elderly's activity space and children's activity area show a relationship of inclusion and embedment. Children's interest facilities such as entertainment and fitness equipment and sand pits can be arranged in the middle of the area, while simple elderly fitness equipment, fitness trails, and rest seats can be arranged around and at the edges of the area, which can ensure that children's activities are within the sight of the elderly, It can also meet the needs of the elderly's own behavioral activities (Fig. 30.6).

30.7 Conclusion

The promotion of inclusiveness of urban public green space is an important strategy to cope with the higher demand for leisure activities of future citizens. It is necessary and possible to take micro-renewal as an important means to carry out appropriate transformation of urban green space, improve inclusiveness, give more full play to the effectiveness of external space, improve the enthusiasm of citizens, promote intergenerational integration, and improve the comfort and satisfaction of space use of vulnerable groups with weak activity abilities, such as the elderly and children.

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Frameworks for Dynamic Environments and Neurodiversity. Soft, a Deployable, Stress-Relief and, Adaptive Safe Space

31

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Abstract

The paper presents the overarching principles, the methods employed, and the preliminary design process for the in-progress project titled *Soft. Soft* is a deployable, adaptable prototype for self-regulation positioned at the intersection of interactive technology, digital health, and inclusive design. During the last four decades, emergent theories of the mind, human experience, and computational design have shed light on the potential of dynamic environments. Soft examines the role dynamic environments and can play in redirecting our built environment relationships around the overlooked issue of neurodiversity. How do we design, for whom, and with whom? Soft is a multi-phased project under development by an interdisciplinary team of architects/academic researchers collaborating with medical experts, computer and bioengineers, neurodivergent individuals, self-advocates, and their caregivers. In asking how and where we greet differences, make individuals comfortable, and integrate everyone into the fullness of our systems of choices, the work presented is a vessel for recommendations for various contextual typologies and overlooked experiences. The paper has a dual role; first, to explain the development of Soft as a spatial product that responds to the needs of neurodivergent individuals and second, to put forth a larger research framework that addresses design for inclusive environments. In testing methodologies and technologies in unexpected ways, the project's framework addresses the need for our spaces to leverage conditions of perceptual differences to catalyze change and meet the needs of the neurodiverse population, with proven benefits for the neurotypical. The proposal's vision, as explained under the introduction and frameworks sections of the paper, aligns with seven of the UN's Sustainable Development Goals (SDGs).

Keywords

Inclusive design · Dynamic environments · Sensory design · Biometric feedback

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31.1 Introduction

31.1.1 The Crux

Currently, over 3.5 million people in the U.S. have an autism diagnosis, and roughly 1% of the global population is on the spectrum of autism.[1] Conditions such as autism, ADHD, dyslexia, dyspraxia, and others can affect how people process sensory information, limiting accessibility to the built environment and obstructing—practically and psychologically—their participation in daily objectives as learners and workers, parents, or in other life roles. In alignment with UN's Sustainable Development Goals (SDGs) 3 and 10—*promote well-being for all* and *reduce inequalities*—environments designed to support neurodivergence, with proven benefits for the neurotypical population, can also help everyone's integration into the fullness of our systems and promote quality of life and wellness for all.

We believe that in difference lies potential. It is pivotal to the design discipline to examine neurodiversity as a force of opportunity in rethinking our spaces. In framing novel design methodologies, we explore opportunities to leverage conditions of perceptual and neurological differences to catalyze change and meet the needs of neurodivergent populations. In referencing the UN's 9th SDG, *innovation and infrastructure*, this work also points to the need for a significant transformation in how we view our often-disabling spaces and celebrate and strengthen alternative perceptual models in our civic structures.

The paper has a dual goal; first, to put forth a broader research framework that addresses design for inclusive environments and the critical role of architecture in engaging the UN Sustainable Development Goals (SDGs), and second, to explain the development of *Soft* as a spatial product and a research prototype that responds to the needs of neurodivergent individuals.

[1] Centers for Disease Control and Prevention. 2021. "Data & Statistics on Autism Spectrum Disorder." Centers for Disease Control and Prevention. January 5, 2022. https://www.cdc.gov/ncbddd/autism/data.html.

31.1.2 Embodiment and Enaction: Dynamic Environments of Inclusion

The work presented in this paper is based on scholarly research that unfolds the dynamics observed between scientific methods on cognition and design processes. The theories of human cognition shed light on how the human brain functions concerning its perceptual and neurological processes. Among such theories, the enactivist theories of the mind[2] are most relevant to this paper in describing cognition as a mental function that arises from the dynamic interaction of an organism with its environment (Thompson 2004, 381–398). Enactivism emerged in the second half of the twentieth century from *ecological psychology*[3] and *connectionist psychology,* which have played significant roles in the rise of embodied cognition theories pertaining to the phenomenological tradition. The terms "enaction" and "enactive" are attributed to Francisco Varela, Evan Thompson, and Eleanor Rosch in *The Embodied Mind* (1991). *The Embodied Mind* is influential to the design realm in its effort to place first-person experience at the cutting edge of "the new sciences of mind" (Menary 2010; Rowlands 2013). These theories have been critical in defining the research methods behind the interactive design project, *Soft*, presented in this paper.

Historically, in the sciences of the mind—psychology, neuroscience, cognitive science, and artificial intelligence—and the design realm, the interdependence between reasoning, perception, and embodiment enriched their original scope. As neuroimaging studies document, our sensory

[2] The concept understands mental faculties to be embedded within neural and somatic activities and to emerge through actions of the organism (Gefter 2018).

[3] Ecological Psychology is an embodied, situated, and non-representational approach to cognition pioneered by J. J. Gibson and E. J. Gibson. Connectionist psychology also sets perception as an extended process involving organisms in motion through their environments and hitherto has played an important role in shaping the embodied turn.

modalities are interconnected and encompass the activation of motor, somatosensory, and emotion-related brain networks (Robinson and Pallasmaa 2015, 164–165). In embracing the unknowns of perception and intuition while including the body, this project aspires to offer a valuable resource for the future of the design disciplines regarding dynamic environments with elasticity designed for all. Environments manifest the capacity to respond to various sensory and perceptual models, call for more intuitive relations and address embodied interactions with the world around us.

31.1.3 Project Soft: A Case Study for Responsive Environments and Neurodivergence

Project *Soft* explores technology and dynamic environments' role in resolving perceptual conflicts and redirecting implementation and evaluation methods. Adults and, more so, children with autism frequently seek out smaller, sensory-friendly spaces to help them self-regulate. The project is an adaptable interior environment of approximately 12' by 12' by 13' in height that meets this need while providing the spatial variability often lacking in public and private spaces.

Using non-invasive technologies, *Soft* examines how purposefully modifying sensory aspects of an interior environment—such as the effect of color, light, and sound and their wavelength, frequency, brightness, and oscillation—can affect occupants' physiological and psychological states within a space. The prototype also incorporates body pressure pockets to modulate intensity, frequency, and topography of pressure in proportion to respiratory rate. The project's goal is to establish a series of spatial parameters that serve as a scaffold and then customize based on the individual, with continuous, real-time adaptation taking place dynamically. The project's ultimate deployment regards a networked technology applicable to various interior spaces, scales, and occupants.

Project *Soft* is developed in multiple phases, with this paper addressing the overarching principles and vision of the project, the methods employed to date, and the preliminary design process. This multi-phased project is under development by an interdisciplinary team of two leading architects/academic researchers as part of the *Synesthetic Research and Design Lab* (SR&DL) they direct at the College of Architecture and the Built Environment, Thomas Jefferson University in collaboration with health experts, computer and bioengineers, textile and industrial designers, advocacy groups, neurodivergent individuals and their caregivers.

The *Synesthetic Research and Design Lab*, SR&DL, is a collaborative research-design platform where interactive design, art, digital culture, and emergent health sciences meet. The lab develops practical and theoretical methodologies that critically frame the interactions between humans, objects, and environments under the scholarly underpinnings of embodied cognition. The lab collaborates with the Jefferson Health Center for Autism and Neurodiversity, the Occupational Therapy and Neurology Departments at Thomas Jefferson University, and the University College Dublin Inclusive Design Research Centre of Ireland in partnership with SMARTlab teams in Dublin and Cahersiveen, Ireland, and Niagara Falls, Canada. It also partners with self-advocacy communities and industry experts to build collective knowledge addressing the all-inclusive ways of perceptually experiencing our spaces. The work presented in this paper is a vessel for interdisciplinary recommendations for various contextual typologies and overlooked experiences.

31.2 Materials and Methods

31.2.1 Frameworks for Cross-Disciplinarity and the Lived Experience

Cross-disciplinarity and lived experience are the guiding principles in creating various workflows

and platforms for collective thinking and information sharing. As part of the authors' research lab, the following events and collaborations have been instrumental in shaping the *Soft* project design framework.

Symposia A series of cross-disciplinary international discussions have been organized in the form of yearly symposia on the theme of "Neurodiversity and the Built Environment" (*Building Community*—Fall 2020, *Immersive Experiences*—Fall 2021, and *PlaceMaking*—Fall 2022 are the focused themes for each of the years up to date). The discussions involve voices from diverse cultures across the globe. They include notable architecture practitioners and scholars, medical experts, population health scientists, neuro aestheticists, computer scientists, educators, writers, autistics, parents, autism advocates, and the tech industry. In these international forums, the discussions and actions presented cover a range of scales and goals addressing, more or less directly, seven of the UN's SDGs. These are *good health and well-being*, *quality education*, *gender equality*, *decent work, and economic growth*, *innovation and infrastructure*, *reduced inequalities, and strong institutions*.[4] The range of ideas and approaches varies, from presentations that address strategies for equitable employment opportunities (UN's SDG 8) to infrastructural equity (UN's SDG 9), to equitable quality education (UN's SDG 4), and more.[5]

Academic Design Studio An advanced interior design studio is shaped as part of a new studio design teaching sequence. From the Fall of 2020 to date, the design studio has been partnering with different community agents and educational programs for neurodivergent students and self-advocates to develop a novel glossary of spatial experiences that celebrate differences and the wide needs of the human spectrum. These partnerships align with the UN's SDGs goal 16 in building effective, accountable, and inclusive institutions at all levels.

Exhibitions Publications and internationally exhibited experimental installations[6] positioned in the intersection of interactive design, art, digital culture, and emergent health sciences have been developed. These provide feedback and applied knowledge for the technological and sensory systems employed to develop project *Soft's* hypothesis.

Collaborations The development of project *Soft,* to date, is being supported by a neurologist, co-director of the *Center for Neurorestoration,* and a lead Research and Development engineer involved in a Brain-Computer Interface for Stroke Clinical Trial from within our academic institution, Thomas Jefferson University in Philadelphia. An electrical and computer engineer from Temple University in Philadelphia specializing in bioengineering is involved in integrating the sensor and biometrics recording systems.

From within our academic institution, a pediatric nurse practitioner, associate director of Nursing Research at the *Jefferson Center for Injury Research and Prevention,* and a developmental and behavioral pediatrician, director of the *Jefferson Health Center For Autism and Neurodiversity,* together with an occupational therapist from the *Department of Occupational Therapy*, College of Rehabilitation Sciences, are also collaborators to the project in supporting the creation of a diverse focus group of neurodivergent individuals. Additionally, in communicating post-occupancy surveys to the focus group of non-verbal, autistic individuals with the use of reading board technologies, their team is developing.

Our current focus group for feedback and assessment consists of a nonverbal young man with AS, a verbal young man with AS and medical conditions, a verbal young woman with

[4] Refer to UN Sustainable Development Goals (SDGs) https://sdgs.un.org/goals

[5] Refer to the recorded presentations and full programs for these annual events: https://www.Jefferson.edu/NeurodiversitySymposium. "3rd International Neurodiversity & the Built Environment Symposium: PlaceMaking," Thomas Jefferson University, accessed December 1, 2022, Jefferson.edu/NeurodiversitySymposium.

[6] The multisensory, interactive, traveling installation *Synesthesia* is a recent project by the *SR&DL* and was conceived as part of the lab's ongoing research agenda. SR&DL. "SynestheticDesignLab." Accessed December 3, 2022. https://www.synestheticdesignlab.com/synesthesia.

AS, an adult woman, an architect with AS and OCD, an autistic adult who uses they/them or he/him pronouns. The selection is based on various differences, abilities, ages, medical conditions, and gender/sexuality. We aim to expand this list to eight individuals as a beginning point.

The project acknowledges that the neurodiversity of voices—across gender, sexual orientation, and diverse abilities—is key in absorbing the growing, bottom-up support networks and the increasingly powerful self-advocacy voices that are vital partners in shaping our spatial visions. In alignment with the UN's SDGs goals, 5—*gender equality*—and 10—*reduced inequalities*—respectively, architecture, intersectionality, and the neurodiverse experience are inseparable in creating inclusive futures that move from awareness and acceptance to celebration and pride. The project explores interaction as valuable design phenomena, of soft disciplinary borders and wider fields of knowledge.

The conceptual development of the project is supported by a 2021–2022 completion grant from the *Research Office* and a 2022–2023 seed grant from the *Center for Smart and Healthy Cities* of Thomas Jefferson University. For future phases of the proposal, further funding opportunities will be sought.

31.2.2 Project *Soft*: Design Aspects

In employing the term *Soft,* the project drives inspiration from three primary references. First, project *Soft* investigates the use of firm combined with flexible materials to explore soft, tactile, and flexible spatial imaginaries. Second, *Soft* engages the notion of *bodily*—of the body—attributes in syntony with Friedrich Kiesler's ovoid-like Endless House (1947–1960), conceptualized as an adaptable microcosm of human development based on the metaphor of the womb as a safe space. The third reference weaves in Nicholas Negroponte's *Soft Architecture Machines* and his inquiry on the disciplinary boundaries of the architect as a professional and the reconsideration of the occupant as an active participant in the design process via computer-aided operations.

Project *Soft* develops its research and design inquiry into two distinct realms: a physical and a virtual/responsive. Both can be evaluated independently at first, converging into one integrated solution.

Magda Mostafa's autism ASPECTSS™ design index[7] has guided the project's design decisions. Notably, the "*sensory zoning* index" is referenced in more detail in this paper and about the project's "responsive system." In contrast, the other index points are referenced for the physical and morphological systems at play.

31.2.2.1 Physical System: Firm Versus Soft Matter

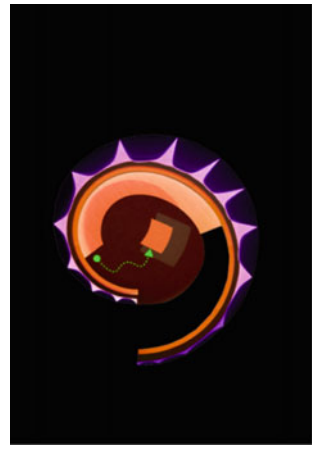
From a physical, material, and morphological consideration, project Soft is measured by the principal design operations outlined below.

Memory and material research We think of *soft* architecture as a place in which memory defines structure. The lines dividing the interior and exterior are diffused, creating an uncanny relationship between organic forms and manufactured materials. We associate *soft* architecture also with material characteristics—yielding readily to touch or pressure; deficient in hardness; smooth; pliable; and malleable. The project is iterating on large-scale steam-bending wood techniques to achieve complex space curvatures in combination with textile and tensile interior moments to create a hybrid environment for various tactile needs.

Transitional entry sequence Project *Soft*'s curvilinear, nature-inspired geometry and tectonic language create a smooth transition from a larger space into its soft interior (Fig. 31.1a).

Variability and Flexibility Soft provides options for users with various needs. The project is inclusive of multiple ergonomic factors; it

[7] "The Autism ASPECTSS™ Design Index is the first set of evidence-based design guidelines worldwide to address built environments for individuals with Autism Spectrum Disorder. It was developed over a decade of research and consists of seven criteria proposed to be facilitative for ASD design. It is used as both an assessment and design development tool. The index refers to Acoustics, Spatial Sequencing, Escape Space, Compartmentalization, Transitions, Sensory Zoning, and Safety." (Mostafa 2015).



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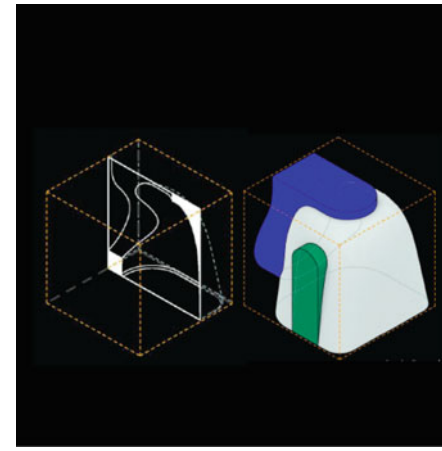

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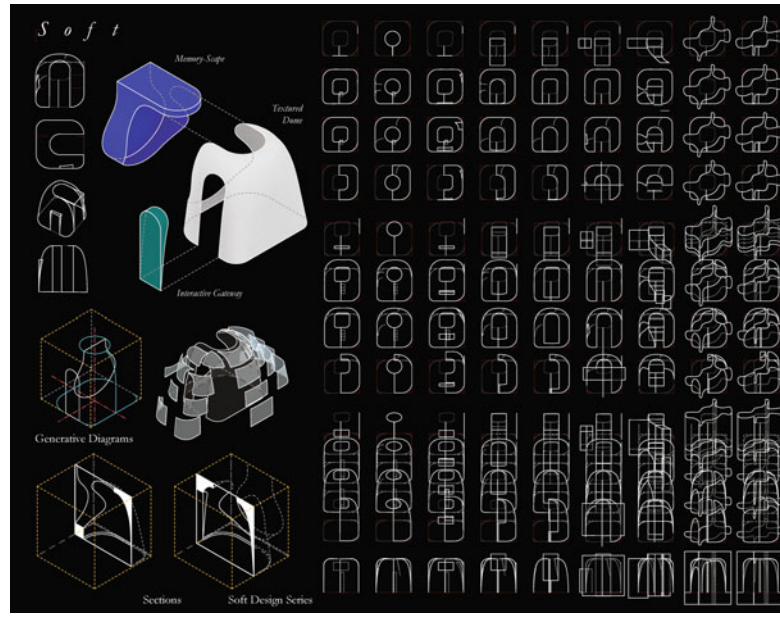

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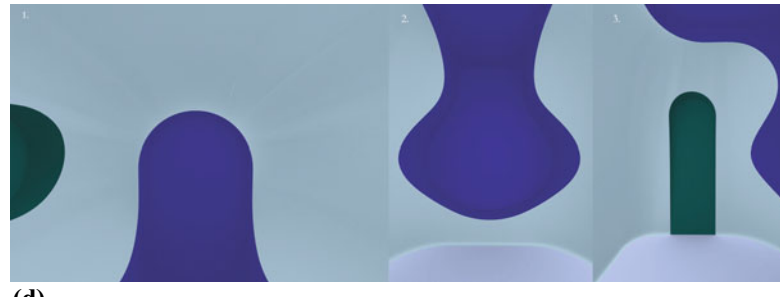

(d)

Fig. 31.1 **a** Project's *Soft* design approach as a standalone space (approx. 12' by 12' by 13' h) within a larger context. The planar diagram indicates a smooth transition zone from the larger space the prototype is placed into its soft interior. **b–d** Project's *Soft* early design iterations for integration within a typical existing exam or calm down hospital room (approximately 10' by 10'). Perspective views showcase various concepts for microzones: a textured dome, a memory scape, and an interactive gateway, respectively. All iterations are based on feedback from ASD advocacy groups and health experts. Currently, the first stand-alone option is under fabrication and further development

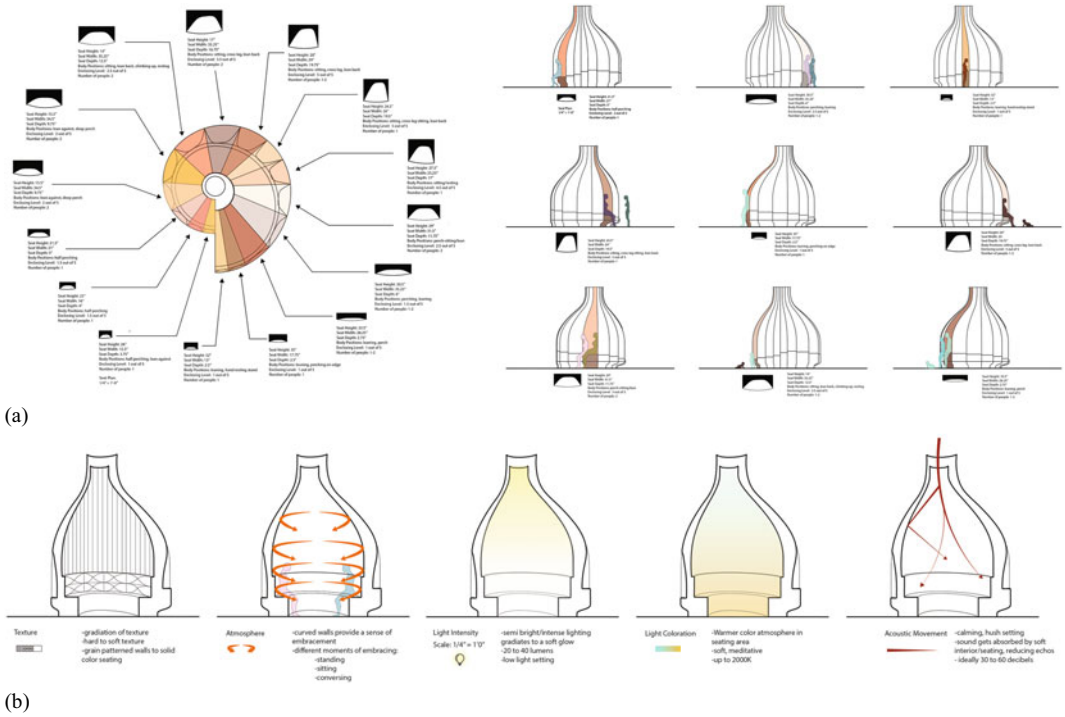

Fig. 31.2 Project's *Soft* design iteration as a stand-alone space within a larger context, **a** Project's *Soft* planar and elevational diagrams indicate provision of variability and flexibility aspects, via various microzones, resting options, and intimate nooks inclusive to various ergonomic factors, **b** Environmental aspects dynamically adapting in real-time in response to body-based biometrics

provides flexibility and variability via various microzones, resting options, intimate nooks, and the ability for the individual to organize various components of the interior space, such as movable furniture pieces (Fig. 31.2). It, therefore, provides multiple, nested scales within its larger approx. 12' curvilinear footprint that progressively narrows as it develops vertically. Its geometric composition, gender-neutral material finishes, color, light, texture, acoustics, and overall detailing follow evidence-based research to provide multiple options and space personalization.

Deployability Efficiency in fabrication can ensure an automated, cost-efficient construction and assembly process. Its fabrication method entails a construction based on detachable pieces for easy placing and dismantling, making it viable for various environments. *Soft* is scalable, variable and serves several contexts, such as sensory-loaded lobbies, hospitals' calm-down spaces, and, oncology units, amongst others.

Adaptability The inclusion of responsive design components regulates the environment via biometric input. The research evaluates the impact of the designed overall geometry, materiality, and acoustics to provide options to its users in their self-regulation process.

31.2.2.2 Responsive System: Dynamic Matter

Soft is an encapsulated environment where neurodiverse individuals can safely retreat when overwhelmed or overstimulated. Unlike other notable work in this field, we seek to use distant-to-the-body technology to adapt the environment in real-time in response to body-based biometrics. Closed-loop biofeedback is a well-established concept in which an individual's biomedical data is used to modify external

stimuli in real-time to achieve a desired outcome. Biofeedback-mediated relaxation techniques have shown benefits for sufferers of migraines, ADHD, and anxiety. Our methodological goal is to create a reactive environment that can assess an individual's sympathetic nervous system activation levels and respond by intelligently modifying their environment to soothe, calm, and relax.

To date, our team has conducted a literature review and feasibility study for the placement of sensors and interactive electronics in a neuro-protective space. We have looked at existing such spaces and studied their choices of instrumentation. We have also looked at over-the-horizon sensor technology that may become feasible to integrate in the medium term. We have also researched a scientifically backed set of surveys and test instruments that can be used for assessment. In alpha-testing the ideas, we are creating basic proof-of-concept tabletop demos to integrate them with the physical structure at a later phase. The idea is to work closely with focus groups of neurodivergent individuals to test the surveys and our test instruments and get feedback on the proof-of-concept demos.

Biometric Recordings There are many biometric measurements that can reliably yield actionable information on an individual's level of stimulation. Heart rate variability (HRV), galvanic skin response, and body temperature are the most reliable. Heart rate variability measures fluctuations in beat-to-beat duration, which can change when an individual becomes scared, nervous, or anxious. Increasing heart rate typically suggests an adrenaline-mediated fight-or-flight response (Ihmig et al. 2020; Persiani et al. 2021). Galvanic skin response (GSR) measures the skin's electrical impedance. Skin impedance tends to decrease in response to elevated emotional arousal due to changes in sweat gland activity (Persiani et al. 2021). Rapid changes in body temperature are also linked to fear or anxiety-based physiological reactions. These changes are most commonly related to changes in vasoconstriction (Tattersall 2016; Chudecka and Lubkowska 2018; Lin et al. 2019). Brain activity is also used to assess the mental or emotional state, typically in the alpha band (8–12 Hz) (Bower et al. 2019; Higuera-Trujillo et al. 2020). Pupil dilation is yet another potential indicator of aroused emotional state (Higuera-Trujillo et al. 2020). Movement-based activities such as fidgeting, tapping, or rocking are also signs of emotional self-soothing (Essary et al. 2020; Motti 2019; Munir and Takov 2022; Park et al. 2020; Reinecke et al. 2020; Ringman and Jankovic 2000).

In principle, each state can be used separately or in combination to drive a closed-loop biofeedback system. The system would then modulate environmental factors such as lighting, sound, temperature, or movement to elicit biometric recordings suggesting reduced emotional arousal. However, this ideal model is limited by several practical aspects. The most substantial of these is the ability to acquire biometric signals without directly placing electrodes on the subject. Each biometric recording would typically require one or more electrodes placed in direct skin contact. For example, electrodes placed on the chest (a direct measure of cardiac muscle electric fields) or the hands or wrists (electrically or optically measuring changes in blood flow) measure heart rate. Recordings of brain activity require a minimum of two electrodes, touching on or around the scalp; specific sensor location significantly impacts signal validity.

Some measures, such as temperature or movement, can be taken without direct body contact. However, even in these cases, sensors must be appropriately located and calibrated. For example, while hand-held, non-contact skin temperature sensors are commonly used in healthcare environments, they still require a human operator to aim, trigger, and read the measurement. Likewise, movement sensors such as pressure or visible-infrared hybrid cameras must be located in areas with consistent and unobstructed access to the individual under measurement. Therefore, a degree of automation is necessary even for non-contact measurements.

Another layer of complexity necessitated by the proposed work is that sensor systems should be constructed from off-the-shelf technology

whenever possible. Commercially available sensors have the advantage of being packaged and calibrated for use with standardized connections, power, and data transfer protocols. While certain remote-sensing technologies are in development, it would be impractical to integrate them into a production-quality system like what we are currently designing. For example, researchers are studying whether high-sensitivity video recordings can be used to measure heart rate based on subtle changes in face color as the heart pumps blood through the body (Barbosa Pereira et al. 2018; Wang et al. 2018). Despite promising initial results, such lab-based systems typically require precisely controlled environmental conditions, such as lighting and distance to the camera. Variations in hair, glasses, or skin tone may confound them. Consequently, any closed-loop biofeedback system we are proposing will be more robust if based on commercially available sensors whenever possible.

In this design, we pursue a partial data approach in which not all biometric signals may be accessible at any given moment. This is necessitated by the restriction that the user should not be asked to place any electrodes on their body. Instead, electrodes and sensors can be dispersed strategically throughout the environment of the prototype with the expectation that the user achieves sufficient physical proximity to them without even being aware of their presence (Fig. 31.3). For example, electrodes that are responsive to the heart's relatively strong electric field can be embedded within the fabric of a cushion or seat that the user will see as a desirable place to rest. Likewise, GSR sensors can be placed in multiple locations, such as a hand-rest, or fidget toy, and pressure sensors can be placed within the floor, seating area, and walls. One or more remote infrared sensors can be placed in elevated areas with unobstructed line-of-sight access to common seating locations in an attempt to assess body temperature.

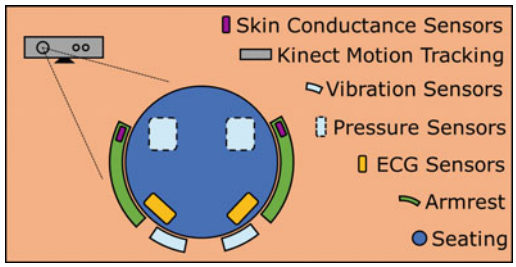

Fig. 31.3 Different types of sensors and technologies built into the environment in various scales to create different opportunities for signal measurement

By design, this strategy's expected outcome is inconsistent biometric data. The user is unconstrained from moving freely within the space; consequently, they will come in and out of contact with the various sensors. It is hypothesized that as long as some sensors can acquire meaningful data at any given time, it will still be possible to modulate the environment to reduce stress and anxiety.

A baseline system includes the sensors that produce raw data at varying rates. It is, therefore, necessary to collate and summarize data at some regular rate, likely every 1–5 s, to provide meaningful and coordinated biofeedback to the environment.

A body motion sensor, such as the Microsoft Kinect, detects body posture and movement (Essary et al. 2020). These systems typically have a broad field of view and can extract body coordinates (arms, legs, hips, head), eyes open/closed, and hands open/closed. Raw body measurements are produced between 20 and 60 times per second. These will need to be summarized into score-describing behaviors such as pacing, fidgeting, tapping, and rocking. Similarly, pressure sensors can be built into various floor and seating locations and can also be used to assess stereotypical anxiety movements.

Heart and GSR measurements within the prototype will be made via electrodes embedded into furniture, fabrics, armrests, and cushions. Heart rate estimates can generally be updated once per second and GSR measurements every 4–5 s. We will attempt to retrofit off-the-shelf touchless thermometers for body temperature measurements, although these must typically be used within 5 inches of a person's forehead.

In summary, some subset of the embedded and remote sensors will be capable of recording meaningful data that can be summarized every

1–5 s. Those data can be saved to a file and sent to a processor that determines how to modify the environmental controls.

As a preliminary phase, once the prototype is constructed, the measurements will take place upon the individual's entry to the space and in regular time intervals as mentioned above for the time duration the individual is inside the space. Another focus group will include a neurodivergent individual together with a caregiver. In exiting the space, we will conduct post-occupancy surveys and interviews with our focus groups to evaluate whether the positive spatial impact is long-lasting.

31.2.2.3 Evaluation Methods Principles

In developing our hypothesis for evaluation methods, we pose the following questions: How do we design without overtly codifying? For whom and with whom? How do we implement, and how do we continuously evaluate our frameworks? In examining possibilities of data-driven metrics to evaluate a design environment, on the one hand, the space has the capacity to sense and respond to accommodate a set of comfort thresholds for the human body. The human body serves as the entity being measured to evaluate an environment and inform design decisions. In our hypothesis, the simultaneous employment of metrics for both the space and the body is a multilayered approach; the goal is a human–environment conversation that brings sensory aspects to the forefront.

In addition to the biometric recordings via sensor systems and a data-driven evaluation approach, we are examining methods for ethnographic impact and observational research analysis. Therefore, our evaluation hypothesis is based on mixed methods, including shaping focus groups to conduct observation sessions, interviews, and surveys. In survey methods, our research has revealed that the phrasing of questions and the semantic and social-psychological aspects are critical. Survey data are particularly affected by the respondents' sensitivity—furthermore, in the case of neurodivergent individuals—to the framework in which a question is asked.

We have reviewed survey instruments commonly used to assess anxiety, especially in youth. Such instruments measure how effectively a neuroprotective environment reduces anxiety field settings. There are a large number of survey instruments that psychologists use to assess anxiety, both for adults and children. Importantly, all these surveys measure an individual's overall anxiety level over months. They are not designed to determine whether an individual is having an acute stressful episode. Also, surveys are rarely used in a standalone capacity. Psychologists integrate personal observations with results from numerous tests and surveys to generate an overall assessment of anxiety. One child psychologist we interviewed suggested the SCARED survey, which consists of 38 questions ranked on a 3-point scale (Birmaher et al. 1997).

The above-mentioned combinatorial evaluation approaches, surveys, and instruments will be tested in the months to come with the focus groups, as described in Sect. 2.1, and within the actual research prototype that is currently under construction. The research paper presents the evaluation hypothesis the team has put forth regarding how outcomes will be measured once the focus groups physically engage in the prototype space.

Considering the challenge of finding resources and ensuring funding, the project has been structured in multiple phases. The paper presents the overall project's vision and the development of current methods to get feedback from a larger audience and possibly expand its reach of collaborators while the project enters its prototype construction phase and proof of concept.

In a future phase, and before the working prototype gets deployed to various contexts, the goal is to study the resulting environment as a research platform, thus redefining, as needed, the research that drove the initial design decisions of the project's outline. With that, we will conduct a post-examination analysis of the prototype built.

31.3 Conclusion

As architects and designers, we need to interact with more potency and contribute more effectively to the cultivation, preservation, and claim to dignified space. The *question of inclusion* has no one answer, but the methods and framework established in the *Soft* experiment can be used to promote integration and implement change. This work—a physical prototype and a framework for inclusive design—responds to the ongoing, overlooked critical issues of access, safety, and comfortability and our current spatial reality that constitutes edges and exclusions for various sensory perceptual models.

The research trajectory of this work in progress must be manifested in a cross-disciplinary realm. In mapping flows of knowledge, as well as importing and exporting concepts, operations, tactics, and methods traditionally in the periphery of the design field, we stand for dialectical design thinking. All agents involved in making our built environments are encouraged to think about how our proposals could be attuned to the environment by interrogating the theories of what architecture does for society and the life after architecture. It also actively expands architecture's ideological and critical role in creating multivalent environments that embrace diversity.

With *Soft,* we ask: How do we, as practitioners and theorists of the design disciplines, advance the efficacy of our engagement in inclusive spaces without resorting to an overtly codified set of practices that can still reshape our environments and ultimately change the way we work? Malleable, flexible, and adaptable contexts that provide options while keeping a certain structure represent more diversity and reality on the spectrum.

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Part V
Age

Design Process Suitable for Elderly Person

32

Julia de Oliveira Marques
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Abstract

The aging process, considered a global phenomenon, is on the recent agenda of the *Decade of Healthy Ageing 2020–2030* (WHO World Health Organization (2020) Decade of healthy ageing: plan of action. https://www.who.int/publications/m/item/decade-of-healthy-ageing-plan-of-action) and aligned with the *Sustainable Development Goals* (WHO World Health Organization (2018) The global network for age-friendly cities and communities: looking back over the last decade, looking forward to the next. https://apps.who.int/iris/handle/10665/278979). Considering the importance of the environmental context for the process of aging, Environmental Gerontology seeks to describe, explain, modify, and optimize the relationship of the older people with their spatial surroundings, exploring the influence of the environment on the aging process (Wahl et al., Gerontologist 52:306–316, 2012). The configurations of the cities and housing can harm or facilitate the aging process. In many developing countries, the aging process must be analyzed from the perspective of economic, racial, and gender inequality. The conditions of aging are not only just products of individuals' personal choices but also of social and economic determinants. The *Global Age-friendly Cities Guide* (WHO World Health Organization (2007) Global age-friendly cities: a guide. https://apps.who.int/iris/handle/10665/43755) establishes the importance of planning urban environments that are more friendly to older people, especially considering their participation in decision-making. An age-friendly city seeks to encourage active aging by optimizing opportunities for health, participation, and security. Therefore, cities must adapt their structures and services so that they are more accessible and inclusive. For those solutions to be as effective as possible, the participation of the elderly person in the design process is necessary. In this way, the design process must also be adequate. The objective of this article is to emphasize the importance of environmental adaptation projects for elderly individuals and especially the development of design processes that are suitable for their participation.

Keywords

Aging process · Design processes · Environmental adaptation

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32.1 Introduction

Adequate housing for older people is an important factor for active and independent aging (WHO 2018). Due to the aging process, a worldwide phenomenon, today's society has many elderly individuals living alone or with other elderly. Cities and housing must be prepared for this new population configuration, and so architects and engineers must be prepared to deal with this new demand.

There are several studies about architectural design processes that highlight the procedures and efficiency of a well-done process (Fabricio 2011; Kowallowki 2011; Moreira 2011). However, few studies have focused on design processes for elderly people, and even fewer studies have considered their participation in the process.

Due to its complexity and variability, each architectural project is considered unique, and there are no precise recipes for solving the problems (Kowallowki 2011). Despite this, design processes usually follow the same development stages: understanding the problem, formulating solutions, developing solutions, and detailing (Fabricio 2011). However, when the project is aimed at elderly individuals and with their participation in its development, adaptations must also be made in the design process. During aging, many elderly people have a normal decline in cognitive abilities (Busse 2015), requiring different attention to development stages.

This article seeks to highlight the importance of environmental adaptation designs for elderly people and especially the development of design processes that are suitable for their participation.

32.2 Aging Process

32.2.1 World Phenomenon

The aging process has been a recurrent object of study in recent decades by several disciplines and areas of knowledge. Considered a worldwide phenomenon, population aging is the result of the age transition process supported by a few factors (Kalache et al. 1987). The advancement of medicine and the improvement of sanitary conditions promoted a reduction in the mortality rate and an increase in life expectancy. In parallel, there is a decline in fertility rates, with a reduction in the number of children per family. In this way, the combination of improved quality of life, increased life expectancy, and new social dynamics resulted in population aging (WHO 2018).

In many countries, but especially in developing countries, the aging process must be analyzed from the perspective of economic, racial, and gender inequality and its consequences for the individual (Mazuchelli et al. 2021). Reducing social inequality is a major challenge for governments, but since the quality of life of the individual is influenced by the conditions present throughout his life course, producing improvements in socioeconomic conditions can result in better levels of health and well-being for the population in general and especially for the elderly (Busse 2015).

Aging, whether normal or pathological, is not just the result of genetic conditions or the choices made by the individual throughout life. One must consider the economic, social, cultural, and environmental factors in which people are inserted. Inequality has an important impact on the aging process; therefore, the greater the inequality is, the more adverse its effects on people of all ages (Borim et al. 2016). Although we have technological resources to make housing more adequate, there are still major obstacles for a large part of the population. Many people live in inadequate housing, without access to the most basic services and in areas of environmental risk. Both income and place of residence inequalities are enormous (Kalache 2016).

Because of the demographic transition process, there is an increase in elderly people living alone or with their spouse, promoting an older and heterogeneous population that demands care (Busse 2015; Camarano 2016). Cities and housing, through their environmental configurations, can facilitate or harm the aging process.

32.2.2 Physiological Changes and Architectural Solutions

During the aging process, physiological changes occur in individuals, and the physical spaces that were initially used may present obstacles and be considered inadequate or promote risks. To ensure the quality of life and safety of elderly people in their homes, it is important to assess the need for an architectural design for environmental adequacy. An important factor to be considered in environmental assessments is environmental comfort (Mülfarth 2020). Each country, or region, has a set of architectural norms and guidelines for the elaboration of architectural projects. These are essential requirements for the development of public projects or projects with a wide variety of users, as they seek to meet the needs of most people. However, not everyone is covered by these standards.

A careful assessment of the individual's cognitive, physical, emotional, functional, and social domains will allow for the best person-environment adaptation (Perracini 2016), but not only the needs must be considered in the elaboration of an environmental adaptation project.

32.2.3 Environmental Adequation: Desires Beyond Needs

There is a consensus in the gerontological literature that both personal and environmental resources contribute to good aging, as it does not occur isolated (Wahl et al. 2012; Wahl and Gerstorf 2020). In this way, environmental contexts, internal or external, can result in positive or negative associations, acting as facilitators or barriers to individual functioning and development.

Housing and neighborhoods should facilitate the independence and well-being of elderly individuals, seeking to understand the implications of the environment in the aging process. Housing is fundamental to the lives of elderly individuals, and affordable and adequate housing is the key to aging well (Faulkner 2021).

The environment can play a facilitating or limiting role in the functionality of elderly individuals, in addition to varying throughout life. That is, different environments can have different impacts on the same individuals at different stages of their old age (Perracini 2016). Thus, it is important to understand when it is possible to continue living in the same environment and when interventions or adaptations may be necessary.

To implement environmental changes, it is necessary to understand who will be using that environment. Understanding their individual characteristics, such as desires and preferences, as well as carrying out multidimensional assessments to identifying their needs. The environment can be defined as a set of physical, affective, and spiritual attributes that surround an individual. It can have different impacts on the user depending on their health conditions or life stages. This variability requires a flexibility of environments to contemplate heterogeneity (Perracini 2016).

Residential satisfaction is an important component for the well-being and quality of life of elderly individuals. People, regardless of age or ability, seek to live in places that they can enjoy and that facilitate connections with other individuals in the community. Promoting residential alterations for environmental adaptation can increase satisfaction with life and prolong the permanence of daily activities in housing (Arias-merino et al. 2019).

Aging is a heterogeneous process in which each individual is the result of their life course thus far, being influenced by biological factors but also by socioeconomic, cultural, and emotional contexts. The development of an architectural project is a complex process as it involves the combination of technical and artistic solutions. There is no single method to solve all problems, as each case is unique and needs specific solutions (Kowallowki 2011).

32.3 Architectural Design Process

32.3.1 Life Cycle of a Project

Civil construction, considered one of the contributors to a country's economy, is a process that

takes place in sequential steps but often with an overlap during implementation. One of these stages is intended for the development of the architectural design, that is, the drawings that will guide the execution of the construction. The development of an architectural design occurs through the succession of four main stages of development: understanding the problem, formulating solutions, developing solutions and detailing (Fabricio 2011). This division aims to facilitate execution control, defining the roles and responsibilities of those involved. Although common in all construction or renovation projects, in smaller projects, these phases can be less formal (Olatokun and Pathirage 2015).

Due to the complexity of the design process in architecture, there are no precise formulas that unite form, function, and technology (Kowallowki 2011). What exists is an architectural design process with some common characteristics that uses methods and tools as needed. It is a sequence of distinct and identifiable activities that occur following a logic (Fabricio 2011). The development of an architectural design suitable for elderly person is a unique project, and it must consider several factors in its composition, such as technical, economic, and functional factors, as well as personal, psychological, aesthetic, cultural, and social factors (Kowallowki 2011). To be able to handle all these variables, the project team must be multidisciplinary, with the support of other areas and designers.

For an architectural design suitable for elderly person, it is important that the design process pay special attention to the first stage, the stage of understanding the problem. In this stage the analysis, hierarchy and synthesis of the problem take place. It is in this moment that all the factors that involve the project will be raised, including technical, economic, functional, personal, psychological, aesthetic, and sociocultural factors. The result of this survey is called an architectural program.

32.3.2 Architectural Program

The architectural program is a document prepared at the beginning of the development of the architectural design, at the stage of understanding the problem. Its objective is to gather important information that involves the contextualization of the project, clearly establishing the problem that the form must solve. As projects can be very diverse in nature, programs can also be diversified (Moreira 2011). This document must be prepared before the development of the project, as it will serve as a guide and reference of the needs to be met. It begins with the discussion of the problem, collects the necessary information, and ends with the definition of the architectural program (Andrade 2011).

Architectural program development is a process of clarifying the wants and needs for the project from the client's perspective. When little attention is given to this stage, the project, and consequently the construction, ends up not corresponding to the goals and objectives expected by the client, resulting in their dissatisfaction (Olatokun and Pathirage 2015). However, a good architectural program is not something so simple to achieve.

Different factors and barriers can affect the development of the architectural program, from basic information not provided by the client to the size of the project to be elaborated or even the skills of the project team for this stage (Olatokun and Pathirage 2015). Furthermore, clients may not be used to the architectural design process, not knowing the stages and how to behave in each one.

To try to get around this situation and considering that design decisions are made based on the quality of information obtained from clients during the elaboration of the architectural program, design teams must create a culture that supports giving adequate time to its development (Olatokun and Pathirage 2015). For the

elaboration of the architectural program of environmental adequacy for elderly people, the architect must know not only the physical environment to be worked but also the characteristics of the elderly person who will enjoy it.

32.4 Architectural Program Suitable for Elderly People

32.4.1 Multidisciplinary Approach

To know the physical environment, it is necessary to determine the norms and legislation in force for the region in which it is located. They will provide the constraints that the design must meet. It is necessary to identify and analyze the surroundings, considering the neighboring buildings, streets, and sidewalks, because a house is more than just the private environment, it is also the connection and interaction with the surroundings. A good project must consider the geographical conditions of insulation and ventilation so that the result produces the best possible environmental comfort. In addition, a detailed survey of the internal conditions of the environment must be carried out, such as the general dimensions, electrical and hydraulic points, doors and windows, materials, and finishes, as well as the existing furniture.

To get to know the elderly person, it is necessary to go deeper into their way of life, understanding their interests, their preferences, and their dislikes. Identify which activities they usually do alone, which they need help with, and which they would like to do alone. Try to understand what they would like to change and what they would like to keep. For the project to be able to meet these demands, it is essential to carry out a survey of the anthropometric measurements of elderly individuals. Therefore, with these measures, it is possible to make an adequate and personalized project for the individual to avoid underestimating the person's capabilities and not overestimating, making activities difficult or impossible.

There is a lot of information and variables that must be collected and attended to. That is why a multidisciplinary team is necessary for the elaboration of a project suitable for the elderly (Fabricio 2011): doctors and nurses contribute to the health assessments of elderly individuals; physical therapists and occupational therapists help to identify the ability to move and perform daily activities; and architects and engineers determine the technical and constructive solutions to meet the needs presented. However, the solutions developed will only be met if the elderly person participates in the design process (Fig. 32.1).

32.4.2 Inclusion of Elderly Individuals Through Participatory Design

Participatory Design is a methodology that emphasizes the involvement of future users in the development process. It is theoretically based on constructivism and attempts to understand the implicit or tacit nature of users, considered "experts by experience". Their knowledge is as valuable as the knowledge of designers and researchers in a collaborative design process (Merkel and Kucharski 2018). Despite the importance that user participation has gained in recent decades, it is necessary to pay attention to the fact that participants are often not representative of the diversity of groups and potential users, so that the real requirements are often not met (Grates et al. 2019).

Participation can help avoid age-related stereotypes and prejudices since many solutions that do not take older people into account end up being oriented toward a deficit rather than a more proactive approach focused on the engagement and empowerment of the elderly person (Merkel and Kucharski 2018). These characteristics are evident in architectural solutions that start to consider environments only in their hospital aspects.

When developing a project for older people, it is important to first identify all the stakeholders that will be part of the process. In addition to the design team, it is necessary to identify who will be the end user and those who will be part of the

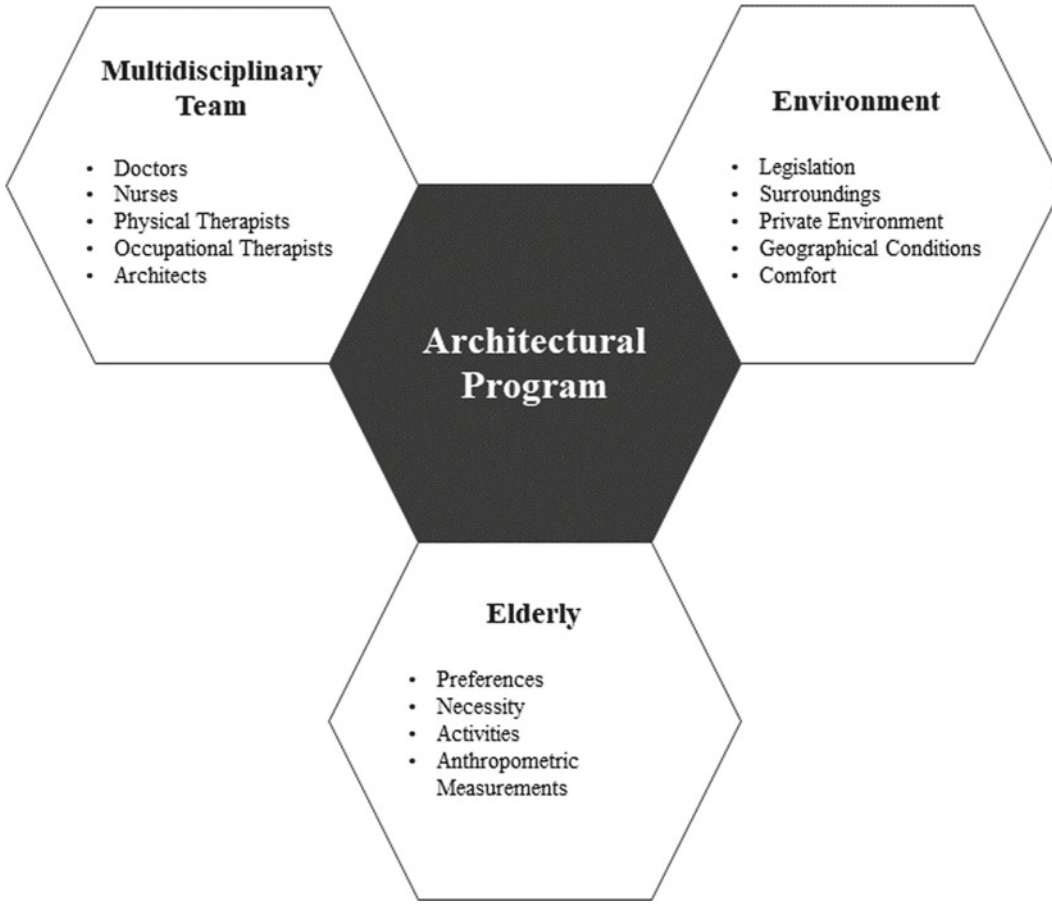

Fig. 32.1 Architectural program suitable for elderly

process, either contributing with knowledge or financially. Although the main interest of the project is to meet the needs of the end user, this step is important to define the roles and responsibilities of each stakeholder, making clear the involvement of each stakeholder and seeking to avoid conflicts throughout the process.

Elderly persons may be involved at various stages throughout the design process. They can be present at the initial design stage, throughout the process, in critical decisions, or participating in research on user characteristics and preferences. The way in which their participation will take place depends on the methods and instruments used and the level of involvement with the process. The elderly person can be a participant, advisor, or decision-maker. Based on their level of involvement, different activities are carried out (Merkel and Kucharski 2018). At this point, the multidisciplinary assessment of the elderly person is essential, which will provide information on their ability to be involved in the process.

One way to ensure the participation of the elderly person in the design process is to fragment the steps, reducing the amount of information per interaction. During the design process, there are several decisions that must be made, from the general dimensions of the environments to details of finishes and decoration. The chosen design solutions, based on the elaborate architectural program, are presented to clients, and decisions are made in project approval meetings. During the aging process, there is a normal decline in cognitive abilities, which

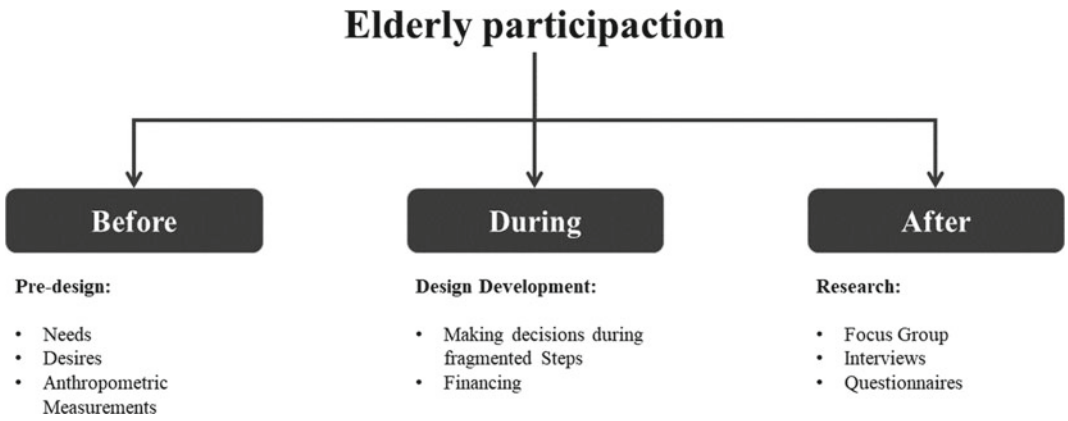

Fig. 32.2 Diagram of elderly participation

varies for each individual (Busse 2015). Thus, decision-making can be impaired in situations with a large amount of information. By reducing the amount of information and making decisions, approval meetings do not become tiring experiences, allowing the elderly person to be fully involved at all stages. In addition, it is important that meetings are scheduled on convenient days and times, ensuring the willingness of those involved.

The involvement of older people in the design processes just for legitimation purposes needs to be avoided. Future users play an important role in designing projects, and environmental adaptation solutions need to focus on users' characteristics, needs, and preferences (Merkel and Kucharski 2018). A case study is the adaptation of the apartment blocks in Ommoord, a residential neighborhood in Rotterdam. After 30 years of construction, the buildings no longer met the necessary standards of the residents and, in a co-design process, they created an architectural solution with the participation of the inhabitants themselves (Fig. 32.2).

32.5 Conclusion

Physiological changes resulting from the aging process often require changes in housing to promote a healthy and independent life. As aging being a heterogeneous process, each person will age in their own way based on their life course and personal experiences. There is no single rule to adapt the environment for this stage of life. However, to determine their needs and desires, each elderly person must be evaluated individually. Their physical, cognitive, psychological, and social domains must be considered, in addition to the characteristics of the environment in which they live. Therefore, new constructions or adaptations for this stage of life must be done through a multidisciplinary approach, considering the knowledge of professionals from different areas. Architects, gerontologists, health professionals, politicians, and others, can contribute to the elaboration of designs to support those moments of transition, which will impact all of us eventually.

However, those who can most contribute to the elaboration of designs suitable for elderly, are the elderly themselves. For its accurate elaboration, it is important that the process of design should be participatory, being inclusive with seniors. Therefore, the design process for the elaboration of designs suitable for elderly also be adapted to the elderly person's interaction capabilities. In other words, the result of the project must be adapted to their needs and desires, but the process for it to be developed must happen in a way that allows, and encourages, the participation of elderly individuals. Although much research discusses the architectural design process, little emphasis has been placed on a process

suitable for elderly. The contribution of this article to the scientific knowledge is to complement and add value to the field of design process, emphasizing the suitability for elderly individuals. Architects and engineers should adopt a more proactive attitude in promoting design processes suitable for the participation of elderly individuals (Löschke 2022).

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Education for Future Inclusion of Young People

33

Jeanette Frisk, Emma Lorenzen, and Peter Villiam Barfod

Abstract

The public urban environment is something we share. It is a space in which we all participate at all times and all ages, and it affects us extensively. So, shouldn't we have the opportunity to affect it, too? Planning the city requires tools and knowledge, which are not available for all groups of society. It is thus our job as architects and urban planners to make this available to people who are not the usual decision-makers. Young people are a demographic group who spends a lot of time in our urban spaces, but at the same time has little authority over the development of these. They are the ones to inherit these places, but they are often not built for them. In many cases, youngsters lack both the knowledge about and the opportunity to affect the spaces they use. In this essay, we suggest giving young people tools to take part in democratic conversations about urban development through the institutions they frequent. We can teach them about the city and how it is planned so that they themselves can develop the built environment. By presenting well-planned teaching material we give young people access to the knowledge they need to be able to develop, imagine, participate in, and have an opinion about the city. At the same time, strengthening young people's ability to come up with solutions for their city makes them experts in developing a city that caters to all its different users. A future city for all.

Keywords

Inclusive · Urban design · Involvement · Young people · Co-creation

33.1 Introduction

When we truly feel at home in an urban space, we feel as if we own it—as if the city is ours. This feeling of belonging, that we belong in the city and that the city belongs to us, relates to our well-being, our ability to participate in public life, and the incentive for upholding and caring for urban spaces. But this feeling is hard to foster and is only afforded to a select few. And while urban designers are increasingly focusing on broadening the spectrum of people their designs accommodate, such an approach is insufficient, if we are to create truly inclusive cities. Even the most benevolent city plan cannot provide people with a sense of ownership if they have no real

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influence on the decision-making process (Collins and Ison 2009).

Urban planning and design require resources (skills, knowledge, etc.) which are unequally distributed among people and groups of society. And so, if we are to take seriously the notion of inclusive urban planning, we need to ensure that those without these resources are given the opportunity to participate in the debate and decision-making concerning our cities.

One group traditionally excluded from decision-making processes is young people, in spite of them being frequent users of the public realm. With few indoor spaces of their own, they tend to use the cityscape as a place to foster their communities. At the same time, young people's use of urban spaces is often delegitimized by design—a design which they have little to no influence on.

So how do we change the pattern? It starts with moving from the mindset of designing "for" young people, and instead ensuring their influence through a co-creating process. One way to do this is by inviting young people to learn urban planning and giving them the opportunity to acquire the necessary tools to make an impact on the urban spaces. In other words: going back to school and teaching urban planning to young people.

In this essay, we argue that the results of this change will not only affect the next generations' sense of belonging and ownership of the urban space. It could also be a way to better involve other minority groups. Schools are (or can be) important drivers of social mobility and starting there can ensure an equal opportunity to be included.

33.2 Methods and Materials

The methodology of this argumentative essay is rooted in the urban consultancy arki_lab's years of experience with creating inclusive involvements in urban planning and design in Denmark. With a focus on designing with and not for people, we have noted how certain groups of people often are excluded from participation in the usual practices of urban development. One such group is young people, which will serve as our point of departure in discussing how cities can become more sustainable through inclusiveness and diversity. The foundation for this argument is located in our own experience with designing cities with young people, current state-of-the-art research on the field, and our own publications (Fig. 33.1).

33.3 Inclusive Design Begins in the Process

In this paper, we argue that the main challenge for equitable urban design is the lack of inclusion—especially in relation to marginalized groups. But, as decision-makers will remind you, the urban planning process already includes public hearings and citizen involvement projects. So, why the need to focus on groups such as young people?

Partly, it has to do with a long-standing culture of excluding young people from decision-making processes (Owens 1994; Bredow 2006). Even when they are officially a part of the conversation, this inclusion is often a façade—a way of giving them a sense of control, without allowing them actual authority over the final design (Sawyer 2022). As a result, young people are left skeptical of such offers of "participation".

Furthermore, they often do not have the necessary tools to participate in citizen involvement on equal footing with adults. It is a prerequisite for participants to have certain knowledge, vocabulary, and skills in order to formulate ideas and engage with other stakeholders in the process (Frisk et al. 2019). However, most young people haven't learned how to participate in involvement and thus be an active part of the conversation of change.

So, there are multiple reasons why young people do not participate in citizen involvement by default, despite being frequent users of urban spaces.

Fig. 33.1 Young people are designing and building their own plant walls as a part course on green urban development

33.4 The Young People's City

Since young people mostly do not have their own indoor space, urban environments become the meeting grounds for many youth communities. However, current research indicates that urban spaces often are not designed with young people in mind nor can uphold these communities (Owens 2020; Bishop and Corkery 2017; Clark and Uzzell 2002; Duzenli et al. 2010). This creates a problem of legitimacy of young people's use of urban spaces. When urban spaces are not designed with young people's activities in mind, and especially when they have no influence over this design, it can have a negative impact on their feelings of ownership toward them (Bishop and Corkery 2017). And since feelings of ownership and belonging often correlate, young people can be left feeling estranged from the very places they inhabit.

According to anthropologist Shannon Mattern (2003), "in the public realm, architects are in the business of building not only buildings, but also consensus—and, in the process, values, identities and ideologies". This means that including young people in the urban design process is not only a matter of allowing them to influence their physical environments—it can be an opportunity for them to shape their public identities, to legitimize their presence in the public space, and to ensure a sense of belonging and co-ownership over the cities they live in.

33.5 A Change of Power

A central tenet of inclusive design is the redistribution of power. Generally, architects and urban planners are the ones in power to shape and design urban spaces, and consequently the power to decide the purpose, values, and identities these spaces inherit. But is the architect really the sole expert on the urban spaces which multiple people use on a daily basis?

The structure of involvement in design processes, as with all other involvement structures, is influenced by existing power structures in

society, which favor the majority and discriminate against minorities (Hastrup 2013). In order to break with these structures, we have to examine our processes and ask which groups are not included in the conversation. When we did this at arki_lab, we found ourselves only talking with adults, even though young people have just as strong a claim on urban spaces. This is why we argue that by involving young people in decision-making processes, we are changing the power dynamic of urban spaces.

Young people use urban spaces differently than adults and small children, and in order to ensure that urban design is inclusive, it is a prerequisite to bear all different uses of a space in mind (Bishop and Corkery 2017; Düzenli et al. 2018). Thus, to ensure social sustainable urban planning and design, the structure of involvements has to be examined. We have to look at who is invited to the table and who is left outside the decision-making process. One way to work with this power structure in citizen involvement is to firstly create a common language. This is necessary to ensure accessibility for everyone to be able to participate in the process. (Frisk et al. 2016).

33.6 Education as a Tool

In our experience, one of the best ways to include young people in the involvement processes is to meet them in their everyday lives. Among other things, we believe it means teaming up with schools. This is because schools are cultural institutions facilitating knowledge and learning, which are necessary in order to give young people the tools to participate in the involvement processes (Frisk et al. 2016). Therefore, classrooms are the perfect place to facilitate the learning experience of urban planning and get ideas out in the most constructive way (Fig. 33.2).

The main benefit of this educational approach is that young people can influence urban spaces on an informed basis. Through education, we can ensure a higher degree of equal footing with other groups in the process of designing and planning our cities (Frisk 2016). Moreover, the learning process can further give young people an opportunity to take a critical stance toward both urban planning and society as a whole. This snowballs into a general idea of how we teach young people to actively participate in the democratic society (Bishop and Corkery 2017).

Fig. 33.2 Young people are taught to analyze their immediate physical surroundings

Additionally, it provides a way to engage in UN Sustainability Goal 11: Sustainable cities and communities, since the involvement of young people as an inclusive process activates a socially sustainable approach to urbanization (Target 11.3).

A recent example is from our involvement project from Eastern Aalborg in Denmark, where we involved young people through local schools. This was done by creating teaching materials on basic urban planning and design for six graders, teaching and presenting the young people with tools which would later be used to identify their dreams for their local urban spaces. In the end, the young people presented their collages, images, and other visual designs of their hopes and dreams for their city. These presentations were later both used to communicate local needs for stakeholders and at pop-up events around the city. Thus, the young people's dreams and aspirations for the urban space were the foundation for a broader involvement process. Furthermore, in this project, young people made a substantial part in influencing the overall outcome of the development strategy for Eastern Aalborg, since it was their dreams which the stakeholders had to consider when developing future plans.

Involvement through schools can be a way to reach across cultural and socio-economic gaps. Including urban planning in the curriculum is one way to ensure access to tools of participation. Furthermore, by engaging the classroom there is a bigger incentive for the parents to get involved as well. This creates an opportunity to further include multiple groups by using young people as gateways into local neighborhoods (Frisk 2016).

33.7 The Urban Designer as Facilitator of Learning Processes

As a consequence of this approach, we should be critical of the position architects and urban designers hold. Designers of urban spaces need to be facilitators of processes in which they create the framework for laymen to be able to articulate their insights, frustrations, and ideas stemming from the expertise of everyday familiarity with the city.

From our experience, we have seen the positive effects of including young people in the plan and design of their urban spaces. We suggest giving young people tools to take part in democratic conversations about urban development through the institutions they frequent. By presenting well-planned teaching material, we give young people access to the knowledge they need to be able to develop, imagine, participate in, and have an opinion about the city. At the same time, strengthening young people's ability to come up with solutions for their city makes them experts in developing a city that caters to all its different users (Frisk et al. 2016). This is what we mean when we say that urban designers should design *with* people, rather than *for* people.

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Empowering Teenagers Through Built Environment Education While Experimenting (In)The Public Space

34

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Abstract

Teenagers may not be the most obvious left-out category of people, but in the design and use of public spaces they are often left out. Public space belongs to everyone, yet teenagers seem not to have the means to make their voices heard when it comes to demanding their own space, which represents their identities and offers a creative and comfortable environment in which they can socialise and evolve. De-a Arhitectura Association began to develop the Urban Up educational program in 2016, as a starting point in diversifying its portfolio with another age group, that of teenagers, aiming to be inclusive of all categories and backgrounds. Throughout the past years, Urban Up tried to come before their need to be more involved and heard, regarding their wishes and expectations from the built environment and the public spaces they use, through different hands-on activities (extracurricular) and with a design thinking methodology for improving their schools. Trying to constantly find better communication channels and to reduce the generational distances, we started a fellowship program for students in different study fields connected to the built environment (multidisciplinary teams), in order to bring teenagers and young adults together. The students became mentors for the high school students, in workshops they co-designed, aiming to engage them in better understanding and using public spaces. It is our belief that the more aware and involved teenagers are today, the more active and responsible citizens they will be tomorrow.

Keywords

Teenagers · Built Environment · Education · Public Space · Inclusivity

34.1 Intro—Urban Up in De-a Arhitectura's Portfolio—The Beginning

Through its activity, De-a Arhitectura Association aims to introduce architecture and built environment education for children and teenagers in the school curricula, as well as to encourage and guide teachers to use the built environment and architecture as learning resources for other subjects. It promotes architecture and built environment education for children, teenagers

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and teachers in schools, and it involves professionals of the built environment in all these processes. The idea of the quality of the built environment as a civic responsibility is a core value of the organisation. De-a Arhitectura has a large network of built environment professionals who enjoy sharing knowledge with children and teenagers involved in our programs regarding elementary notions of architecture and urbanism, through direct observation and analysis of the built environment we live in and also apply these notions in a common creative process, to benefit from the results of their work and communicate them. The teaching and learning methods are experiential and rely on creativity, curiosity, communication skills and team spirit.

Another purpose of De-a Arhitectura is to increase the visibility of the architects' profession in society, starting with the school environment and also by continuously training architecture and built environment professionals to better communicate with a broader audience.

De-a Arhitectura Association started as a working group in 2011, when the six founding members wrote the "De-a Arhitectura [Playing architecture] in my city" course, for children in the 3rd and 4th grades. The NGO was legally formed in 2013, and it had the optional class "De-a Arhitectura [Playing architecture] in my city" approved, after the pilot year, 2012. In the following years, the portfolio of De-a Arhitectura Association diversified with a new course for first years of school—De-a Arhitectura Mini, many club activities, more cities, schools and professionals involved in the programs, but mainly targeting children between 6 and 12 years old. Before the Urban Up program, over 3600 school children, 135 volunteer architects and 140 teachers were reached.

Reducing discrepancies between the way professionals understand the built environment and the way the broad public does is the key to a better built environment. After the first years of activity, it became more and more obvious that there is a particular category of users we can address, the most present ones in the public space, the teenagers. They are specific users that are still passionate, curious and willing to learn new things though not yet corrupted by the monotony and responsibilities of adult life that tends to make us become idle to problems that we don't perceive as our own. As adults, we seem to lose the awareness regarding the impact the built environment has upon us, we take everything as a given and we only focus on our day-to-day routines. We also become less introspective than teenagers and easily ignore how our own behaviours impact the built environment, public spaces, nature and other people.

For teens, "there are simply more things happening than at any other time—a teenager is neither a child nor an adult, but a complex mixture of both. These years are not a gap—rather they are a wonderfully exciting collision when all the different strands of our life get tangled together in a way that will never happen again." (Bainbridge 2010). This amazing combination of emotions and experiences leads to a perspective that can contribute to improving the environment and space in an inspired and constructive way, in understanding things in a creative way.

Considering all of the above and based on our previous experiences and conclusions, in the fifth year of activity, 2017, the De-a Arhitectura Association launched a new project, Urban Up! Built Environment for High-School Students. Through this new project, the activities portfolio gained another age group, that of high-school students. The idea of the project that led to the birth of the Urban Up program arose because of the little knowledge teenagers have about the way the environment we live in is altered.

34.2 Urban Up! Built Environment for High-School Students—Outcomes

The intention of the project was to bring knowledge and shape attitudes about the values of the built environment, sustainable development and the role of young people in the processes of transformation that affect their cities. The curricula and workshop activities were designed to help the high school students acquire skills to learn

how to learn, to communicate and to be part of a team, meanwhile becoming citizens aware of the built environment, as well as promoters of positive changes in their cities. The project was implemented between April and December 2017. The 54 workshops took place in 7 cities in Romania—Bucharest, Braşov, Sibiu, Cluj-Napoca, Timişoara, Iaşi and Constanţa, and they reached 1025 high school students. A total of 26 built environment professionals (architects, city planners, engineers, anthropologists) were trainers of the 4 workshops briefly described below.

Workshop A: *Monument, who are you*? & *Anti-boredom map*

Through interactive exercises, the participants better understood how cities are transformed, why they should care about the quality of the built environment, why heritage matters, which are the relevant and exciting places to spend time together with other citizens who have similar interests, how to design, imagine and present those places, how accessible certain areas are, in their city, etc. (Fig 34.1).

Workshop B—*A project for my city* & *City tour*

The main idea that the participants synthesised after this workshop was that the space of the city is something concrete that influences each of them, just as they can also influence the city, even though not as much as they get to have an impact on their own space at home. The first part of the workshop was a role-playing game where some of the characters were those who decide how to spend public money for new projects in the city. They found out how our cities transform and how decisions are made on projects regarding the city. The second part of the workshop was wrapped as a challenge to brand their city and explain it to others as such, through a guided tour for anyone who would like to better know the places they like best.

Fig 34.1 Anti-boredom map exercise in Bucharest at Galateca Gallery, November 2017

Workshop C—*Not in the mood today & The claimed city*

One topic of this workshop was to identify the links between the built environment and the physical and emotional state of those who use it. The participants presented their own personal opinions and observations regarding the aspects that influence the quality of life in their cities. They analysed the existing facilities in some areas of their cities and determined if they are sufficient for the inhabitants. They got to compare and contrast places they like and places they don't and to find arguments why some places are appreciated by others, but not by them, using a space analysis criterion that the built environment professionals use. Also, besides objective criteria, the participants had to pay attention to the way that perception influences us differently, based on each person's sensitivity and personal experience, learning to be more empathic with those that don't share their perceptions and opinions.

Workshop D—*Wheeled access & Defendant city*

After this workshop, the participants might have become more interested in influencing the decisions made for the harmonious and inclusive development of the city, because they better understood how the city influences our everyday life, even if we are not typical users. First, the city was either accused by a prosecutor's team of diminishing the quality of life of its inhabitants or defended by a team of lawyers. The best argued side was decided by a jury which gave the verdict in the end. During the second part of the workshop, the students followed an itinerary through an urban area nearby either pushing a stroller, in a wheelchair or pulling luggage. So, the participants got to experience a certain area in terms of accessibility and gained more experience in analysing the city.

34.3 Follow-Up—The City and The Professions of the Built Environment

The purpose of the city and the professions of the built environment project was to raise interest and attract the attention of high school students towards the city, and also to offer teaching and learning methods, already tested in 2017. The methods could also be used by teachers, NGOs and public local authorities, since the built environment can really be a fruitful research and reflection topic. This follow-up project was also a means to reiterate the intention of our approach towards projects for teenagers and young adults. It was a way to raise awareness that the teenagers' perspective on the built environment should matter. The project was carried out by the De-a Arhitectura Association in 2018, under the Urban Up! umbrella, in partnership with Bucharest City Hall through the Center for Educational and Sports Projects (PROEDUS) and "Ion Mincu" University of Architecture and Urban Planning (UAUIM).

Why another project for high school students?

Because we considered that it was important to continue to cultivate their knowledge about how our living environment is changing, it was an opportunity to create contexts for teenagers to meet active and passionate professionals of the built environment who are examples of social engagement. It was meant to be a framework for them to practice and develop their social and civic skills, and critical analysis, while demonstrating social integration behaviours. One objective was to empower teenagers to have a proactive attitude and take their own educational path into their own hands.

The participants, over 100 high school students from 20 high schools in Bucharest, experienced one or more workshops and were very

enthusiastic to interact with the students from "Ion Mincu" University of Architecture and Urban Planning, on their grounds, in the university studios. For the teaching staff of the university and the architects who took part in the project, meeting the high school students was a chance to `feel' the pulse of the young generation, soon to be active in the fields of the built environment, either as future professionals or as beneficiaries or users of urban spaces.

34.4 The Need for Urban Up to Grow Up (With a Fellowship for University Students)

"Teenagers have a language of their own" as De Bruce J. Gevirtzman says, and this language and their preferences make them into these exuberant personas that have the energy to change and colour the world with fantabulous ideas. More so, when teenagers become involved in a movement or project, they engage both younger and older people in their lives in the immersive story they create, often surprised by their fresh angle or perspective on things.

Since 2018, Royal Institute of British Architects (RIBA) has started an extensive national program to educate children about the built environment in British schools, something that the De-a Arhitectura Association has been doing, with the support of architects, for quite some time. Any educational program and project about the city and the built environment is a plus in the education of young people, regardless of the profession they will choose in the future, because they will be either our colleagues or the beneficiaries of the proposed projects by us and in both situations, they must be able to make informed decisions.

The excitement of the 2017 project and the feedback we received from over 1000 high school students that took part in the workshops, as well as the energy we received from them and their creative and honest outcomes, made it clear that Urban Up! has to become an umbrella for diverse projects dedicated to teenagers and youths. In 2019, we had some attempts to continue in Sibiu, after winning a competition on the Social Agenda of the Sibiu City Hall and being shortlisted in another competition, but the formal request they both had did not align with our objectives enough, so we decided to put things on hold. Meanwhile, focusing towards a new target age group, that of young adults, became an objective on the agenda of De-a Arhitectura Association and after a general assembly in 2020 a dedicated work group was formed. We already had a strong identity and the Urban Up! platform, so it became obvious that Urban Up! needed to grow up, bringing youths side by side with teenagers in our educational projects.

The first priority was to upgrade the age group, so we decided to also address students. They are closer in age with teenagers who usually look up to them, and their knowledge and interest in the city can be a relevant means to share knowledge. The idea of a fellowship was the one through which to best bring together teenagers and students, and it was also the best approach to empower the students into taking action. The aim of this particular fellowship was to engage the students in a co-design process of new urban pedagogy educational scenarios for high school students' workshops. The call for participants was launched in April 2022. It was not only dedicated to students from fields related to built environment and urban studies but also connected study fields, aiming for a diverse, interdisciplinary group of fellows. 30 students with different backgrounds applied (urban planning, architecture, psychology, educational sciences, anthropology) and following a selection process, 26 fellows were selected. Some of our selection criteria were their motivation regarding interdisciplinary and participatory processes, their interest in the life of the city, their civic involvement or the potential to do so and their willingness to pass on the concept of active citizenship to high school students.

The Urban Up Fellowship was structured in three modules: module 1—Inspiration and forming teams based on common interests, module 2—Co-creation of the educational scenarios, and module 3: test and pilot in workshops

with high school students. The first and second modules took place in May 2022, at the beginning and at the end of the month, so that the third module that meant to test and pilot the co-designed workshops could take place during the summer.

The first module took place at ExpoHUB OARB (headquarters of the Bucharest Territorial Branch of the Romanian Order of Architects) and was meant to inspire the fellows and to expose them to diverse intertwined contexts and initiators with interdisciplinary approaches in their fields of work. The 14 guests from different organisations presented some of their initiatives that changed the life of the city for the better. The main topics our fellows got in touch with were inclusive design, empathy and vulnerable users (AMAis, Active Watch), quality of the built environment and good design (the Order of Romanian Architects, Dizainăr), bottom-up initiatives (the Cișmigiu Civic Initiative Group, the Legacy Bucharest community centre), documenting urban experiences (Vira Association) and sustainable mobility (Bate Șaua, Hai cu Bicla). After their presentations, our guests were divided in three, covering the following large sustainable development topics: social, economic and environmental. The fellows got to have informal conversations regarding their own interests on these topics in a world cafe format. The world cafe format, in which the participants have the opportunity to visit each table, ensures an informal, dynamic and interactive relationship, a two-way exchange of ideas and a networking opportunity.

The team-forming process was also a participatory result meant to create an organic option for the fellows, based on their areas of interest aligned with the 5 previously defined subtopics: heritage conservation, ecology, sustainable mobility, inclusivity and good governance.

Between the first and second modules, the fellows, guided by each team's mentors, turned their ideas into workshop scenario drafts, as a work base for the second module. During the second module, the fellows presented their ideas and received feedback both from the mentors of all 5 teams and their peers. Following the feedback sessions, the students translated the presented ideas into clearly structured workshop scenarios which were afterwards tested through role-play and each team got to facilitate parts of their scenarios, while the other teams got to impersonate high school students. The fellows and mentors went through the rights and obligations of citizenship, imagined that they had their own political party and took it upon themselves to solve some problems in the city, discussed mobility by wearing the hats of different stakeholders, looked for social and spatial landmarks as starting points for conversations about heritage and walked around the area and felt the city at their feet looking for subjective details that bring it to life. The simulations were followed by another feedback session, so that the workshop scenarios could be finalised while integrating the useful feedback.

The third module took place during the summer. It started in June, with a workshop led by the Sustainable Mobility Team in a city centre park, in Bucharest, where 12 high school students from 3 different schools participated. In August, all 5 teams of fellows got the chance to test their workshop scenarios in Năvodari, a small town by the Black Sea, in a high school students' summer camp. Representatives from all the teams were there to pilot their scenarios, and they had the chance to receive constant feedback from the same group of 20 teenagers of different ages and from different places in Romania. The 5 workshops were the people of the city—aiming to create a frame for understanding how the city influences the quality of life of its inhabitants; the heritage of the city—aiming to encourage teenagers to appropriate the concept of heritage by understanding it in a personal key; the nature in the city—aiming to overlay the sensorial perception of the urban space on the presence or absence of nature and how this impacts each of us; city governance—aiming to contribute to the civic involvement of young people, with the concept of common interest at its core, being a very relatable concept in relation to the built environment; sustainable mobility in the city—developed around the importance of inclusive design and a city for all.

Some of the opinions voiced by the high school students through the anonymous feedback form they filled are "I gained a different image regarding the city and its buildings, the green spaces, etc", another student said: "I'm glad that I managed to better observe the things that surround me. Although some notions were repeated more, this helped us to better understand them" (targeting the content). A student commented about the activities: "They put us in motion, and it wasn't something boring where it only included theory. It's easier to learn through practice." One of their colleagues mentioned: "We managed to get out of the visual sphere and differently perceive the world we live in." On the collaboration with the fellows, the teenagers said: "It was a pleasure to meet them and exchange knowledge. One of the coolest parts of the camp" as well as "Super nice. I love their enthusiasm and dedication to what they study."

34.5 Still Growing Up—Recent Projects

The fellows that facilitated the workshops during the Năvodari summer camp manifested their interest and availability for continuing to facilitate their workshops from now on and also to be a part of other Urban Up! projects we have on the agenda. All 5 student-developed scenario proposals are creative and have the potential to grow into lasting programs, not just single workshops. The 5 teams will have the opportunity to coordinate the workshops in different contexts: in high schools, at cultural events, at local community events, etc. We also want to implement the educational scenarios during the Different School Week program, starting with the 2022-2023 school year.

Another growing direction for Urban Up is through an international Erasmus+ project—Palimpsest Cities, in which 2 fellows that already have a bachelor's degree joined our team. Some of the project objectives are to raise awareness about local cultural values at a higher education level by focusing on future architects, conservators and interior architects, to increase the interaction of children and young people with cultural heritage and archaeological sites and to enrich architectural education with informal practices.

Also, in 2021 two of the members of the De-a Arhitectura team (authors of the current essay) submitted a project to ARCUB (a public cultural institution in Bucharest) through which they proposed to initiate a participatory planning process for public spaces, with and for teenagers. In 2022, it was selected to be funded and it was implemented in November and December. The call addressed Bucharest high school students and 15 spots were available, but in the end, we had the pleasure to meet 19 participants. The project brought teenagers, students and professionals together for 3 days of hackathon, where both high school and university students assisted to presentations of the guests on topics such as urban acupuncture and micro interventions in the public space, inclusive design, recovered places and spaces through versatile design proposals, democracy of the public space, social vulnerability, the 15 minutes neighbourhood and cities for happy people.

The TU_act project involved 10 Urban Up fellows in different stages: 8 as mentors and `translators' of the high school participants' ideas in concrete proposals, 1 in the team of authors for the contest brief and 1 in the jury team.

The nineteen students were organized in five different teams. In the week that followed the hackathon they submitted a proposal that illustrated their vision on the urban acupuncture intervention for a public space, of their choice. The main focus of the proposal was on the needs of their specific group and the needs of their peers, in relation to the chosen urban space. Teenagers like to use the urban space as a vessel for their creative ideas, and they should be encouraged to explore and shape the space as they see fit for their use and different types of activities. The five proposals were team 1—Urban Glade, team 2—modulOM, team 3—Hangout, team 4—Take a Break Here and team 5—Our Spot. The 3 projects awarded by the jury were as follows: 1st prize was won by team 5 (Fig. 34.2),

Fig 34.2 Extract from the contest proposal of theme 5—our spot (Spotu' nostru)

2nd prize was won by team 1 and 3rd prize was won by team 2.

The teenagers in team 5 described their approach as follows: "Once we found our chosen spot, we started to interact with it and we discovered its potential to be valued. We aimed to bring the invisible layers forward, the ones that not every person passing by notices. The wall (there since the 70's when there was a building site here) is both a limit and a link between two spaces, separate together. Our proposal amplifies many perspectives gathered in the same place. We felt like bringing a direct path to a gate unopened yet, to link to existing trails. Through the created portal we turn a simple crossing over from one side to another to an event. We felt that this place is intimate but open. There, you feel surrounded by people but alone, with yourself. Through modular urban furniture (adaptable and multifunctional) we preserve this character. The

modules can be moved around considering the activities there, and so we create a diversity of experiences. (...) This is how we ended up with a simple result, but complex at the same time, with many hidden messages and interpretable symbols."

The jury, formed of 3 built environment professionals and an urbanism student and Urban Up fellow, considered that Our Spot proposal convinces primarily through the choice of place: a non-place, located next to the traffic flow of the area, a space neither public, nor private or part of the park, enhanced with multipliable, flexible and relatively readily available means.

All five proposals were very brave and creative and all 8 mentors, students in architecture, interior architecture and urbanism, considered that they also had a lot to learn from the teams of teenagers they guided and supported throughout a week of developing ideas. Some of the mentors said that they were really impressed by their initiative and determination and also by their awareness regarding important themes of today's society, like social justice and equity, climate change, gender studies, and even politics and civic engagement, and they do not remember to have been so aware as teenagers.

The scenario of the Teens Urban Acupuncture project that consists of a hackathon followed by an ideas contest is designed to be repeated in the years to come and even in other cities in Romania perhaps, in other countries.

34.6 Conclusions

All in all, teenagers are part of the local community, and communities shape and adapt space to their own needs. By understanding how local development happens, youths will become more aware of what they can do in the future and will be able to have an impact on improving their cities, according to their creative demands and expectations. In the future, we aim to contribute to engaging high school students in the decision-making processes related to urban development in their cities. They are not simple users of the urban layout and have their own vision and benefits out of the interactions in (with) the urban space, individualised to the various activities they carry out in the city.

Throughout our projects in the Urban Up program, we aim to continue to bring teenagers, students and professionals together and to offer high school and university students a platform to express their needs and ideas with regard to their inclusion in public space and in society while they are young and not necessarily yet taxpayers or voters.

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35 Generative Design Method of Building Group Based on AIP (Aging in Place) Assessment: The Case of Dense Urban Renewal Districts in Hong Kong

Youlong Gu, Yecheng Zhang, and Wei Xuan

Abstract

High-density urban development is often accompanied by the phenomenon of aging, and AIP (aging in place) is considered as one of the main approaches to cope with aging in high-density urban environments in the future. In this paper, we explore the possibility of building group generation at the scale of high-density urban blocks and the future guidance of urban design based on the AIP assessment system and a generative design method under multi-objective optimization. To achieve this goal, we take Sham Shui Po and its surrounding areas in Hong Kong as the study area, and then score the indicators at both the block and grid levels through the assessment system in the AIP context, and then obtain objective weights through the CRITIC method to obtain a comprehensive score. We further delineate the renewal area by the clustering algorithm, filter the generation range, and then use the indicators filtered based on the weights as the optimization direction to design a set of building generation patterns according to the local planning requirements and then carry out multi-objective optimization generation design. The original gene data is extracted and analyzed after the results are verified to obtain a better range of indicators for the urban design. The evaluation results of the generated building groups show that the built environment of the block is more suitable for aging-friendly living and can guide future high-density urban design under this AIP assessment system according to the better gene range in the system.

Keywords

Aging in place · Urban renewal · Assessment system · Generative design method · CRITIC method · Multi-objective optimization · Hong Kong

35.1 Introduction

35.1.1 Background

Currently, the pace of population aging is much faster than in the past. WHO states that between 2015 and 2050, the proportion of the world's population over 60 years will nearly double from 12 to 22% (World Health Organization 2022). Thus, aging will be a national health and social system challenge for all countries and regions in the future.

In recent years, AIP (aging in place) has been recognized as a good old-age care approach that

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enables older people to maintain independence and have access to social support. There is a growing emphasis on the role of the local environment in facilitating AIP, which is reflected in debates around lifetime neighborhoods, livable communities, and age-friendly cities (Buffel et al. 2018; Scharlach and Lehning 2013). At the same time, some research adds to our understanding of how to create communities that support the needs of people as they age, including adapting to the physical environment (e.g., infrastructure, transportation, and housing) as well as social dimensions (e.g., social and civic engagement, community care, and neighborhood support) (Buffel et al. 2019; Gardner 2011).

In terms of conceptual discovery and spatial identification related to the aging place, Lewis and Buffel (2020) also compared in detail the conceptual differences between aging in place and the places of aging through case studies, and explore the process of change over time. Dawidowicz et al. (2020) used contemporary trends in the field, state and local policy, as well as on survey data from the target population and on information provided by experts to identify active aging places based on the QGIS platform.

In the context of research on aging in place, some studies have assessed and scored the living space of older adults through an evaluation system designed based on AIP. For example, Mercader-Moyano et al. (2020) (Mercader-Moyano et al. 2020) proposed a Multidimensional Assessment System of the Built Environment (MASBE) to test the built environment, which emphasizes the acceptance and perceived suitability of housing and neighborhood size for older adults. By designing and quantifying 35 multidisciplinary variables related to the needs of the elderly through seven categories of dimensions, a new evaluation model is provided for decision makers to help adjust future urban policies. Fan Zhang et al. (2021) (Zhang et al. 2021) propose a multi-scale spatial framework for housing that uses BIM information to support multi-level spatial evaluation to assist the government in assigning suitable public housing to elderly applicants, and to provide property developers and local governments with additional guidelines for housing design and urban redevelopment.

35.1.2 Our Study

Most AIP-based quantitative assessment systems involve multiple levels of complex data, and the lack of actual BIM information for buildings in some areas due to their early age, or the difficulty of obtaining information related to the building interior environment due to personal privacy and the actual living environment, makes it difficult to implement the entire assessment system completely and quickly. At the same time, the resulting score results are not translated into spatial terms, which is difficult for developers or governments to understand.

Therefore, in order to reduce the difficulty of spatial information acquisition, this paper designs a set of AIP assessment systems based on multiple sources of big data from meso perspectives combined with literature review, and generates multi-objective optimization of building groups based on the assessment results, and translates the results into spatial terms to better help architects, urban planners and policy makers to understand and formulate urban renewal plans.

Like other developed countries and regions, Hong Kong is facing a serious population aging challenge. As the area with the highest population density in Hong Kong, Sham Shui Po and its surrounding areas will achieve rapid growth of more than 10% in the official population forecast for the next 10 years (Planning Department 2021). This presents a challenge to further improve the living environment while addressing the persistent issue of aging. Jayantha et al. (2018) also pointed out that the structural design and configuration of facilities in rental housing in Sham Shui Po are not reasonable and the government needs to redesign the physical environment space. Therefore, we choose the dense urban renewal districts of Sham Shui Po as the case study.

This paper is organized as follows: Sect. 35.2 describes the complete workflow of the study,

including the AIP assessment system, data acquisition, weight acquisition, region delineation, and strategy of the evolutionary algorithm; Sect. 35.3 describes the generated results, visualizes the outstanding individuals, and validates the results on this basis, and extracts the raw genetic data as a spatial terminology guide; finally, Sect. 35.4 summarizes the main conclusions of this paper.

35.2 Material and Methods

In terms of site selection, the physical space of Sham Shui Po and the surrounding area in Hong Kong which is a representative of high-density cities, and where there is a serious aging problem, is chosen as the site for the research. Sham Shui Po (longitude: 114.167210, latitude: 22.328171) is located in the north-western part of the Kowloon Peninsula, covering an area of about 1047 hectares, with a population of about 353,000, divided into 21 constituencies. As early as 2000 onward, the government attempted to incorporate some specific elements of facility and housing design consistent with the aging in place concept into its public housing rebuilding program to meet the needs of older adults.

We designed a generative method-focused research workflow for the generation and optimization of the overall environment for the area's physical space based on AIP shown in Fig. 35.1.

35.2.1 AIP Assessment Process

In terms of indicator construction, this research aims to analyze the information evaluation of community public facilities and transportation facilities for older people based on the mesoscale. Therefore, by researching the interaction between the physical family environment and old age through three indicators of safety, accessibility and mobility, and comfort, and stress the importance of time-series changes in the environment and place to the healthy aging through wind and heat environmental simulation data, and then judge the importance of multi-dimensional indicators by an objective weighting method, and constructs a scoring matrix to compare the weights of each indicator during the comprehensive multi-instrument evaluation.

35.2.1.1 AIP Assessment Process

The literature review was used for the assessment system establishment as well as preliminary screening work. The literature research data in this paper was obtained from 2015–2022 sciencedirect, springer, wiley and other databases, and keywords such as *aging in place*, *AIP*, and *place aging* were selected for the search, and more than 10 pieces of literature related to quantitative assessment and index construction were retrieved. Based on the multi-source big data acquisition method and feasibility analysis under the mesoscopic scale of this paper, the final

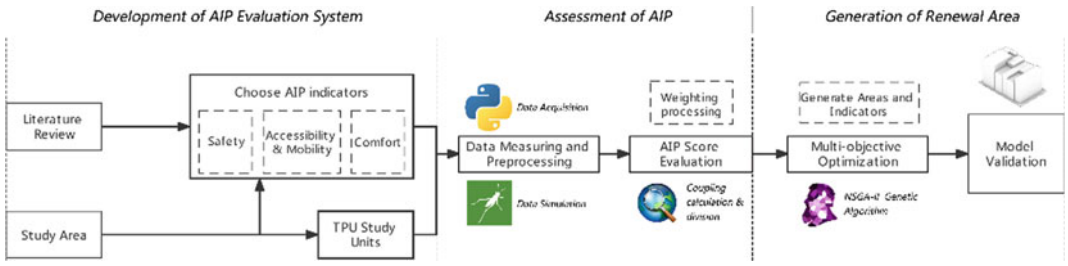

Fig. 35.1 Research workflow

Table 35.1 AIP indicator assessment system

Level	Iindicators	Description	Source
Safety	Traffic flow	The suitability of traffic flow	(Jelokhani-Niaraki et al. 2019)
	Lighting at night	Street brightness rating at night	(Jelokhani-Niaraki et al. 2019)
	Security and police service	Number of emergency phone booths, police patrols, policy stations and other policy services within walking distance (500 m)	(Jelokhani-Niaraki et al. 2019)
Accessibility & Mobility	Entertainment facility	Number of parks, Greenery, sports facilities, community centers, and other recreational and sports facilities within a walking distance (500 m)	(Jelokhani-Niaraki et al. 2019); (Kano et al. 2018); (Luciano et al. 2020)
	Shopping facility	Number of grocery stores, markets, shopping centers, and other shopping facilities within walking distance (500 m)	(Kihl et al. 2005; Luciano et al. 2020)
	Medical facility	Number of pharmacies, pharmacies, community clinics, hospital clinics and other medical facilities within walking distance (500 m)	(Kihl et al., 2005; Luciano et al. 2020)
	Transportation facility	Number of bus stops, subway stations and other transportation facilities within walking distance (500 m)	(Jelokhani-Niaraki et al. 2019; Kano et al. 2018; Kihl et al., 2005; Luciano et al. 2020)
	General facility	Number of banks, laundries, bookstores, libraries and other transportation facilities within walking distance (500 m)	(Luciano et al. 2020)
Comfort	Solar radiation (winter)	Community-wide solar radiation in winter	(Giridharan et al. 2007); (Peng and Maing 2021)
	UTCI comfort	UTCI comfort outdoor environment	(Giridharan et al. 2007; Sining Peng et al. 2021)
	Pedestrian level wind	1.5 m mean wind speed numerical simulation	(Giridharan et al. 2007; Sining Peng et al. 2021)
	Integrated environment	Coupled humidity, wind speed and other integrated wind-thermal environment	(Giridharan et al. 2007; Sining Peng et al. 2021)

selection of 12 indicators for three levels of Safety, Accessibility & Mobility, and Comfort is shown in Table 35.1.

Considering the system accuracy requirements, this study uses the design of 10 M*10 M fishnet as the basic analysis unit in ArcGIS 10.8, and conducts sub-indicator evaluations based on the AIP evaluation framework. Among them, house price data and traffic flow intensity data are collected through Python 3.8, and security and police services, the accessibility & mobility of recreational facilities, shopping facilities, medical facilities, transportation facilities and general facilities, are POI (point of interest), sourced from Hong Kong Geodata Store (https://geodata.gov.hk/gs/), and then accessibility analysis is performed by the radiation range through the proximity tool in ArcGIS 10.8. Average radiation in winter, thermal comfort, wind speed at pedestrian height and integrated wind-heat environment data are distributed for calculation and coupled by the free Grasshopper 3D Ladybug Tools.

The block-level division in this study is based on the grid-level basic score and the Hong Kong Small Tertiary Planning Unit Group. For the

purpose of urban planning, the entire territory of Hong Kong is divided into 291 Tertiary Planning Units (TPUs) by the Planning Department of the Government of the Hong Kong Special Administrative Region. The planning system incorporating the TPUs thus allows for a more localized and accurate assessment system and scope of generation, after the total grid score is obtained, the net is segmented based on the block area and the grid arithmetic mean within the area is calculated. AIP evaluation score of block level can be seen in Fig. 35.2.

35.2.1.2 Weight Acquisition

This study determines the weight contribution of each indicator mainly based on the information entropy of the data set. The traditional entropy method can only calculate the entropy according to the variability of indicators but ignores the correlation between data. So, the CRITIC method is applied to make corrections, which comprehensively measures the objective weight of an indicator based on the comparative strength of the evaluation indicators and the conflict between indicators. By this method, the variability of the indicators is shown by a standard deviation of S_j (indicating the fluctuation of the differences in the values taken within each indicator. The larger standard deviation indicates that the greater the difference in the values of the indicator, the more the information will be screened, and the evaluation intensity of the

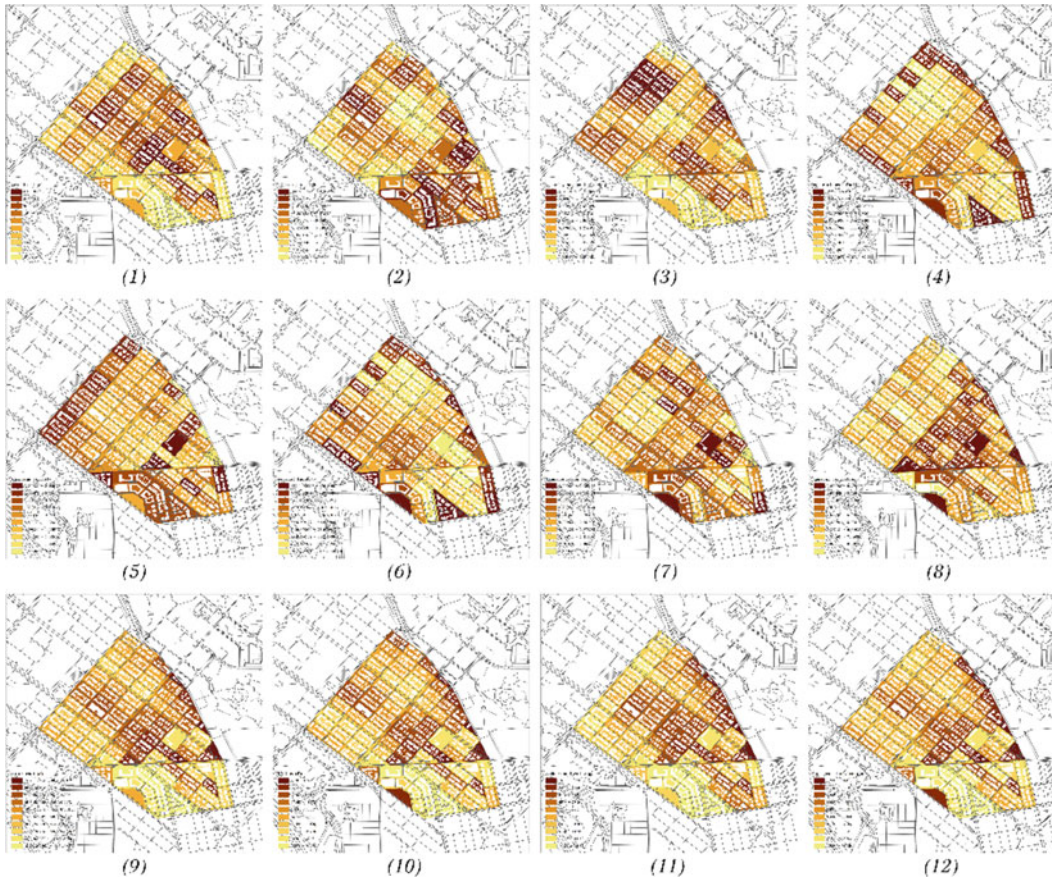

Fig. 35.2 AIP evaluation score of block level. (1) traffic flow (2) lighting at night (3) security and police service (4) entertainment facility (5) shopping facility (6) medical facility (7) transportation facility (8) general facility (9) solar radiation (10) UTCI comfort (11) pedestrian level wind (12) integrated environment

indicator itself will be stronger, and more weight should be assigned to the indicator) and the conflicting of indicators is shown by a correlation coefficient (indicating the correlation between the indicators. If the correlation with other indicators is stronger, the conflict between the indicator and other indicators will be less, the more the same information will be screened, the more repetitive evaluation content can be reflected, weakening the evaluation intensity of the indicator to a certain extent, and less weight should be assigned to the indicator) (Table 35.2).

$$\begin{cases} x = \frac{1}{n}\sum_{i=1}^{n} X_{ij} \\ S_j = \sqrt{\frac{\sum_{i=1}^{n}(X_{ij}-x)^2}{n-1}}; \ R_j = \sum_{i=1}^{p}(1-r_{ij}) \end{cases}$$

35.2.1.3 Total Score Assessment and Zoning

After obtaining the weights, the scores of each index of the grid are weighted and calculated, and combined weighting and TPU planning range to obtain grid level and block level total scores as shown in Fig. 35.3.

Spatial clustering of scores by Anselin Local Moran's I is conducted to update generation ranges (Zhang et al. 2019). The algorithm results in high-high clusters (HH), low-low clusters (LL), high-low outliers (HL) and low–high outliers (LH) at the 95% confidence level of statistical significance. The clustering at the block level and the grid level based on INVERSE_DISTANCE, corresponding to the low-low clustering areas from the significance test on the assessment system, and the comparative analysis excludes the indicator interference of house prices and general facilities. The final total scores of flow-low clustering areas are shown in the figure. After overlaying the TPU planning range, regional zoning is conducted by the evolutionary algorithm, and after removing the heterogeneous commercial plots, a total of 13 TPU composite commercial and residential plots are selected for the generating design level based on INVERSE_DISTANCE, corresponding to the low-low clustering areas from the significance test on the assessment system, and the comparative analysis excludes the indicator interference of house prices and general facilities. The final total scores of flow-low clustering areas are shown in the figure. After overlaying the TPU planning range, regional zoning is conducted by the evolutionary algorithm, and after removing

Table 35.2 Analysis results of the CRITIC method

Indicator	Variability of indicators	Conflict of indicators	Volume of information	Weight (%)
NMMS_traffic flow	0.157	11.449	1.799	7.032
NMMS_lighting	0.124	10.696	1.327	5.189
NMMS_security	0.204	11.823	2.406	9.405
NMMS_entertainment	0.199	11.987	2.386	9.327
NMMS_shopping	0.185	10.753	1.985	7.757
NMMS_medical	0.221	10.996	2.428	9.490
NMMS_transportation	0.167	10.846	1.816	7.097
NMMS_general	0.166	10.639	1.770	6.918
MMS_solar	0.254	12.012	3.049	11.920
MMS_utci comfort	0.255	12.059	3.077	12.028
MMS_wind	0.125	10.965	1.368	5.347
MMS_environment	0.203	10.688	2.172	8.490

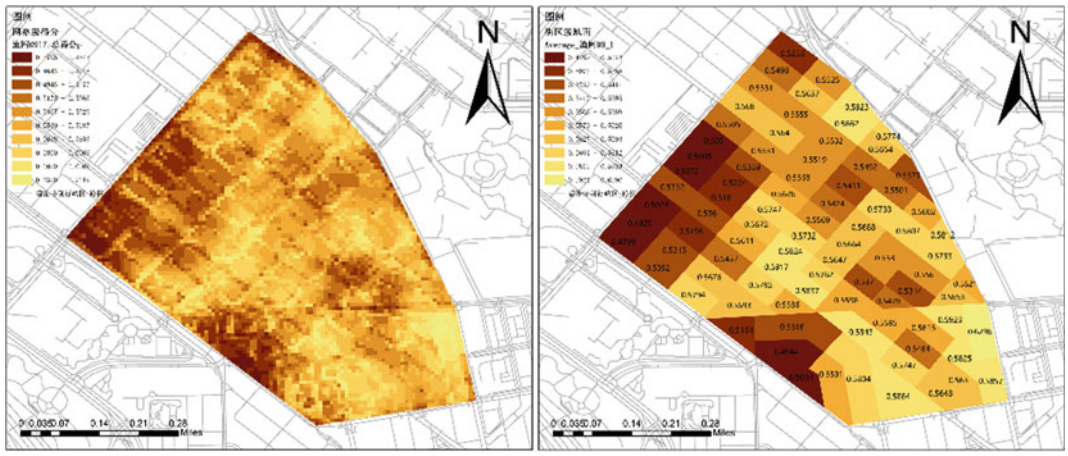

Fig. 35.3 Total score at the grid level (Left) and total score at the TPU block level (Right)

Fig. 35.4 Anselin Local Moran's: Distribution of clustering results (Left) and zoning of generation regions (Right)

the heterogeneous commercial plots, a total of 13 TPU composite commercial and residential plots are selected for the generating design (Fig. 35.4).

35.2.2 Generative Design Method

35.2.2.1 Building Generation Settings

In this study, we hope to be able to control simple geometric parameters to simulate the complex changes of Hong Kong's urban blocks, and to achieve basic parameter adjustment through the plug-in Grasshopper in the 3D-NURBS modeling software Rhinoceros 3D. According to the survey of the study area, we divide the base grid by the random rectangular tiling method, take the building footprint of the original plot as a guiding parameter to control the rectangular tiling subdivisions, and conduct random subdivision by Jared Tarbell textures under the subdivision conditions, and then obtain the building base grid through random distance setbacks. According to the current situation of the study area, grids are deleted with the two values of $10m^2$ and $1000m^2$ as filtering conditions, to remove the building substrate with scale

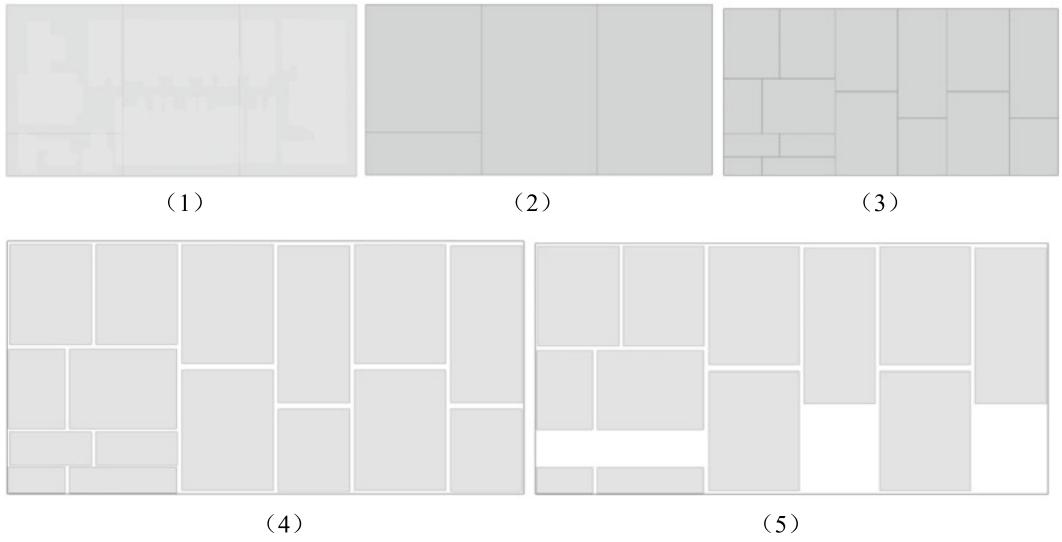

Fig. 35.5 Diagram of plot generation (1) Zoning based on original substrate (2) Zoning (3) Texture subdivision (4) Plot setback (5) Plot screening

distortion and simulate the small spaces in the local block. After obtaining the final substrate, building density control is carried out according to the Hong Kong Planning Standards and Guidelines (Planning Department 2021). According to the Planning Department's classification conditions, the planning area falls into Residential Development Density Zone 1, with a maximum residential plot ratio of 8.00, and the building height is controlled to 40-60 m through spatial calculations and development planning, and the final building form will be randomly extruded within the range of the final substrate (Fig. 35.5).

For this generation process, there are following variables as genes:

- Plot horizontal partitioning in the long side direction (Hereinafter referred to as x division, range 2–4)
- Plot horizontal partitioning in the short side direction (Hereinafter referred to as y division, range 1–3)
- Plot random subdivision level (Hereinafter referred to as subdivide, range 1–3)
- Setback distance of plot substrate (Hereinafter referred to as concession, range 5–10%)
- Plot building height (Hereinafter referred to as height, range 40-60 m)

35.2.2.2 Evolutionary Strategy

Multi-objective optimization based on the evolutionary algorithm applied in this study is NSGA-2 developed by (Deb et al. 2000) as a driver algorithm of the free Grasshopper 3D Wallacei plugin developed by Mohammed Makki, (Makki et al. 2018).

The CRITIC method ranks the contribution of the constructed AIP indicators, ensuring the accuracy and efficiency of the algorithm at the same time. In this study, the top five indicators ranked by the CRITIC method are selected for the generation setting, namely thermal comfort, average radiation in winter, security and police services, accessibility and mobility of medical facilities and accessibility and mobility of recreational facilities, covering 53% of the interpretation weight and meeting the system assessment requirements, according to which the constraints and objectives are set in Grasshopper 3D.

Hong Kong has a subtropical monsoon climate. In addition, the deep valley-like environment caused by the small building space in the study area leads to poor ventilation, and thus

thermal comfort becomes an important indicator of assessing the outdoor thermal environment. Therefore, the maximum thermal comfort (UTCI) is selected as the suitability criterion by numerical analysis with the Grasshopper 3D Ladybug Tools.

The dense and homogeneous building layout of the study area is prone to produce building shadows and radiation shading in winter, which is not conducive to the daily outdoor activities of older people. As a result, the period from the autumn equinox (9.23) to the spring equinox (3.23) is selected for the analysis of solar radiation with the Grasshopper 3D Ladybug Tools, to select the maximum average radiation in winter as the suitability criterion.

Security and police services mainly cover the number of emergency phone booths, patrol police, policy stations and other policy services within a 500 m walking distance. The analysis model replaces accessibility and mobility equivalents by the maximum building area within a 500 m walking distance and the maximum accessibility and mobility is selected as the suitability criterion.

The accessibility and mobility of medical facilities mainly covers the number of medical facilities including pharmacies, drugstores, community clinics and hospital outpatient clinics within a 500 m walking distance. The analysis model replaces accessibility and mobility equivalents by the maximum building area within a 500 m walking distance and the maximum accessibility and mobility is selected as the suitability criterion.

The accessibility and mobility of entertainment facilities mainly covers the number of parks, green spaces, sports facilities, community centers and other recreational and sports facilities within a 500 m walking distance. The analysis model replaces accessibility and mobility equivalents by the maximum building area within a 500 m walking distance and the maximum accessibility and mobility is selected as the suitability criterion.

Points related to medical facilities and recreational facilities are derived from building data, and the spatial location of such points is unchanged by default in the generated analysis, i.e., the spatial location is ensured to be physically covered in the generation of the building substrate.

The NSGA-2 parameters in this study are set to a generation size of 50, a generation count of 100, a total population size of 5000, a crossover probability of 0.9 and a mutation probability of 1/n.

35.3 Results

35.3.1 Simulation Results

Four basic types of diagrams of Wallacei reflect the strengths and weaknesses of the global analysis results (Fig. 35.6). Coupling analysis is conducted between the Standard Deviation (SD) Diagram with the Standard Deviation Trendline (SDT), with red lines standing for the first generation and blue lines for the last generation. The center line of each SD curve indicates the average fitness value for a generation. Throughout most of the simulation run, the five indicators under the optimization change in a clear and consistent trend. The center line moving towards the optimal direction from the first to the last generation, with the objectives basically in a stable or increasing state, and the convergence between the optimization objectives observed in the final generations indicates that the algorithm converges to optimality at the end of the simulation.

The Fitness Value Diagram (FV) and Mean Value Trendline Diagram (MVT) can be used to examine the fitness of individuals in parallel (2018) (Navarro-Mateu et al. 2018), with red lines standing for the first generation and blue lines for the last generation. It can be observed that in the Fitness Value Diagram, individuals present gradual convergence and an increase in scores, indicating that more fit individuals are generated during the simulation process. For the indicators of maximum medical and maximum police in the Mean Value Trendline Diagram, the average score shows a partial decrease during the convergence, inconsistent with the other

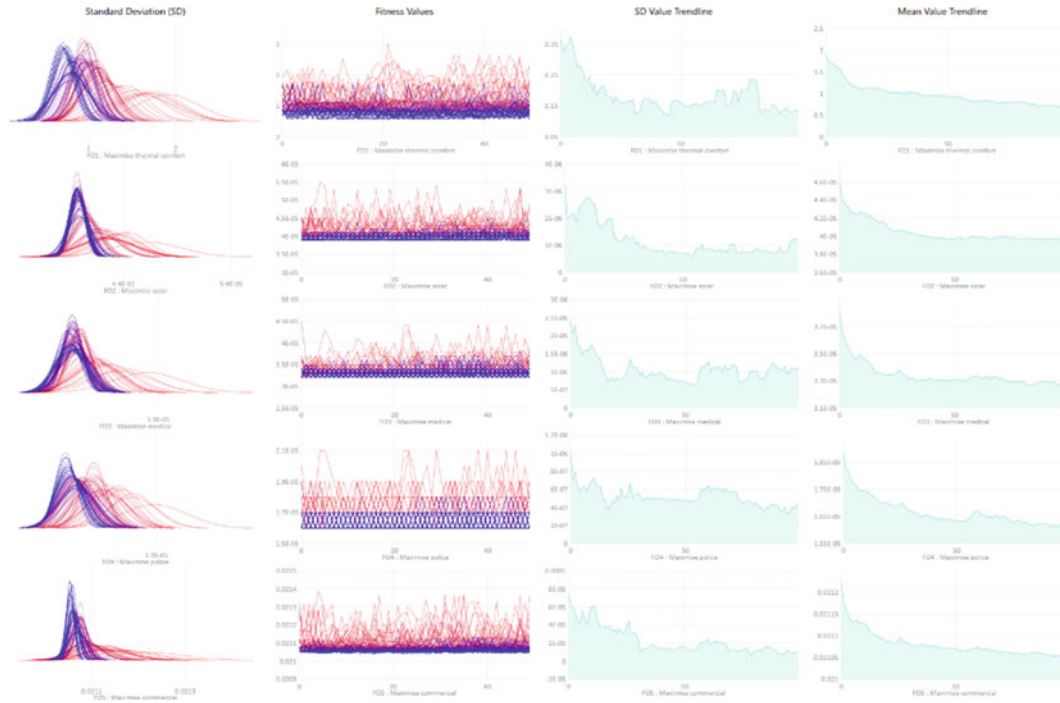

Fig. 35.6 Simulation results (From left to right, SD, FV, SDT, MVT)

indicators and demonstrates the need for the analysis of the global 5000 individuals, with 5000 iterations of the design problem showing an uneven pattern across the simulation and helping to find the better solution.

35.3.2 Excellent Individuals Selection

Due to the strategic nature of the high-density solution scheme in the evolutionary algorithm, a large number of solutions are output as the final result during each iteration, thus it is especially critical to conduct the final individual selection and the statistical analysis of the global solution data. In phenotype selection, careful consideration needs to be made on the way genes are remapped, to make the final solution close to the significant correlation.

On this basis, two types of selection models are used for phenotype selection in this study:

(1) Fitness Average:(x_n means the ranking of solution values according to a specific fitness criterion).

$$\mathrm{FA} = \frac{x_1 + x_2 + x_3 + x_4 + \cdots + x_n}{n}$$

(2) Pareto Front: selected by the K-means clustering algorithm in the last generation (99th generation) according to the clustering center solution.

The selection of the fitness average reflects the phenotype of the highest average score for all indicators, but may introduce extreme individuals specific to the indicator, allowing individuals to achieve a higher average ranking by weakening other indicator scores, while the Pareto representative solution allows the selection of the best phenotype for the relative relationship of a single indicator. For the former, the Parallel

Coordinate Plot is used to filter the top three individuals of 99–19, 92–24 and 98–23. For the latter, the unsupervised machine learning algorithm K-means is used for clustering analysis, with three clusters, in which the central cluster is selected as the representative solution, and the three individuals are 99–0, 99–8 and 99–16. The original genes are obtained on the basis of representational extraction, and since the number of buildings generated in a single block at a time is random, the original genes of the individual in a single block and full blocks are reflected by the calculated arithmetic mean (Fig. 35.7, Table 35.3).

$$X_G = \frac{x_1 + x_2 + x_3 + x_4 + \cdots + x_{13}}{13}$$

(x_n means the arithmetic mean value of a particular type of gene in a single block)

In this simulation, the top three individual results selected based on the fitness average cover the higher scoring results for each indicator score, basically achieving the optimal combined average while satisfying the high value of each indicator. The three individuals selected from each gene series reflect high consistency in terms of random subdivision level, substrate setback distance and building height, and therefore one of the optimal solutions for each gene series can be obtained (Fig. 35.8, Table 35.4).

The three types of Pareto front solutions filtered by K-means represent the three types of generative results in the last generation with certain variability, provided that the Pareto front is achieved, generating greater variability in genes as well as in phenotypes when being compared with fitness averages, and the generative models provide a visual representation comparison of model generation results in the 99th generation.

35.3.3 Results Verification

The six types of results based on the fitness average and the Pareto front are validated in the model, and the coupled calculation of regenerated block scores is conducted in ArcGIS 10.8 by physical engine simulation and data collection, to maintain the weight contribution of each indicator constant and summarize the total and arithmetic mean scores of the 13 blocks in the renewal area for comparison with the original scores (Figs. 35.9, 35.10).

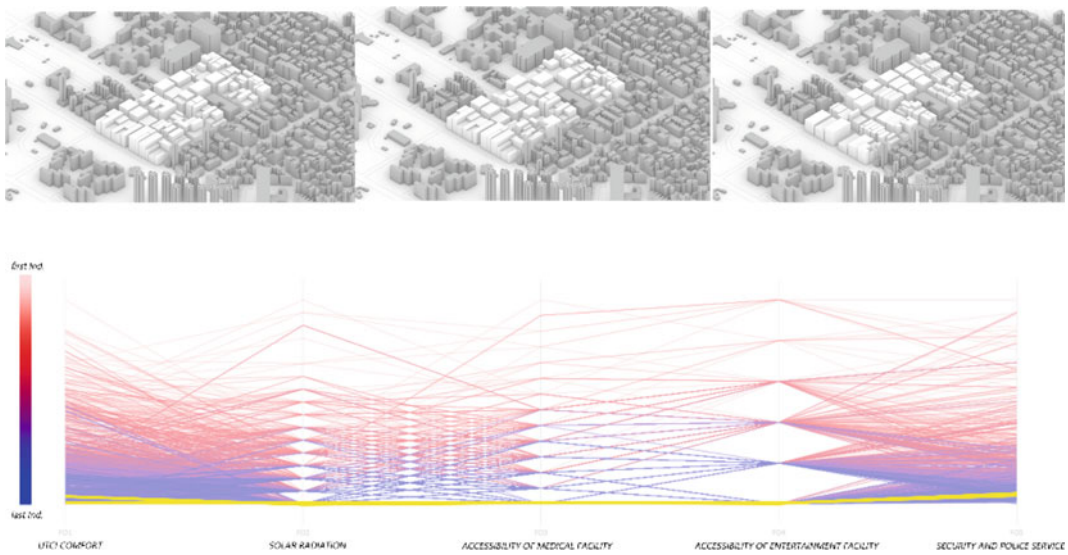

Fig. 35.7 Corresponding generation results (Left, middle, right) and PCP Lines for the three individuals of 99–19, 92–24 and 98–23

Table 35.3 Corresponding initial genes for the three individuals of 99–19, 92–24 and 98–23

	Gen.99 Ind.19	Gen.92 Ind.24	Gen.98 Ind.23
X division	3.08	3.00	3.15
Y division	2.23	2.15	1.85
Subdivide	2.13	2.08	2.13
Concession	0.93	0.93	0.93
Height	56.62	58.00	56.37

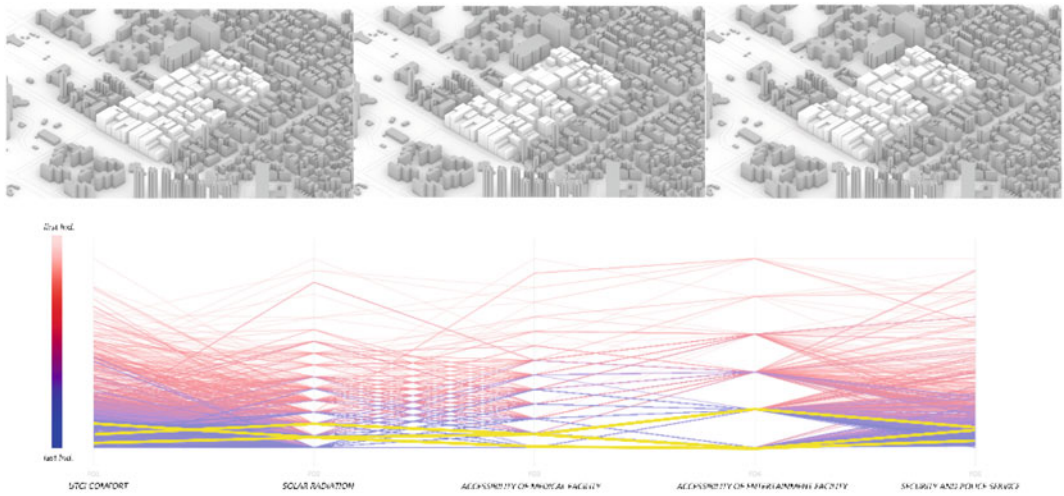

Fig. 35.8 Corresponding generation results (Left, middle, right) and PCP Lines for the three individuals of 99–0, 99–8 and 99–16

Table 35.4 Corresponding initial genes for the three individuals of 99–0, 99–8 and 99–16

	Gen.99 Ind.0	Gen.99 Ind.8	Gen.99 Ind.16
X division	2.92	3.00	3.23
Y division	2.00	2.15	1.92
Subdivide	1.99	2.13	1.95
Concession	0.93	0.93	0.93
Height	56.68	57.52	56.83

Similar to the Parallel Coordinate Plot results, the three individuals selected based on the fitness average show better results in terms of mean total scores, with less variation in mean scores. Each block follows essentially the same trend, with the highest increase in total score of 0.0381 and the lowest increase of 0.0361, an average increase of about 0.0373 and significant increases in blocks 1, 3, 10 and 13. The three individuals selected on the basis of Pareto front improve their total score by a maximum of 0.0322, a minimum of 0.0257 and an average of about 0.0290, while having certain variations in the trend of score improvement (Tables 35.5, 35.6).

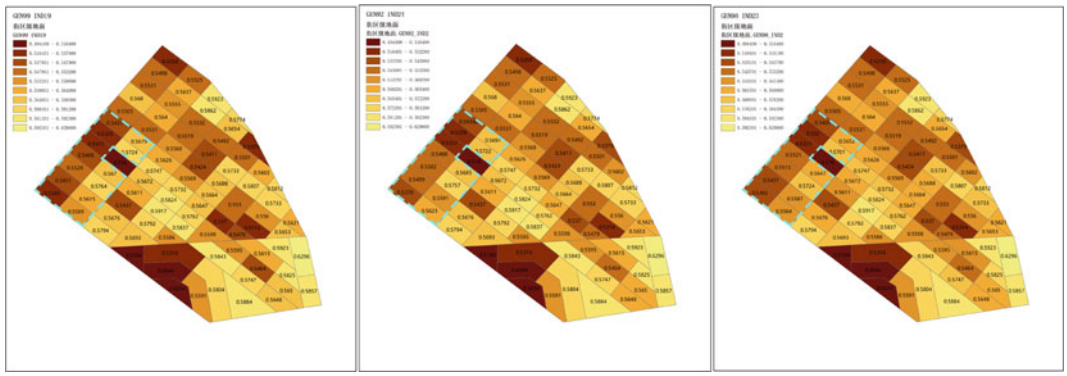

Fig. 35.9 Corresponding AIP assessment results of the three excellent individuals of 99–19, 92–24 and 98–23

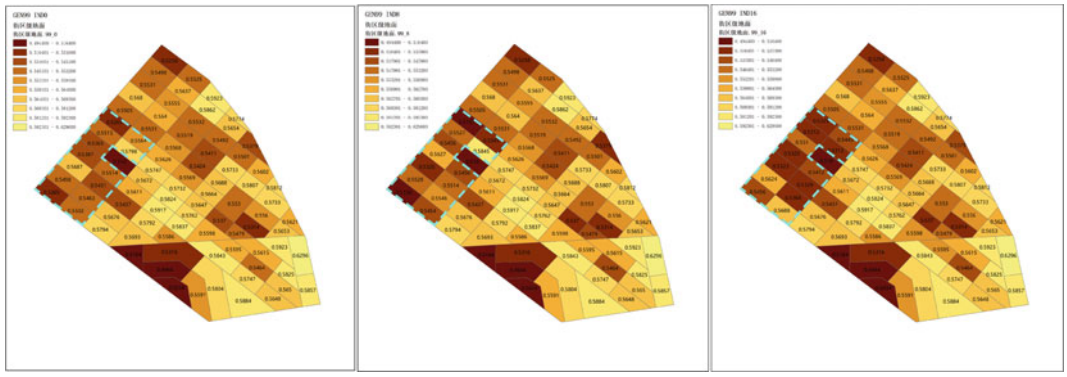

Fig. 35.10 Corresponding AIP assessment results of the three excellent individuals of 99–0, 99–8 and 99–16

Table 35.5 Corresponding AIP scores of the renewal plots for the three excellent individuals of 99–19, 92–24 and 98–23

PLOT	ORIGIN	GEN99_IND19	GEN92_IND24	GEN98_IND23
1	0.4799	0.5346	0.5378	0.5392
2	0.4929	0.5451	0.5499	0.5431
3	0.5024	0.5528	0.5502	0.5515
4	0.5332	0.5468	0.5488	0.5521
5	0.5072	0.5372	0.5322	0.5331
6	0.5050	0.5431	0.5440	0.5405
7	0.5005	0.5325	0.5298	0.5320
8	0.5392	0.5589	0.5623	0.5564
9	0.5315	0.5615	0.5591	0.5587
10	0.5196	0.5764	0.5757	0.5724
11	0.5360	0.5670	0.5685	0.5647
12	0.5389	0.5679	0.5697	0.5652
13	0.5224	0.5724	0.5722	0.5701
Average	0.5161	0.5536	0.5539	0.5522

Table 35.6 Corresponding AIP scores of the renewal plots for the three excellent individuals of 99–0, 99–8 and 99–16

PLOT	ORIGIN	GEN99_IND0	GEN99_IND8	GEN99_IND16
1	0.4799	0.5265	0.5136	0.5456
2	0.4929	0.5498	0.5528	0.5624
3	0.5024	0.5687	0.5326	0.5323
4	0.5332	0.5387	0.5627	0.5325
5	0.5072	0.5365	0.5456	0.5510
6	0.5050	0.5265	0.5127	0.5325
7	0.5005	0.5515	0.5527	0.5312
8	0.5392	0.5502	0.5454	0.5688
9	0.5315	0.5463	0.5546	0.5368
10	0.5196	0.5451	0.5514	0.5329
11	0.5360	0.5514	0.5456	0.5412
12	0.5389	0.5564	0.5345	0.5445
13	0.5224	0.5798	0.5845	0.5312
Average	0.5161	0.5483	0.5453	0.5418

35.3.4 Excellent Genes Extraction

Each generation of individuals consists of a data column of five genomes to jointly determine the phenotypic characteristics. After fitting all the genomes of the 50 individuals of each generation to obtain the arithmetic mean, the representative values of the five genomes representing each generation are collected for statistical calculation and then compared with the genes of the six excellent individuals selected (Fig. 35.11), to find out the high score significant value relationship.

For the indicator of x division, the interquartile range is [2.06, 3.56] with a median of 3.13 and a mean of 3.08. The selected range of excellent genes is [2.92, 3.32], and the suitable division score is 3.0–3.3 after rounding upwards according to the division score characteristics. As the length range in the long side direction is [114, 120] for the study plot, the suitable building group length range in the long side direction for this study area is [34.54, 40.00].

For the indicator of y division, the interquartile range is [1.60, 2.56] with a median of 2.13 and a mean of 2.08. The selected range of excellent genes is [1.85, 2.23], and the suitable division score is 1.9–2.2 after rounding upwards according to the division score characteristics, which is basically equal to the average gene level. The length range in the short side direction to the study plot is [48, 65], and the suitable building group length range in the short side direction for this study area is [21.82, 34.21].

For the indicator of subdivide, the interquartile range is [1.33, 2.42] with a median of 1.82 and a mean of 1.87. The selected range of excellent genes is [1.95, 2.13], and the suitable value for the internal subdivision is 2 after rounding upwards according to the division score characteristics, which is above the average gene level. The suitable lengths in the long/short side directions for the study area are rounded, and the suitable length ranges in the two directions for the single building in this area are [17.27, 20.00] and [15.61, 17.10], respectively.

For the indicator of concession, the interquartile range is [0.91, 0.94] with a median of 0.92 and a mean of 0.93. The values of selected excellent genes are all 0.93, indicating that 93% is the global optimal solution for the indicator of building concession, which remains largely consistent with the mean and median gene levels. After fitting the better solution range of the long/short side division, the appropriate setback distances for this area are [4.84, 5.60] for

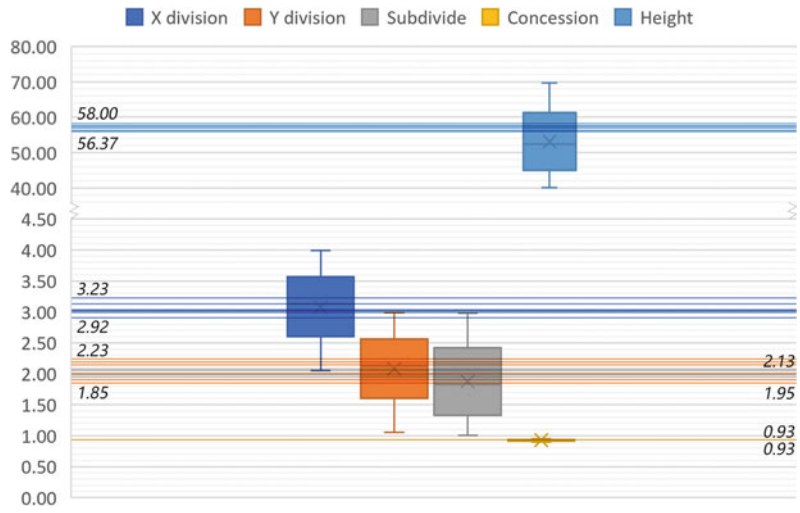

Fig. 35.11 Statistics of five types of input gene data and six excellent individual gene ranges

the length range in the long side direction and [3.05, 4.79] for the length range in the short side direction.

For the indicator of height, the interquartile range is [44.97, 61.31] with a median of 52.36 and a mean of 53.10. The selected range of excellent genes is [56.37, 58.00], which is significantly higher than the global gene level, and when combined with the floor heights, the suitable number of floors is approximately 17–20.

As a result, in Sham Shui Po and its surrounding areas, with the road network and block scale remaining unchanged, the following indicators for the renewal of the relevant buildings, based on the current situation of high-density development in Hong Kong and the AIP assessment context, are: in the direction of the long side of the site, the appropriate length of the building is 17.27–20.00 (m) and the appropriate concession distance is 4.84–5.60 (m); in the direction of the short side of the site, the appropriate length of the building is 15.61–17.10 (m) and the appropriate concession distance is 3.05–4.79 (m); the suitable number of floors of the building is 17–20. This data can provide a reference for future urban renewal or urban strategy implementation, and also can be used to re-extract excellent genes according to different optimization target orientations under renewal.

35.4 Conclusion and Future Works

This paper proposes a generic framework for the assessment and generation of urban building groups based on AIP. The assessment system is based on a literature review and provides a comprehensive quantification for urban exterior spaces, containing three levels of Safety, Accessibility & Mobility, and Comfort. The framework is able to avoid the acquisition of weights in subjective contexts through the CRITIC method in order to calculate comprehensive scores of AIP at different levels. At the same time, the combination of multi-objective optimization based on evolutionary algorithms can provide more permutation possibilities and obtain robustness after optimization by evolutionary algorithms at any time according to the goal orientation than the traditional top-down uniform planning. The proposed framework combines AIP evaluation, multi-source big data acquisition, spatial objective assignment and generation techniques under multi-objective optimization. It can be extended to other high-density urban areas in the field of age-appropriate urban space evaluation or urban renewal.

Meanwhile, the Pareto front solutions screened based on K-means in this paper demonstrate the advantages of unsupervised machine learning,

i.e., to quickly select clusters of different feature representations and to select central solutions. For the purpose of conducting future research on more iterations and more complex indicator systems, machine learning and reinforcement learning (RL) can be adopted to screen high-density solutions in evolutionary algorithms, where each individual can be considered as an agent with a reward function after objective selection, thus further accelerating optimization and achieving parallel optimal solutions.

Appendix

See Table 35.7.

Table 35.7 Glossary

Aging in Place (AIP)	The ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level
CRITIC method	One of the objective methods for determining the criteria weight
TPU planning range	The abbreviation of the third-level planning department of the Hong Kong Special Administrative Region
Jared Tarbell textures	Random subdivision texture
Multi-objective optimization	An area of multiple criteria decision making that is concerned with mathematical optimization problems involving more than one objective function to be optimized simultaneously
Evolutionary algorithm	An algorithm that uses mechanisms inspired by nature and solves problems through processes that emulate the behaviors of living organisms
Gene	Different input feature data for each individual in evolutionary algorithm
Population size	Iterative population size in evolutionary algorithm
Aging in Place (AIP)	The ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level
Crossover probability	Gene (number) exchange probability in evolutionary algorithm
Mutation probability	Gene (number) mutation probability in evolutionary algorithm

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Impacts of the Elderly-Oriented Residential Buildings in Northern Communities of the Elderly Based on Artificial Intelligence Technology

36

Jingyi Mu, Tian Wang, Zheng Sui, Minghui Xue, and Shanshan Zhang

Abstract

Most of elderly people suffer from a series of unhealthy mental and emotional states; therefore, it is crucial to provide suitable living environment and ageing service based on the psychological demands of the elderly. With the rapid development of economy and society, Artificial Intelligence Technology (AI) have also been applied to the residential design field of elderly care communities. In China, the traditional ageing housing is too narrow for the structural design, causing some problems of mental health; the current indoor space and outdoor environment can't match the elderly's need; the special climate environment in the northern region has a great influence on the design of ageing housing. This study analyses the impacts of ageing residential design based on AI of the elderly in Changchun, China. 312 elderly people living in ageing community are involved. Through the analysis of different types of the space, the needs and perception of the elderly, the results find the elderly is more satisfied with the activity area division, privacy protection and travel convenience of the elderly-oriented residential buildings. The design of home-based elderly-oriented residential buildings can effectively reduce the incidence of depression and anxiety of the elderly and improve their mental behaviour. Finally, this paper puts forward the living environment and space optimization strategies for the health of the elderly of ageing communities in northern China and put forward the application of AI in elderly care facilities.

Keywords

Elder-oriented design · Ageing community · Mental health · Artificial intelligence

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36.1 Introduction

With the advancement of science and technology and the rapid development of social economy in China, the average life expectancy of the population in the world has been significantly improved, and the population ageing is also increasingly prominent (Westbury et al. 2019). China has stepped into an ageing society in 1999, there was about 130 million elderly people, accounting for 10% of the total population (Shen and Ho 2020). The ageing society comes for the developed countries when their socio-economic development reached a relatively high level and the entire society had a relatively rich material foundation, that can be called being rich before ageing. China's elderly care industry is still developing, but the aging trend has been very serious (Wu et al. 2020). Such difference leads to the tremendous pressure to the young and middle-aged people with a small proportion of the population on the payment of supply for the elderly population. Social wealth creation and modernization cannot meet the rapid development demands of the elderly population, and it is easy to cause large social contradictions (Huhtinen et al. 2019). Elderly people also suffer from a series of unhealthy mental and emotional states such as pessimism, depression, loneliness and anxiety caused by decreased immune capacity, degraded physiological functions, dementia, cardiovascular and cerebrovascular diseases (Bony et al. 2020). Therefore, it is crucial to provide ageing service based on the psychological demands of the elderly.

With the rapid development of economy and society, AI systems have also been applied to the residential design field of elderly care communities through technologies such as the Internet of Things (IoT), covering smart home appliances, smart monitoring equipment, smart medical care and smart assistive devices, promoting the development and expansion of AI elderly-oriented residential buildings (Mehmood et al. 2019). The home-based ageing service is promoted by the government, taking the family as the core, the community as the support and the professional service as the basis, to provide socialized services for the elderly living at home with the main content of solving the difficulties of daily life, including life care and medical service (Bennett et al. 2019). However, the survey found that the traditional ageing housing is too closed for the structural design, so that the elderly lives in a narrow space, causing some problems of mental health such as the loss and loneliness of the elderly. In addition, the functional composition and outdoor environment can't match to the characteristics of the elderly, and the 'guest room style' living space is too open and lacks of privacy (Farrer et al. 2019). Moreover, the special environment in the northern region has a great influence on the design of ageing housing. Climate, temperature, ice, snow, sunlight, heavy rain, and wind and sand will greatly hinder the daily outdoor activities of the elderly (Creighton et al. 2019). Therefore, the community ageing housing is designed intelligently based on the special environment in the north, with a view to providing assistance for the development of the elderly industry.

In summary, there are many points needing our attention. Is there any difference in the impacts of elderly-oriented home-based residential community and institutional ageing residential community on the mental health status of the elderly? Whether the elderly is satisfied with AI equipment or systems in the ageing community? How does the difference in mental health of the elderly perform in different sociological demographic characteristics?

36.2 Methodology

36.2.1 Selection of Research Objects

In this study, elderly people over the age of 50 in four ageing communities in Changchun, which is a northern city, were selected as the research objects, 312 elderly people were divided into two groups: elderly in group S1 live in the elderly-oriented residential building, and elderly in group S2 live in the institutional ageing community.

The home-based ageing model (Weale et al. 2019) refers to the social nature of the community ageing service developed by the community and society to assist the main members of the family to provide daily life care, diagnosis and treatment, culture and art, spiritual comfort, and other level services for the elderly who settle in the home. It is possible to effectively combine the child ageing with family ageing, other family members provide ageing resources for the elderly, taking the family as the core of the ageing work and accompanied with the community professional service guarantee.

The institutional ageing model (Sawan et al. 2019) refers to an organization that provides comprehensive services such as diet, hygiene, life care, health management and recreational activities for the elderly. It can be an independent legal entity or a department or branch affiliated to a medical institute, an enterprise or institution, a social group or organization, or a comprehensive social welfare institution. Children can also visit the elderly at regular intervals.

36.2.2 Questionnaire

By referring to the previous literature (Wells et al. 2019) and combining with the special environment of Changchun area, the Questionnaire on Elderly-oriented Service and Spatial Evaluation in Residential Areas in the Northern Region is compiled in this study. The questionnaire mainly includes the basic information of the subject, the basic information of the ageing housing where the subject is located, the satisfaction of the subject to the ageing community, the satisfaction of the subject to the ageing service and the satisfaction of the subject to the residential building. The content of the ageing community includes building type, greening degree, outdoor landscape, property management, air quality, indoor decoration, furniture quality, ageing service, regional plan, privacy protection, entertainment facility and travel convenience. The ageing service includes regular medical examination, medical service, nursing service, square dance, poetry recitation, surrounding environment, expenses and health lectures in the community. The contents of the residential building include corridors, elderly-oriented ramps, rest areas, indoor dining, elevators, green spaces, indoor activity spaces and express storage. The rating is based on a 7-level scale, with 0–7 indicating extreme dissatisfaction, relative dissatisfaction, dissatisfaction, general, satisfaction, relative satisfaction and extreme satisfaction, respectively.

36.2.3 GDS

The GDS is used to evaluate the depression of selected elderly people in this study. The scale is single-dimensional and provides 30 test questions, with ‘yes’ and ‘no’ as the answer. ‘Yes’ is recorded as 1 score, and ‘no’ is recorded as 0 score. The higher the score, the more severe the subject’s depression. 10 scores and below can be considered as no depression, 11–20 scores can be considered as mild depression and 21–30 scores can be considered as moderate to severe depression.

36.2.4 SAS

The SAS compiled by Zung et al. (2019) (McDerby et al. 2019) is to evaluate the anxiety of selected elderly people in this study. The scale is single-dimensional and provides 20 test questions. The 4-level grading system is used, 1 indicates no or rare anxiety, 2 indicates anxiety at sometimes, 3 indicates frequent anxiety and 4 indicates anxiety at most times or all the time. The higher the score, the more severe the anxiety of the subjects. 49 scores and below can be considered as no anxiety, 50–59 scores can be considered as mild anxiety and 60–80 can be considered as moderate and severe anxiety.

36.2.5 MHS for Elderly

HMS for the Elderly (Batchelor et al. 2019) is used to evaluate the mental health status of the

selected elderly in this study. The scale includes five dimensions of emotion, personality, interpersonal communication, adaptability and cognitive ability, providing 50 test questions, with 'yes' and 'no' as the answer. 'Yes' is recorded as 1 score, and 'no' is recorded as 0 score. The higher the score, the higher the mental health level of the subject. It can be known based on the internal consistency test that the Cronbach's α coefficients of emotion, personality, interpersonal communication, adaptability, cognitive ability and the overall scale are 0.785, 0.814, 0.849, 0.917 and 0.886, respectively.

36.2.6 Statistical Analysis

The data processing in this study is processed by using the SPSS19.0 version statistical software, the measurement data is expressed by mean ± standard deviation, and the count data is expressed by percentage (%). An analysis of variance is used to analyse the relationship between mental health level and social demographic characteristics of the elderly in group S1. The t test is used to compare the satisfaction of the elderly in the group S1 and S2 with respect to the old-age community, ageing service and residential buildings. The independent t test is used to compare the depression, anxiety and mental health of the elderly in group S1 and S2. $P < 0.05$ indicates there is a statistical significance. Origin 8.5 is used for drawing.

36.3 Results

36.3.1 Analysis on Overall Satisfaction of the Elderly in Two Groups to the Current Ageing Communities

Image (Fig. 36.1) shows the satisfaction of the elderly in the group S1 to the ageing service, regional plan, privacy protection, entertainment

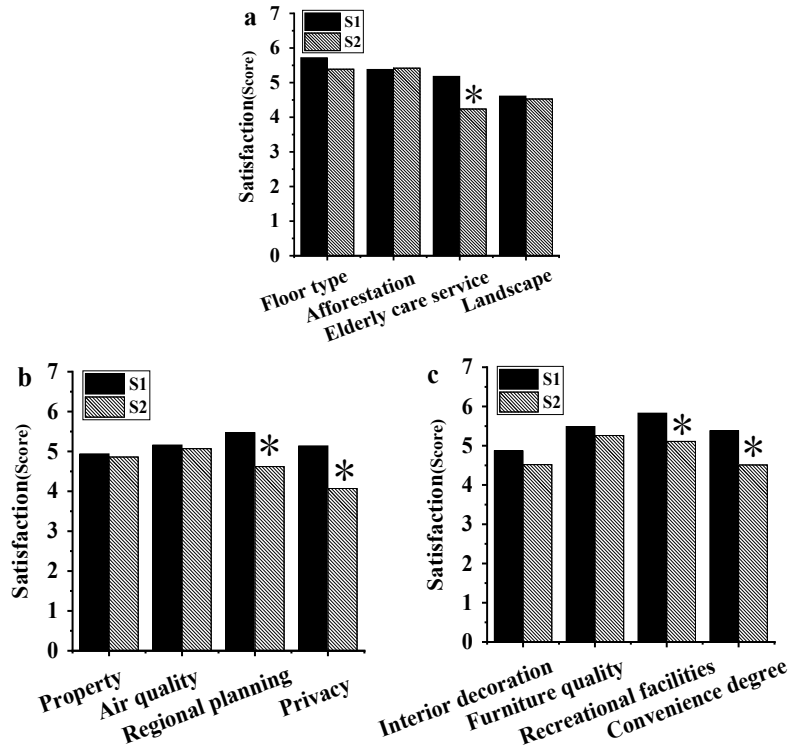

Fig. 36.1 Analysis on overall satisfaction of the elderly in two groups to the current ageing communities. *Note* Figure **a** shows the satisfaction to the building type, greening degree, ageing service and outdoor landscape; Figure **b** shows the satisfaction to the property management, air quality, regional plan and privacy protection and Figure **c** shows the satisfaction to the indoor decoration, furniture quality, entertainment facility and travel convenience. * indicates the difference is of statistical significance compared to group S1 ($P < 0.05$)

facility and travel convenience is significantly higher than that in the group S2, and the difference is statistically significant ($P < 0.05$); compared with the elderly in the group S2, the satisfaction of the elderly in group S1 to the building type, greening degree, outdoor landscape, property management, air quality, indoor decoration and furniture quality is not significantly different ($P > 0.05$).

36.3.2 Analysis on Satisfaction of the Elderly in Two Groups to the Current Ageing Services

As shown in Fig. 36.2, the satisfaction of the elderly in the group S1 with the regular medical examination, medical service and nursing service in the community is significantly higher than that in the group S2, and the difference is statistically significant ($P < 0.05$); the satisfaction on regular square dance, poetry recitation, surrounding environment, expenses and health lectures is not significantly different from those in the group S2 ($P > 0.05$).

36.3.3 Analysis on Satisfaction of the Elderly in Two Groups to Current Residential Buildings

As shown in Images (Fig. 36.3), the satisfaction of the elderly in the group S1 to the corridors, elderly-oriented ramps, rest areas and indoor dining in the current residential buildings is significantly higher than that in the group S2, and the difference is statistically significant ($P < 0.05$); the satisfaction of elderly in the group S1 to the elevators, green spaces, indoor activity areas and express storage is not significantly different from that of the elderly in the group S2 ($P > 0.05$).

36.3.4 Analysis on Satisfaction of Elderly in Two Groups to AI Equipment

As shown in Images (Fig. 36.4), the satisfaction of the elderly in group S1 with nursing robots, fall alarm systems and remote rescue systems was significantly higher than that in group S2,

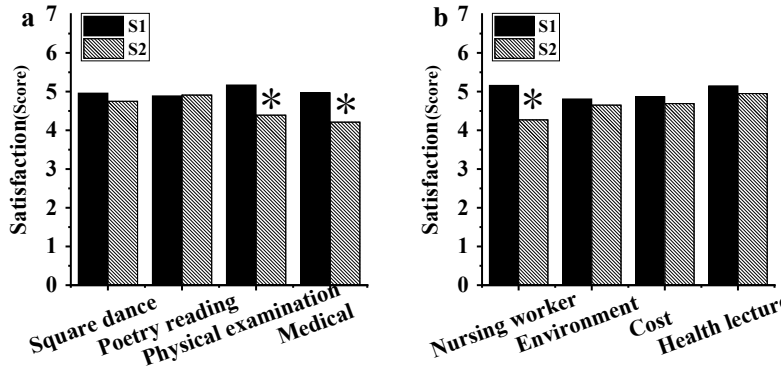

Fig. 36.2 Analysis on satisfaction of the elderly in two groups to the current ageing services. *Note* Figure **a** illustrates the satisfaction to the square dance, poetry recitation, medical examination and medical treatment; Figure **b** illustrates the satisfaction to the care worker, surrounding environment, expenses and health lecture. * indicates the difference is of statistical significance compared to group S1 ($P < 0.05$)

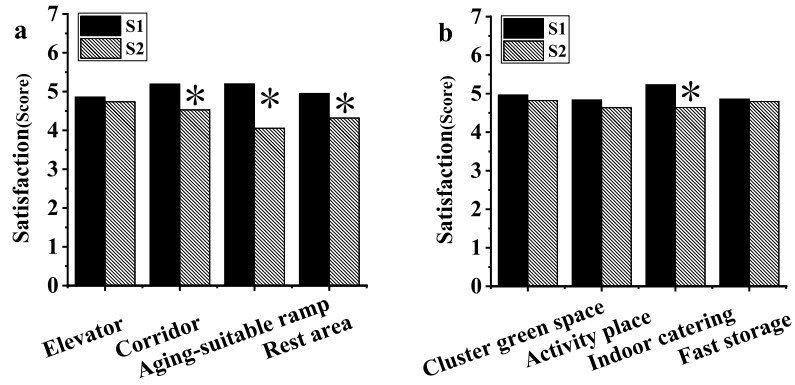

Fig. 36.3 Analysis on satisfaction of the elderly in two groups to current residential buildings. *Note* Figure **a** shows the satisfaction to the elevator, corridors, elderly-oriented ramps and rest areas; Figure **b** is the satisfaction to the green space, indoor activity area, indoor dining and express storage. * indicates the difference is of statistical significance compared to group S1 ($P < 0.05$)

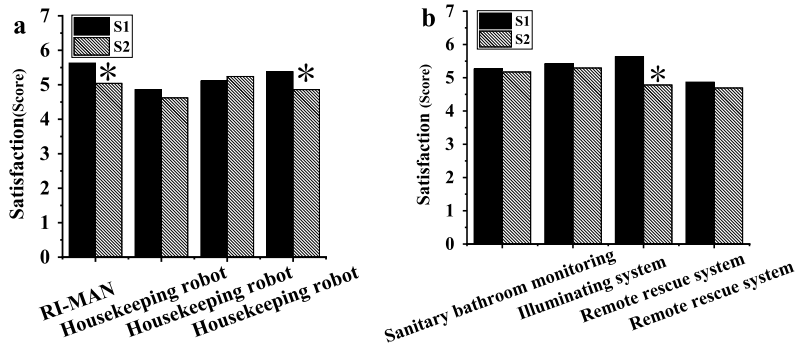

Fig. 36.4 Analysis on satisfaction of elderly in two groups to AI equipment. *Note* Figure **a** illustrated the satisfaction on nursing robots, housework robots, vital signs monitoring system and fall alarm systems; Figure **b** illustrates the satisfaction on bathroom monitoring system, smart lighting system, remote rescue systems and wearable equipment. * suggested that the difference compared to group S1 was statistically significant ($P < 0.05$)

and the differences were statistically significant ($P < 0.05$); there was no obvious difference for satisfaction of elderly in group S1 and S2 with housework robots, vital signs monitoring system, bathroom monitoring system, smart lighting system and wearable equipment ($P > 0.05$).

36.3.5 Comparison on Depression and Anxiety Degrees of the Elderly in Two Groups

As shown in Fig. 36.5a, the incidence of mild depression of the elderly in the group S1 (11.09%) is not significantly different from that in the group S2 (9.88%) ($P > 0.05$); the score for moderate to severe depression (10.53%) and the overall incidence of depression (21.62%) of the elderly in the group S1 are significantly lower than those of the elderly in the group S2, which is 27.45% and 37.33%, respectively, and the differences are statistically significant ($P < 0.05$). The incidence of mild anxiety of the elderly in the group S1 (10.84%) is significantly higher than that in the group S2 (6.18%) ($P < 0.05$); the probability of moderate and severe anxiety (4.67%) and overall incidence of anxiety (15.51%) in the group S1 are significantly lower than those in the group S2, which are 26.91%

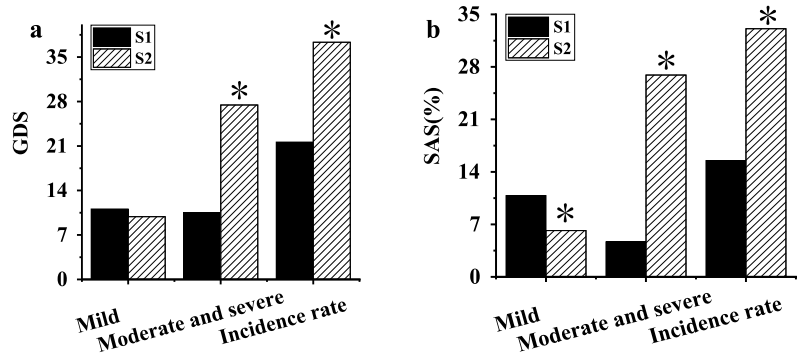

Fig. 36.5 Comparison on depression and anxiety degrees of the elderly in two groups. * indicates the difference is of statistical significance compared to group S1 ($P < 0.05$)

and 33.09%, respectively ($P < 0.05$) (shown in Fig. 36.5b).

36.3.6 Comparison of the Elderly in Two Groups to the Mental Health Levels

As shown in Fig. 36.6, the total scores of emotion, interpersonal communication, adaptability, cognitive ability and mental health of the elderly in the group S1 are significantly higher than those in the group S2, and the difference is statistically significant ($P < 0.05$); compared with the elderly in group S2, the difference in the personality of the elderly in the group S1 is not statistically significant ($P > 0.05$).

36.3.7 Correlation Between the Mental Health Levels and Sociodemographic Characteristics of the Elderly in Group S1

As shown in Table 36.1 below, there is no significant difference in the mental health level of the elderly in terms of gender, position, living status, marital status and having children or not ($P > 0.05$); there is a significant difference in the mental health level of the elderly at the age level, and the mental health level of the elderly being elder than 86 years old is significantly lower than that of the elderly being younger than 86 years old ($P < 0.05$); there is a significant difference in the mental health level of the elderly at the

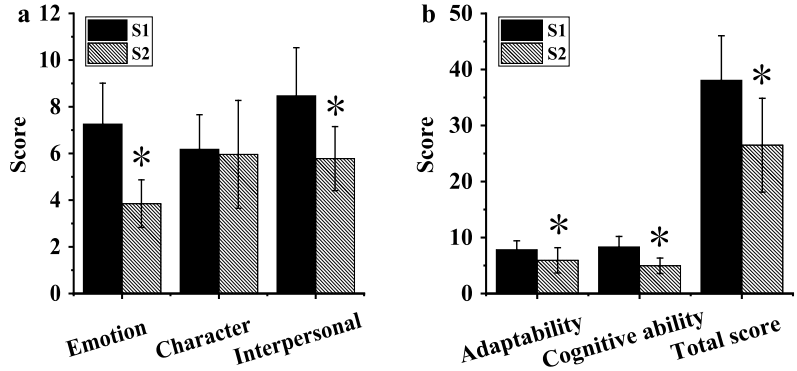

Fig. 36.6 Comparison of the elderly in two groups to the mental health levels. *Note* Figure **a** is the score of emotion, personality and interpersonal communication; Figure **b** shows the score of adaptability and cognitive ability, and the total score of mental health. * indicates the difference is of statistical significance compared to group S1 ($P < 0.05$)

Table 36.1 Analysis of variance on the mental health levels and sociodemographic characteristics

Variable	Classification	Total score of mental health	X^2	*P*value
Gender	Male	37.49 ± 7.36	3.684	0.061
	Female	38.77 ± 6.79		
Age (years old)	<55	39.64 ± 6.33	7.836	0.026
	56–65	39.52 ± 6.81		
	66–75	39.38 ± 7.28		
	76–85	38.82 ± 8.04		
	86–95	36.77 ± 6.47		
	>95	36.24 ± 6.28		
Education level	No education experience	35.92 ± 8.11	6.954	0.000
	Primary school education	36.11 ± 7.65		
	Junior high school graduates	36.30 ± 7.27		
	Senior high school	36.62 ± 6.91		
	Undergraduate	38.94 ± 7.25		
	Master and above	39.27 ± 8.11		
Monthly income	Below 1,000 Yuan	36.29 ± 9.16	6.845	0.011
	1,000–3,000 Yuan	36.54 ± 8.25		
	3,000–5,000 Yuan	36.94 ± 8.19		
	5,000–8,000 Yuan	39.07 ± 6.96		
	8,000–10,000 Yuan	39.28 ± 7.63		
	Above 10,000 Yuan	39.84 ± 8.25		
Living status	Living with children	38.52 ± 8.42	2.717	0.119
	Living with grandchildren	37.51 ± 7.06		
	Living alone	37.34 ± 6.94		
	Living with wife or husband	38.24 ± 7.25		
Marital status	Unmarried	38.11 ± 7.17	1.639	0.084
	Married	37.31 ± 7.39		
	Divorced	38.04 ± 5.82		
	Widowed	37.84 ± 7.35		
	2 children	37.55 ± 7.28		
	3 children and above	37.71 ± 6.93		
	No child	38.51 ± 7.73		
Physical condition	Worse	33.79 ± 8.31	7.492	0.000
	Bad	34.16 ± 7.37		
	Not good	34.47 ± 8.25		
	General	35.18 ± 7.31		
	Good	38.51 ± 7.53		
	Better	38.91 ± 6.82		
	Excellent	39.11 ± 6.70		

educational level, and the mental health level of the undergraduates or above is significantly higher than that of the elderly with lower education level ($P < 0.001$); there is a significant difference in the mental health level of the elderly in terms of monthly income, and the mental health level of the elderly with a monthly income higher than 5,000 is significantly higher than that of the elderly with a monthly income of less than 5,000 ($P < 0.05$); there is a significant difference in the mental health level of the elderly in terms of physical condition, and the mental health level of the elderly with better physical condition is significantly higher than that of the elderly with poor physical condition ($P < 0.001$).

36.3.8 Evaluation of Residential Environment by the Elderly in Ageing Communities

Elderly people's evaluation of the residential environment mainly includes subjective overall evaluation, public security environment, traffic environment and living environment.

Figure 36.7 shows the factors affecting the quality of life of the elderly. As shown in the figure, among the old people who participated in the questionnaire, most of them believe that 'economic income and expenditure' and 'housing quality' are the main factors affecting the quality of life, followed by 'health care' and 'transportation commute'. The economic basis determines the daily consumption behaviour of the elderly, and the higher the quality of housing, the more comfortable the life of the elderly, the higher the sense of happiness. With the ageing of the elderly, the body functions have declined, and it is needed to provide a certain medical environment. At the same time, outside traffic conditions also need a certain degree of convenience It indicates that in the construction of residential areas, it is the first priority to meet the needs of the elderly on a moderate economic basis.

Figure 36.8a shows the satisfaction of the elderly with the traffic environment of the residential area. The elderly who think the traffic environment is a normal account for 61.7%, the dissatisfied account for 20.4% and the satisfied account for only 13.8%. On the whole, the elderly think the traffic environment evaluation of the residential area is mediocre. The traffic environment affects the behaviour of the elderly to a certain extent. The better the traffic environment is, the more convenient it will be for the elderly to travel, the better their sense of happiness will be, and the better it will reflect humanistic care. The reason why the elderly are not satisfied with the traffic environment is mainly that there are more vehicles coming and going, and vehicles are randomly parked, followed by a small number of parking spaces.

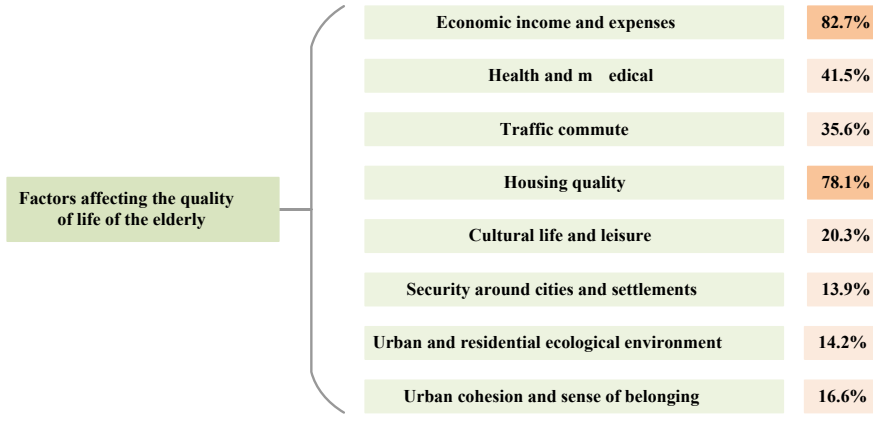

Fig. 36.7 Factors affecting the quality of life of the elderly

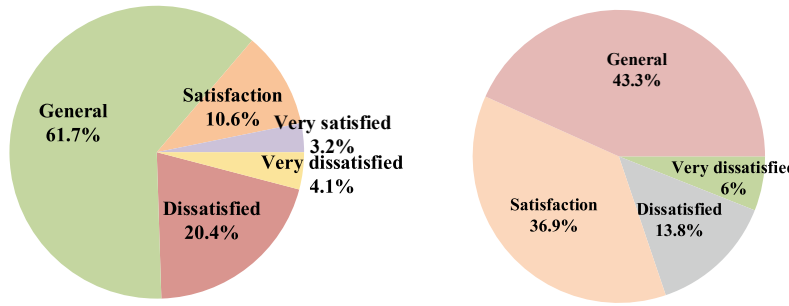

Fig. 36.8 Elderly people's satisfaction with the traffic environment and security environment of the residential area

(a) satisfaction with the traffic environment

(b) security environment

Figure 36.8b shows the satisfaction of the elderly with the security environment of the residential area. As shown in the figure, the elderly are satisfied with the overall security environment of the residential area, while only 19.8% are dissatisfied or very dissatisfied. The elderly are less able to cope with danger. A good public security environment in residential areas can ensure the safety of life and property of the elderly. In the survey of the elderly, the majority think that the existing security facilities need to be further improved, and it is necessary to strengthen the management of residential areas, control the flow of personnel, migrant registration into the home. Therefore, in the construction of residential areas, it is needed to improve the monitoring facilities, reasonable distribution control.

At the same time, it was found that some elderly people had different views on the greening of the residential areas. Some elderly people would turn the public greening land into their own vegetable fields for planting. When investigating the opinions of the elderly on the living environment of the residential areas, as shown in Fig. 36.9, it is found that the opinions of the elderly on the living environment of the residential areas mainly focus on 'public green space' and 'garbage sanitation'. This is because the residential area is the main place for the elderly to carry out their daily activities. A good ecological and green environment can not only purify the air, but also make the living environment more beautiful. The natural oxygen bar provided by green plants is also conducive to the health of the elderly. Therefore, during the construction of residential areas, the public green area of residential areas can be rationally planned to plant the green plants favoured by the elderly people, and the sites for the elderly to plant green plants can also be planned to increase the communication between the elderly and others, enhance the fun of life and realize their self-value. For the sanitary disposal of garbage in residential areas, several more centralized garbage collection points can be set up to complete the garbage cleaning work in residential areas.

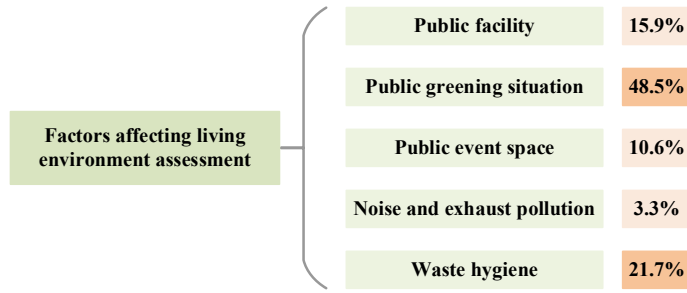

Fig. 36.9 Factors affecting the evaluation of the living environment

36.4 Discussion

36.4.1 Construction of Urban Residential Areas Suitable for Old Life in Ageing Communities

Based on the above analysis and combining the actual situation of Changchun, the following suggestions to construct the residential environment are proposed.

I. Transportation.

Most of the elderly travel on foot, residential traffic should meet the fire requirements on the basis of too much dynamic traffic, not be set between the courtyard, to avoid static traffic interference. Traffic routes in residential areas should be provided in a way that is 'smooth but not straight'. Residential roads are graded and speed bumps and corresponding traffic signs are set at intersections. The entrance and exit of people and vehicles are set, and the route of people and traffic is divided. For some roads that are too narrow, they should be widened to ensure quick passage in case of emergencies or natural disasters.

II Road.

Some roads are used for too long and lack of routine maintenance, which can lead to uneven roads and affect the mobility of the elderly. During the construction of residential areas, these roads should be maintained for levelling, and suitable roads can be set up for the elderly who use wheelchairs to pass through. Secondly, different laying methods and floor tile colours are used to make it convenient for the elderly to identify the location and distinguish the sidewalk from the vehicular roadway. Green belts can also be set to separate the sidewalk from the vehicular roadway. In addition, the winter time in the cold region is long, and there are much rain and snow. When choosing the road to lay brick, it is advised to choose ship-and-galley tile floor tile to prevent old people from sliding.

III Parking lot.

As private cars are nearly saturated, a large number of parking spaces need to be set up in the residential area, otherwise, it will affect the activity space of the elderly. During the construction of parking Spaces, centralized parking in underground garages can be built, which can not only save space, increase parking spaces, but also carry out unified management. For non-motor vehicles, such as electric vehicles and bicycles parking spaces can be set at or near the entrance of the residential area, which can be combined with rest facilities, publicity columns, etc. to save space.

IV activity space.

The activity space should be constructed according to the activities of the elderly to meet the different needs of the elderly. During the construction of activity space, the original residential resources, such as open areas such as flower beds, should be rationally utilized, with seats and other facilities for rest as the centre to facilitate neighbourhood communication. For the hot spot area of old people's activity, these can be established such as chess and card corners, propaganda board, activity sunshine room. In the choice of the activity site, it is advised to choose the sunny, leeward place, where the elderly can dance, do taijiquan, chat and have other collective activities.

V Municipal facilities.

The existing heating resources in the city should be integrated to improve heating efficiency. The pipeline shall be transformed and updated to ensure the basic living needs of the elderly. At the same time, the collection of line processing should be carried out for the remaining external wiring to avoid causing line chaos. At the same time, the residential lighting environment would also affect the night travel of the elderly. If the lighting system is not perfect, the elderly can't avoid obstacles in time when they go out at night, thus the safety is decreased. Therefore, lighting

facilities should be reasonably arranged on both sides of the road, and the lighting colour should be mainly warm tones. In addition, lighting facilities should be installed at the entrance and activity areas of the building to ensure a direct light source and avoid glare.

VI Greening.

According to the climate characteristics of the cold region, the evergreen plants with frost resistance should be selected. For some residential areas 'land without greening', it is appropriate to increase the green area by using vertical greening to save land space. Greening the negative space subdivided into residential areas can enrich the visual colour of the elderly and shorten the distance between the elderly and the plants.

VII Smart home retirement.

Considering the current situation of the elderly living alone, an intelligent elderly care system can be configured based on residential services to provide elderly care services, so that the elderly can enjoy housekeeping, food ordering and delivery, health care and other services without going out. In addition, the health conditions of the elderly can be monitored at any time and dealt with timely.

36.4.2 Application of AI Used for the Aged Group of People

Through the deep integration of artificial intelligence technology and elderly care services, with the algorithm technology and intelligent system platform as the hub, and the intelligent elderly care machine with self-learning ability as the service carrier, to provide efficient and convenient elderly care services for the elderly. AI can promote the quality of elderly care services and medical care services. AI will be mainly used in five aspects in ageing facilities: environmental intelligent control and regulation, life assistance, safety monitoring, medical rehabilitation and spiritual comfort.

I. Intelligent control and adjustment of environment.

Monitor and collect the changes of environmental indicators such as sound, light, heat, air quality through sensors, and adjust in real time according to the needs of the elderly through algorithms to maintain the comfort of the environment at all times.

II. Life assistance.

The Resyone machine wheelchair bed produced by Panasonic Corporation of Japan integrates the electric nursing bed and the fully automatic adjustment wheelchair to help the elderly realize the transfer from wheelchair to bed and from bed to wheelchair.

III. Safety monitoring.

Through the intelligent action recognition of video monitoring, the elderly fall in the monitoring environment can be identified and alarmed at the first time, so that the service staff can find and rescue in time. On the premise of ensuring the timely alarm of security monitoring, the privacy of the monitored personnel is also protected to the maximum extent. The monitored person is hidden in the monitoring screen, and only when the fall occurs, it is displayed in the screen in the form of 'matchman'. The privacy and dignity of the elderly are protected to the maximum extent. (Altum Technology).

IV. Medical rehabilitation.

AI has been applied in the fields of health monitoring and rehabilitation. The wearable intelligent monitoring device can monitor the changes of physiological indicators such as blood pressure, blood glucose, blood oxygen and heart rate of the elderly by collecting data. In terms of rehabilitation assistance, the Japanese robot Hal can help improve the brain, nerve and muscle functions of the disabled elderly. Even the disabled elderly with hemiplegia can recover and gradually recover their function with the help of Hal suit as long as they wear it. The rehabilitation robot has corresponding medical auxiliary

functions, which can not only realize mechanical automation, but also help patients recover.

V. Spiritual consolation.

The AI robots can sense the caressing behaviour of the elderly through sensors, and make interactive feedback to the elderly through shaking his head, twisting or blinking, so as to imitate the real human-pet interaction to the maximum extent, thus alleviating the negative emotions of the elderly and increasing the sense of happiness and happiness of the elderly. It also improves the behaviour and psychological status of patients with cognitive disorders and reduces the use of psychotropic drugs. Research has proved that human–computer interaction between pet robots and hospitalised patients with Alzheimer's disease can enhance the social and emotional response of the elderly by talking and touching.

36.5 Conclusion

Based on the assessment index of the environment for the aged, this study analyses the physiological, psychological and behavioural needs of the aged. A questionnaire is used to investigate the basic information, outdoor activities and the evaluation of the residential environment of 312 people who are engaged in normal physical activities in Changchun. Some suggestions are put forward for the construction of residential areas suitable for old cities. And find out the elderly in Changchun ageing community to the living satisfaction, satisfaction of new AI equipment, depression, anxiety and metal health level. Elderly people from different social backgrounds have different evaluations of the residential environment. The elderly aged over 50 years in Changchun ageing community are selected as the research objects in this study, and they are divided into two groups: the elderly in group S1 live in the elderly-oriented residential building under the home-based mode, and the elderly in group S2 live in the institutional ageing community.

Compared with the traditional institutional ageing model, the elderly is more satisfied with the activity area division, privacy protection, AI equipment and travel convenience of the home-based elderly-oriented residential design, which is specifically reflected in the regular medical examination, medical service and nursing service in the community under the ageing service, and the corridors, elderly-oriented ramps, nursing robot, falling alarm system, remote rescue system and rest areas in residential buildings.

The home-based elderly-oriented housing design can effectively reduce the incidence of depression and anxiety for the elderly, and improve the mental health of the elderly. The elderly-oriented improvement of the residences under the home-based ageing mode based on the characteristics of the northern environment is the necessary condition to improve the mental health level of the elderly in China.

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Inclusive Aging in Place: Proposal for a 0–100 Care Community in Sejong, Korea

37

Sun-Young Rieh

Abstract

In the context of Aging in Place becoming a global trend, the living environment of the elderly in an aging society is recognized as a universal environment that can embrace not only the elderly but also other socially disadvantaged populations, such as children, women, and the disabled, who ultimately form the majority, to achieve authentic social sustainability. Equity in a built environment can be achieved by allowing access to limited resources in the city through walkability, public safety, access to nature, as well as opportunities for socializing and participation. Only an inclusive design induced by dignity and respect that moves away from segregation and exclusion can create a place that leaves no one behind, as also confirmed by the WHO's "Global Age-Friendly Cities Guide" and "Building Child-Friendly Cities: A Framework for Action" by UNICEF. This article examines how major issues, such as intergenerational approaches, facility-sharing, inclusive smart city, and social care, are explored among related organizations that collaborate to create a special neighborhood in the City of Sejong and design detailed strategies for an inclusive design for Aging in Place. As a Master Architect for a "0–100 care community," the author proposed a masterplan in which social care is realized through the arrangement of community facilities in housing, schools, a community center, and community yards through detailed architectural strategies reexamining the issue of the UNSDGs.

Keywords

Social sustainability · Intergeneration · Age-friendly

37.1 Introduction

Aging in place is a global trend in the context of global aging and the importance of the built environment in aging in place is extended in a wide spectrum, as shown in WHO's report "Active Ageing: A Policy Framework" (Fig. 37.1) and "Global Age-Friendly Cities: A Guide" (Fig. 37.2). Outdoor spaces and buildings are specifically mentioned with housing and transportation for age-friendly city guidelines in addition to physical environment as one of the determinants of active aging. However, aging in place cannot be realized without more intangible qualities, such as community support and social

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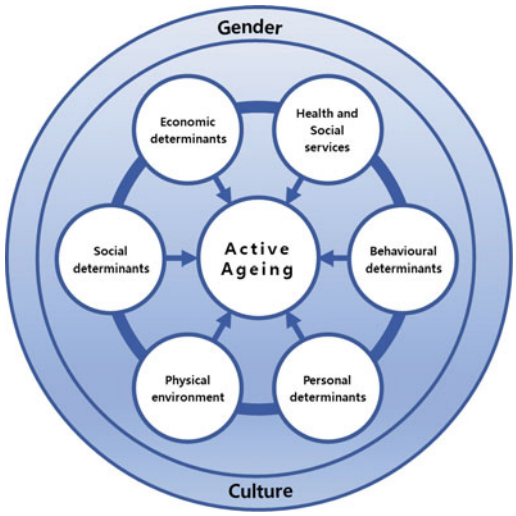

Fig. 37.1 Determinants for active ageing (WHO 2002)

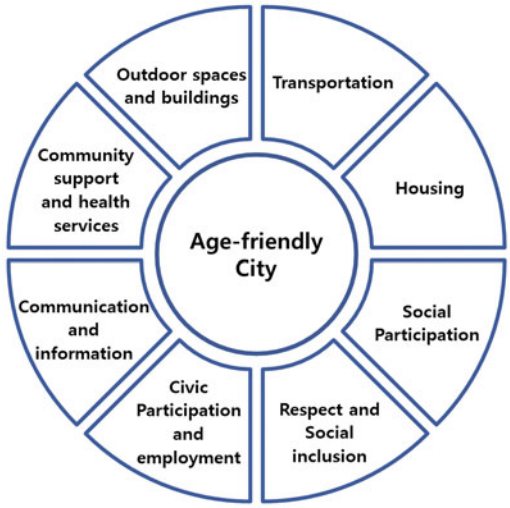

Fig. 37.2 Topics of age-friendly city (WHO 2007)

participation, and social inclusion in addition to age-friendly built environments. Determinants of active aging include "social determinants" and "health and social support" (WHO 2002), and the WHO guide also counts "social participation," "respect and social inclusion," and "community support and health services" as necessary qualities for creating age-friendly cities (WHO 2007).

Given these points, social sustainability has become a critical field for policy-making in aging societies. Sustainability, which is represented by three pillars—environmental, economic, and social—needs to be carefully recalled because social sustainability lacks clear normative value compared to environmental and economic sustainability in capitalist societies. The UN Sustainable Development Goals (UNSDGs) provide a valuable framework for discussing social sustainability within a broader context of sustainability. Targets of UNSDG 11 "Sustainable Cities and Communities" address a wide range of urban challenges, summarized in Table 37.1 (Maha Al-Zu'Bi and Vesela Radovic 2019).

The majority of SDGs concern the physical environment, with social aspects such as safety, inclusivity, and accessibility, with a special focus on the needs of socially disadvantaged people in vulnerable situations. The concept of social sustainability varies according to the socio-economic situation of each country. Davidson (2009) points out that sustainability is a field of politics and what to sustain is not clearly defined, asking "What do we want to sustain?" For example, Stern and Polese identified areas of social sustainability as governance, social, and cultural policies, social infrastructure, public service, urban land and housing, transport and accessibility, employment, economic revitalization, and the building of inclusive public space, while Seguin and Germain identified it as localized effects of national policies, health and education, infrastructure, housing, local urban management, and historical factors (Davidson 2009).

The OECD "Better Life Index" and "How's Life?" are valuable supplementary tools for informing discussions of social sustainability, covering various topics such as housing, jobs, education, civic engagement, life satisfaction, work-life balance, income, community, environment, health, and safety. For example, on the topic of community, frequency of contact with others and quality of personal relationships are identified as critical determinants of well-being because strong social networks can provide emotional support, job access, services, and material opportunities (Better Life Index 2022). Weak social networks can result in limited economic opportunities, lack of contact with others,

Table 37.1 Targets of UNSDG 11 sustainable cities and communities

Targets of Sustainable Cities and Communities(UNSDGs 11)
1. Ensure access for all adequate, safe, and affordable housing and basic services and upgrade slums
2. Provide access to safe, affordable, accessible and sustainable transport improving safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situation, women and children, persons with disabilities and older persons
3. Enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
4. Strengthen efforts to protect and safeguard the world's cultural and natural heritage
5. Significantly reduce the number of death and number of people affected …caused by disaster
6. Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
7. Provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
8. Support Positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
9. Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters and develop and implement, in line with SFDRR, holistic disaster risk management at all levels.
10. Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

and feelings of isolation, which can lead to family breakdown, job loss, illness, and financial difficulties. More than 90% of people across OECD believe that they know someone whom they could rely on in a time of need. In Korea, this number was 80%, which is well below the average of 90% showing that GDP growth is distinct from quality of life. It is reported that older people are three times more likely to lack social support compared to younger people (OECD 2020). Given these points, social sustainability is not a uniformly assessable model, as Griessler and Littig (2005) pointed out, providing an alternative model from the Global South as opposed to the Western/Northern sustainability model, which could be represented by OECD countries (Griessler and Littig 2005). While UNSDGs target the Global South, the Global North could look to the Global South for examples of strong and sustainable communities.

What about social sustainability for aging in place? The aging process can generally be divided into three processes—biological, psychological, and social. The physical environment can facilitate the process of "involution" and, if it is well prepared in advance, it can slow down "senescence." The biological process is influenced by the environment and both the psychological and the social aspect of aging can vary across different living environments later in life. Regardless of elderly people's decreased mobility, physical activity, and social interaction are critical for the quality of life of the elderly; creating neighborhoods with safety, accessibility, and convenience is one of the most critical determinants for aging in place. In this context, an inclusive environment is emerging as a topic that can integrate many aspects of social sustainability. When an inclusive design is defined as something related to the physical body of the user in terms of diversity and life cycle, an expanded concept of inclusive design in urban environments can encompass social aspects in a holistic manner. The case study in this paper introduces the possibility of neighbors providing psychological and social support to each other through the transparent and inclusive design of a shared public space, which in turn makes it possible for social support and social care to slow the process of aging down.

The WHO identified "determinants of active aging" with culture and gender as cross-sectional attributes. These features are related to social aspects which are known to be critical for autonomy and quality of life for elderly people. That is why we need to pay attention to the social

Table 37.2 Contributory factors of urban social sustainability (Dempsey et al. 2011)

Non-physical Factors	Physical Factors
• Education and training • Social justice: inter-or intra-generational • Participation and local democracy • Health, quality of life and well-being • Social inclusion (and eradication of social exclusion) • Social capital • Community • Safety • Mixed tenure • Fair distribution of income • Social order • Social cohesion • Community cohesion (i.e. cohesion between and among different groups) • Social networks • Social interaction • Sense of community and belong • Employment • Residential stability (vs. turnover) • Active community organizations • Cultural traditions	• Urbanity • Attractive public realm • Decent housing • Local environmental quality and amenity • Accessibility (e.g. to local services and facilities/employment/green space) • Sustainable urban design • Neighborhood • Walkable neighborhood: pedestrian friendly

dimension of sustainable development. Through the meta-analysis of factors related to urban social sustainability, Dempsey et al. (2011) categorized factors contributing to urban social sustainability into physical and non-physical factors, as shown in Table 37.2 (Dempsey et al. 2011). Physical factors included pedestrian-friendly walkable neighborhoods, attractive public spaces, and accessibility and quality of environment. Non-physical factors included more critical issues related to the society's function, such as social inclusion, social justice, quality of life and well-being, social capital and social cohesion, networks, interaction, and sense of community and belonging, in addition to some tangible characteristics of good community, such as safety and stability. In this sense, inclusivity, emphasized by UNSDG-11, "Sustainable City and Community", can be considered the primary theme for the realization of aging in place.

With the concept of inclusivity, social sustainability can focus on the development of programs, processes, and products promoting social interaction to protect vulnerable people, respect social diversity, and leverage social capital (Heylighen 2017).

As basic characteristics for social sustainability, inclusive communities' collective aspects of social life have garnered the attention of researchers and professionals focused on issues of sustainability. Dempsey et al. (2011) identified interrelated measurable aspects of the sustainability of a community as social interaction/social networks in the community, participation in collective groups and networks in the community, community stability, pride/sense of place, and safety and security (Dempsey et al. 2011). Every society has different layers of issues related to aging depending on their unique socio-economic and socio-political situation and cultural and gender issues. Thus, an inclusive environment for aging cannot be defined without a clear locally developed assessment tool. Being responsible for developing inclusive environments, architects and urban planners must pay special attention to the way that other societies have achieved inclusive and sustainable environments that support aging populations.

A central issue embedded in aging and inclusivity is "care," which is deeply related to culture and gender. Defining gender and culture as cross-cutting determinants for active aging, the WHO emphasized that culture surrounds all individuals and populations, shaping the way we age. They considered gender as a "lens" through which we consider the appropriateness of various policy options affecting the wellbeing of men and women (WHO 2002). "The Care Manifesto" emphasized the importance of caring communities in which everyone can support each other and generate networks of belonging. It considered freedom from care as bound up with the intimacy of close relationships, such as family and kinship, specifically mentioning core features for the creation of caring communities: mutual support, public space, shared resources, and local democracy (The Care Collective 2020).

Restructuring space as a means of building caring communities and improving community members' health and environment are consistent with aging in place's requirement to support the elderly's decreasing mobility and encourage their physical activity and social interactions. Sharing accessible indoor public spaces and outdoor green spaces is particularly important to fostering social care distinct from individualized care. Sharing public spaces is only possible when architects and planners restructure infrastructure, such as schools, libraries, and parks. People sharing public resources, both material and immaterial, is only possible when the strong cohesion among neighbors in a community allows for an informal mode of localized care. Lattig and Griessler (2005) also specifically point out the problem of gender-biased care and emphasized that gender-neutral care should be incorporated into the formal sector of society to make it socially responsible for the community (Griessler and Littig 2005).

OECD Better City Index revealed that a society's increased GDP does not necessarily guarantee the wellbeing of people in the society, especially among socially disadvantaged groups. Therefore, social sustainability, inclusivity, and care are not part of the discourse in the Global South or North, and specific solutions considering the local context by design professionals are crucial. By sharing information among societies, we can pass on knowledge embedded within specific localities and achieve meaningful progress in social sustainability. The role of architects and urban planners cannot be overemphasized in this process.

In this article, I introduce my own experience as a Master Architect (MA) of neighborhood design to show how inclusive aging in place in a community in the city of Sejong has been explored to address the issue of inclusivity and aging in place under a framework of "intergenerational space", "facility share", "inclusive smart city", and "motivation for participation" coordinating schools and community centers, as well as community parks with a housing complex of 500 units.

37.2 Material and Method

37.2.1 Methodology of Case Study

This case study is developed in three steps. First, I conduct a literature review to derive our main concept—the environment for aging in place and the attributes of social sustainability necessary for a community to achieve inclusivity—"intergenerational space," "facility share," "inclusive smart city," and "motivation for participation."

Second, I carefully review the possible spaces where these spatial strategies can be embedded and analyze the strategic design necessary to deliver these concepts.

Third, I discuss specific ways of implementing aging in place in the proposed plan, focusing specifically on spatial design, pairing space with spatial strategies. This case study thus shows the practical embodiment of various theories about aging in place explored under the umbrella of social sustainability focusing on inclusivity.

37.2.2 Context of New Administration City, Sejong

Sejong is located 120 km south of Seoul and was designed as a city for accommodating government employees and their families. Construction began in 2007 and the first group of residents arrived in 2011. The city is composed of several districts embedded within neighborhoods creating a ring shape connected with a major Bus Rapid Transit (BRT) route under the master plan of accommodating a population of 500,000 by 2030. Every district has its own characteristics with designated functions, such as the Central Administration District, Local Administration District, High-Tech Industry District, Culture and International Exchange District, University & Research District, and Medical Services District. The concept of "0–100 aging in place" is derived and developed from "Smart Healthy city that promotes walkability" in the Medical Services district, which was determined in advance when the master plan of the city was finalized and documented (Fig. 37.3). Since the public sector has initiated advanced urban planning for cities, several phases of development were created. This project is the first of its kind to integrate public buildings and schools, parks, and housing. MA could propose plans to further the special characteristics of a given district based on MOU among related authorities, such as the Local Ministry of Education, Korea Land & Housing Cooperation, the City of Sejong, and multifunctional administrative city construction agencies to promote successful community design.

The individualized separate development and design, and construction of such cities have heretofore been difficult to achieve. Therefore, developing a master plan was critical to realizing such a city of "aging in place" with an approach in urban design that facilitates intergenerational spatial design through shared facilities and strategic layout of community spaces that link and accelerate community participation in an inclusive atmosphere (Fig. 37.4).

37.3 Principles of Spatial Strategy for Inclusivity

The quality of neighborhoods plays a very important role in maintaining sustainable cities. The living environment of neighborhoods affects social capital through increased social sustainability (Yoo and Lee 2016). For example, a pedestrian-friendly urban environment makes people feel close to their neighbors and gives them a sense of community (Wood et al. 2010). Accessible public facilities strengthen networks among residents, providing opportunities to embrace multiculturalism (Putnam and Feldsein 2003). In addition, street connectivity, safety and livability, and public transport all influence the voluntary interaction of residents and create a sense of community among them (Mason 2010).

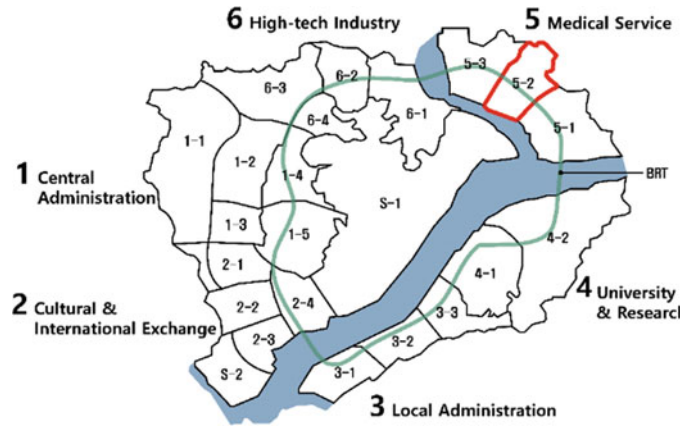

Fig. 37.3 Project location in the city of Sejong

Fig. 37.4 Three major locations of community share

What about inclusive aging in place for elderly people? There are some researches on the elderly people's preferred places for social interaction, for example, community space shared with younger generations. Easy access by public transportation and by foot, safe and reliable routes, and green spaces are all desirable qualities for spaces that engender a sense of community among residents, both for elderly people and those who care for them. The 0–100 care community principles of spatial strategy, such as "intergenerational space", "facility share", "inclusive smart city", and "motivation for participation", are set based on a variety of relevant research regarding aging in place.

37.3.1 Intergenerational Space

Elderly people feel socially alienated when reaching old age, with diminishing social relationships worsened economic conditions, deteriorated physical abilities, and a place that makes them feel a sense of community is very critical. However, many available community facilities for the elderly promote segregation between generations. Therefore, community facilities that can be shared by multiple generations are needed. Accordingly, Choi and Warner (2015) suggested that a comprehensive plan reflecting the needs and wishes of the elderly and families with children is necessary (Choi and Warner 2015). UNICEF has defined attributes of child-friendly cities in terms of the rights of young children, as shown in Table 37.3 (UNICEF 2004). Aspects of social attributes integral to age-friendly cities can be

Table 37.3 Comparison of age-friendly city and child-friendly city

Age-friendly City : Outdoor space & Buildings(WHO 2007)	Child-friendly Cities(UNICEF 2004)
	1. Influence decisions about their city
	2. Express their opinion on the city they want
	3. Participate in family, community and social life
1. Pleasant and clean environment	4. Receive basic services such as health care, education and shelter
2. Importance of green spaces	
3. Somewhere to rest	5. Drink safe water and have access to proper sanitation
4. Age-friendly pavements	
5. Safe pedestrian crossings	6. Be protected from exploitation, violence and abuse
6. Accessibility	
7. Secure environment	7. Walk safely in the streets on their own
8. Walkways and cycle paths	8. Meet friends and play
9. Age-friendly buildings	9. Have green spaces for plants and animals
10. Adequate public toilets	10. Live in an unpolluted environment
11. Older customer	11. Participate in cultural and social events
	12. Be an equal citizen of their city with access to every service, regardless of ethnic origin, religion, income, gender or disability

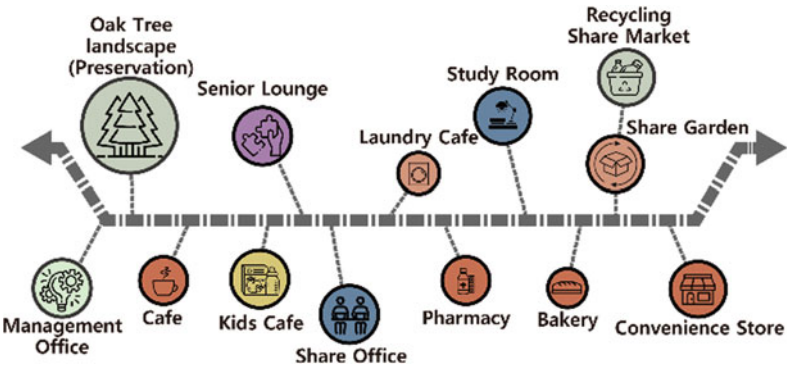

Fig. 37.5 Concept of intergenerational space along public path

summarized as walkability, access to nature, public safety, socializing, and participation, in addition to child-specific aspects such as access to friends and opportunities for play. Covering the specific age-based needs of residents, intergenerational space can be strategically provided by adjacency and linking different single-generation facilities if multigenerational facilities are not appropriate (Fig. 37.5). In addition to intentional programs for multigenerational community space, spaces shared by households with children, elderly people, and single adults allow for everyday multigenerational contact between residents, fostering a shared neighborhood spirit in the housing complex, community center, and school.

37.4 Facility Share

Central to community participation is one critical principle related to intentional policy for shared spaces. The aging in place guidelines provided by US National Conference of State Legislatures (NCSL) specify the joint use of public facilities in terms of modification of land use plans to meet the needs of elderly residents. Using community facilities to provide multiple services allows for better access to services and promotes community cohesiveness. Joint use of community facilities can provide several benefits for older adults. Access to recreational facilities within close proximity to one's residence can improve physical and mental health (Farber and Shinkle 2011).

Facility share is developed in two strands (Fig. 37.6). One is the mixture and redistribution of basic social spaces, such as gyms, libraries, multi-purpose halls, and cafeterias. These spaces are typically included in each school, community center, and housing complex, though the scale varies. Another strand is the coordination of the use of spaces based on designated scheduling during weekdays and weekends for school children and other community residents, including elderly people and parents. The multigenerational use of these common spaces will facilitate unexpected encounters among community members and render them meaningful places with inclusive atmospheres. Voluntary work by seniors to ensure basic maintenance of these places can be a central part of their function. The elderly, with relatively loose schedules, can be a valuable resource to ensure the smooth operation of community spaces.

37.4.1 Inclusive Smart City

Smart cities inevitably embed equity issues in communities because of the digital divide between generations that develops with the advancement of digital technology. As a basic principle of smart cities, optimized resource distribution is always beneficial for young adults with fancy digital tools because publicly collected data is produced by, e.g., credit cards and smartphones, which are not necessarily must-have items among elderly people, children, or socially disadvantaged people with personal reasons.

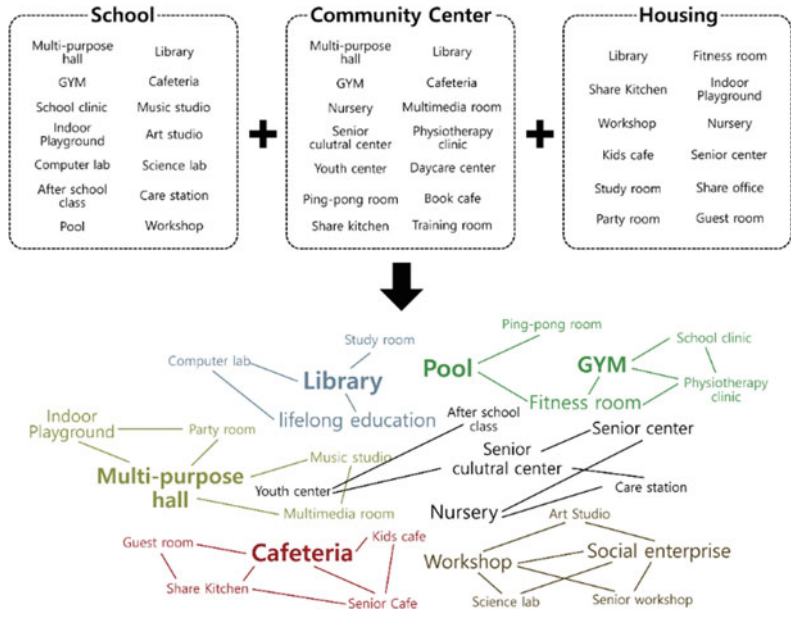

Fig. 37.6 Common facilities restructured for facility share

How, then, can we optimize smart cities to be inclusive and humane for every member of the community? This project found that the special zone along public transportation routes works as an area of natural surveillance and smart monitoring for caregivers. With the advancement of smart cities, bottom-up approaches and inclusive data collection that includes socially disadvantaged groups become critical for closing the digital divide between generations in an aging society. Considering the behavior of socially disadvantaged groups such as women, children, the elderly, and the disabled, smart cities must transform to provide inclusive, rather than top-down machine-oriented, support.

37.4.2 Motivation for Participation

In aging societies, the majority of human capital consists in elderly people with diverse backgrounds. The WHO recommends the participation of those seniors in community events not only as simple attendees but as active planners through empowerment and autonomous participation. Transparent spaces adjacent to community walkways can expose the activity inside to encourage the participation of seniors who want to be active members of a community (Fig. 37.7).

Diverse learning and teaching activity is possible depending on the level of digitalization or skill regardless of one's age as long as a sense of community is formed. Senior's volunteer work in school cafeterias and teenager's volunteer work in the silver center are examples of community participation. The social problem of population decline in Korea is known to be related to young women's reluctance to marry due to the inevitability of having to compromise and sacrifice personal career goals. When community care is activated, elderly people with experience in childcare can be an important source for alleviating the burden placed on women in the neighborhood.

37.5 Discussion: Proposed Space and Implementation

The central issue of 0–100 aging in place is "community care" as a normative definition for sustainable neighborhoods based on a sense of community. Five carefully chosen locations are provided for the implementation of a strategic approach to creating sustainable neighborhoods.

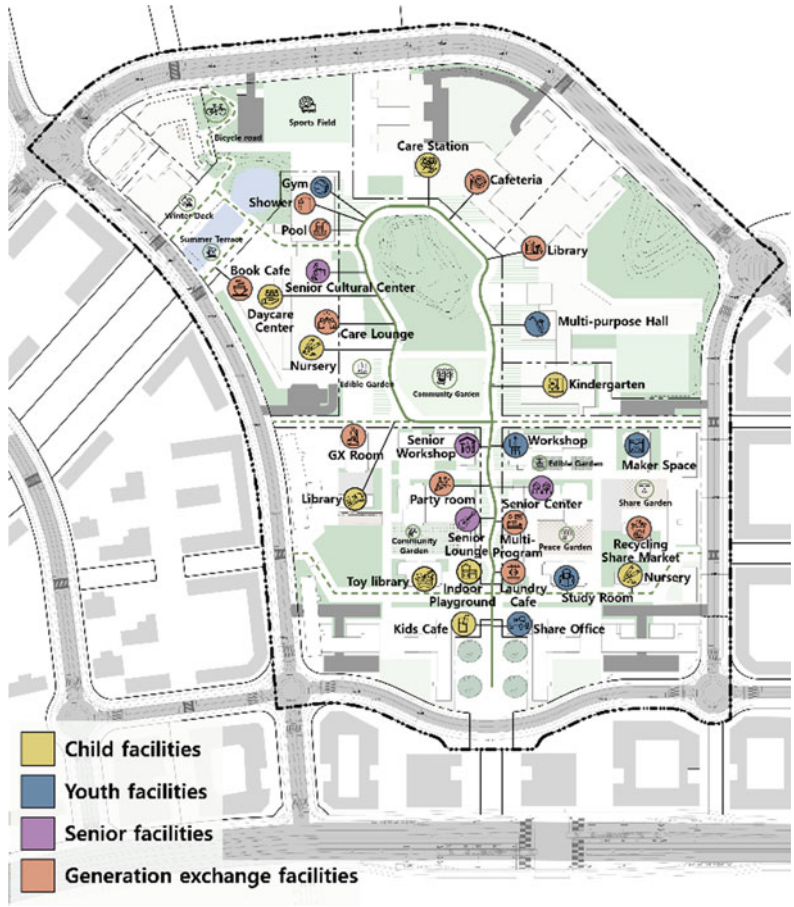

Fig. 37.7 Exposed community spaces waiting for community

The locations are schools, care lounges in community centers, central green paths, safe mobility zones, and community walkways. These locations are the most suitable locations for realizing inclusive principles of social sustainability, as shown in Table 37.4.

37.5.1 School as a Community Hub

Schools have been considered one of the most basic public infrastructure in communities since Perry's concept of a neighborhood concept was defined in the 1930s. Schools as potential spaces

Table 37.4 Proposed space related to spatial strategy

Principles of spatial strategy	Proposed space
Intergenerational space	School as a community hub
Facility share	Community care lounge linking senior center and nursery
Inclusive smart	Central green path linking intergenerational spaces
Motivation for participation	Safe mobility zone for care
	Seamless pedestrian walkway

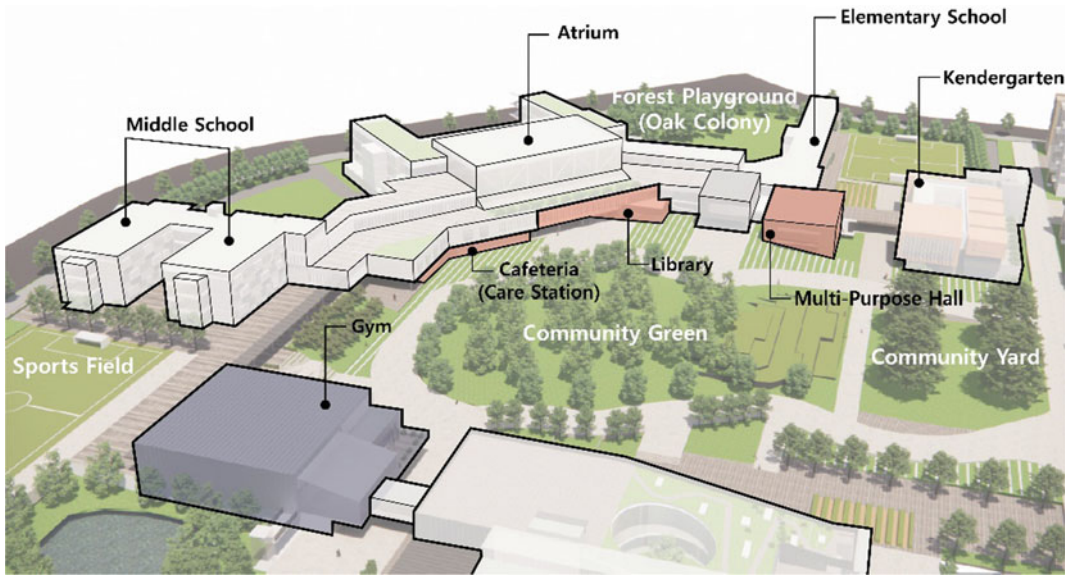

Fig. 37.8 School with shared community facilities

for care, education, and socializing among community members have received increasing attention, becoming a critical aspect for future schools to address the need for continuing education in aging societies. The multifunctional role of schools is not only emphasized in regard to extending operational hours for children but also in regard to the opportunities they can provide to elderly people who live within walking distance, allowing socializing and providing programs for health and wellbeing. Spaces inside the school, such as cafeterias, libraries, sports halls, and multi-purpose halls, are critical spaces for the education of students and community members. In addition to the practical need to share school facilities, social sustainability needs can also be met by school spaces because they are ideal settings for socializing among community members regardless of age, gender, ethnic background, and class (Fig. 37.8).

Broekhuizen (2021) specifically mentions the significant advantages of the socializing function provided by schools. Social education of children can be realized by working in classes, groups, and teams. In addition, recreation time in the schoolyard and during after-school care if school is designed for those functions in advance also fosters socialization. Broekhuizen considers the benefits of integrated space under the concept of care, for example, that socially, economically, ethnically, and culturally diverse groups of children can develop social skills during their most important developmental period (Broekhuizen 2021). Integrated spaces also benefit the elderly, who may be bound by family and kinship and increase physical activity because these spaces give them a chance to socialize while, for example, eating, learning, teaching, and doing volunteer work. To make related spaces that can be shared among community members, this project provided several spaces for multi-purpose use during and after school hours. In addition to designing the sports hall and pool, the multi-purpose hall for extended use of community members, the library was designed as two levels, with the lower level for general community use and the upper level as an education center, which is exclusively used during school hours and converted into a shared community space after school hours for extra-curricular activity and community activity.

Another strategically designed place is the school cafeteria, which previously functioned only as a space for cooking and eating but now

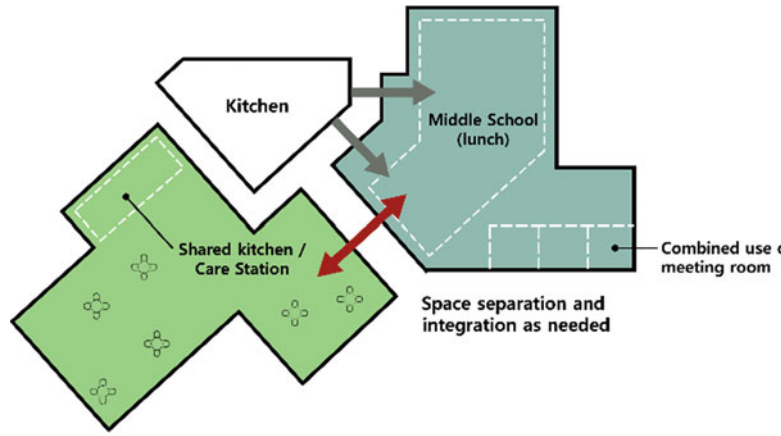

Fig. 37.9 Shared school cafeteria with flexibility

has an embedded care station next to the kitchen. It functions as an accommodating community meeting place and faces a green space, granting every passerby the chance to see community events held inside the school (Fig. 37.9).

37.5.2 Community Care Lounge Linking Senior Space and Nursery

The community center, which accommodates the community office, nursery, daycare, and silver center, is a strategic space for multifunctional as well as intergenerational space in terms of share of care issues. Being juxtaposed horizontally and vertically, caregivers and care receivers can share their sense of community through the care lounge, which is a flexible social space linking the nursery and senior space. It can provide efficient drop-off and pick-up functions in a protected atmosphere, facilitating interaction and communication among caregivers and caretakers that could occur while waiting for pick-up, making care a valuable and essential public good instead of an isolated family matter. The courtyard inside the facility functions as a visual link between users in the lower and upper levels, increasing chances to socialize. The community care lounge will also be used by teenagers, many of whom have a kinship with the facility users, for volunteer care work, making the space more animated and activated.

Roof gardens divided into two different locations can accommodate diverse outdoor activities; one is a rather open active spot, sharing the activity with the passerby in the street and the other is a peaceful therapeutic garden for elderly people facing community green space accessible from the silver center. From this strategic outdoor space, diverse community activities such as barbeques, flea markets, everyday garden work, and walking are expected on an everyday basis. In front of the care lounge is a welcoming terrace provided for family members hanging around before and after drop-off and pick-up, which can also help with managing the overflow of people from the care lounge space during peak usage times.

In aging societies, seniors as both care receivers and caregivers can take care of grandchildren and their parents in the same space. The care lounge provided in the visible location in the community center can be a valuable community public space for strengthening community cohesion through care-related activities (Fig. 37.10).

37.5.3 Central Green Path Linking Intergenerational Spaces

Housing units are composed of various sizes and number of rooms to accommodate diverse households and lifestyles. So far, a typical

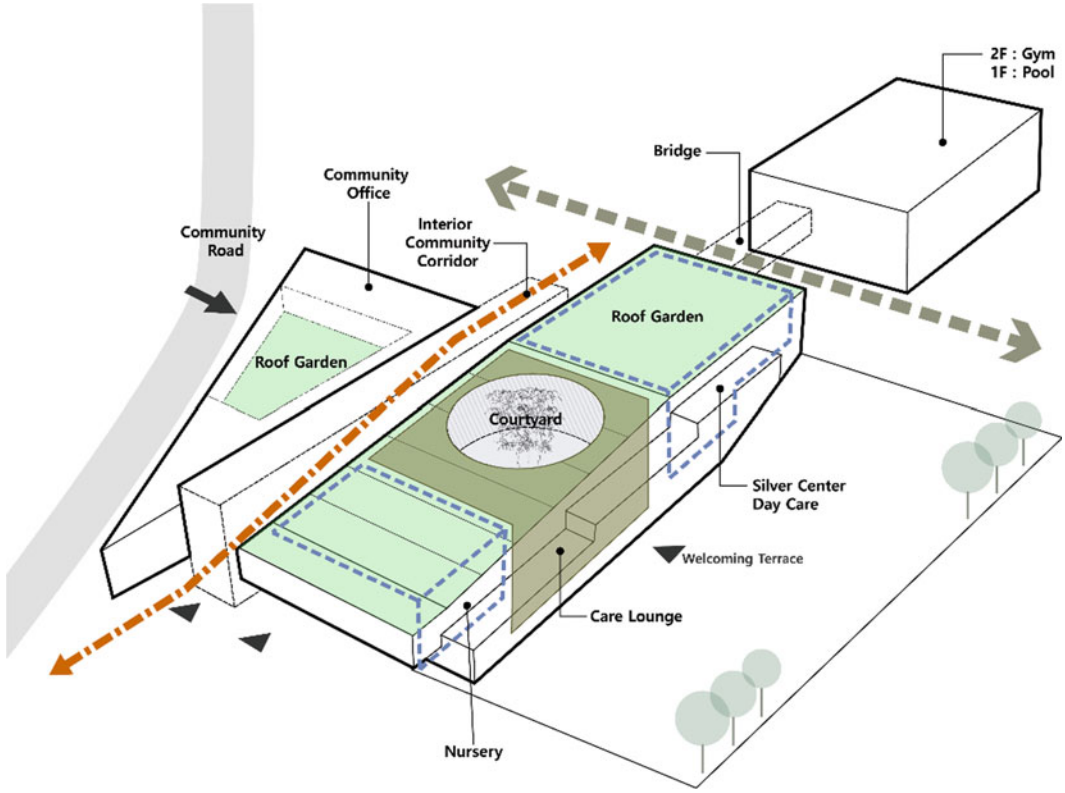

Fig. 37.10 Community center linking intergenerational care

housing project in the new town has the same size of units vertically and horizontally for easy and quick construction, making a homogeneous and exclusive community among the residents who use the same entry hall and elevator. This project intended to accommodate a blend of households in different life stages living side by side, sharing common areas to encourage interactions that could lead to mutual intergenerational support (Fig. 37.11).

Staggered outdoor balconies are the result of those differentiated floor plans. They create a dynamic façade not only on the building scale but also in the street scale. The most distinct location is the green path toward the community yard and school, which has community space located along the path with a transparent greenhouse facing the public side. Possible amenities such as the senior lounge, kids café, toy library, indoor playground, multi-program space, study room, share office, laundry cafe, and maker space, which is customized for particular generations or mixed for community use, are laid out for intergenerational use. The outdoor space forms two different open spaces—peace garden and community garden—enclosed by similar programs in terms of active or passive atmosphere and visually linked through pilotis space on the ground level.

37.5.4 Safe Mobility Zone for Care

Smart cities are centrally controlled with specific algorithms that could be biased without fully understanding socially weak groups unless the person in charge of the algorithm is specially qualified or knowledgeable about those disadvantaged people. In this context, a bottom-up kind of smart city that reflects grassroots participation can improve those weak points, which are related to bias and incomplete data. In this

Fig. 37.11 Housing with community spaces

particular community, a safe zone incorporated in a bus station along the community corridor is central to delivering information on bus arrival schedules, weather information, and important community news that is naturally exposed to people without appropriate smart digital aids.

A typical hub is composed of a bike stand, stroller, and wheelchair station closely connected to the bus station. To ensure nighttime safety, stations should be placed within the sight of a 24 hr facility, such as a convenience store. Toilet facilities next to bus stations are also critical for any passerby because the majority of people in this 0–100 aging in place community serve a function in the process of care (Fig. 37.12). Hanson (2004) pointed out that a seamless link in city services assumes inclusivity only when they include public toilets with universal design and quantity to support women, care receivers, and people of a certain age whose majority has some form of disability (Hanson 2004).

37.5.5 Seamless Community Walkway

Appropriate outdoor infrastructure is critical for aging in place in terms of elderly people's independence and quality of life because it can provide critical support for social interactions and a healthy lifestyle. The positive effect of age-friendly urban landscapes in terms of environmental experience and wellbeing is evidenced in various aspects. Therefore, seamless community walkways with green space are essential to design aspects in 0–100 aging in place communities. Providing seamless travel through safe, accessible, and universal design, women with children and seniors (with potential disability) can maintain social interaction with community members while enjoying a healthy lifestyle.

Crime Prevention Through Environmental Design (CPTED) is the first concept for a seamless community walkway possible. 24 hr

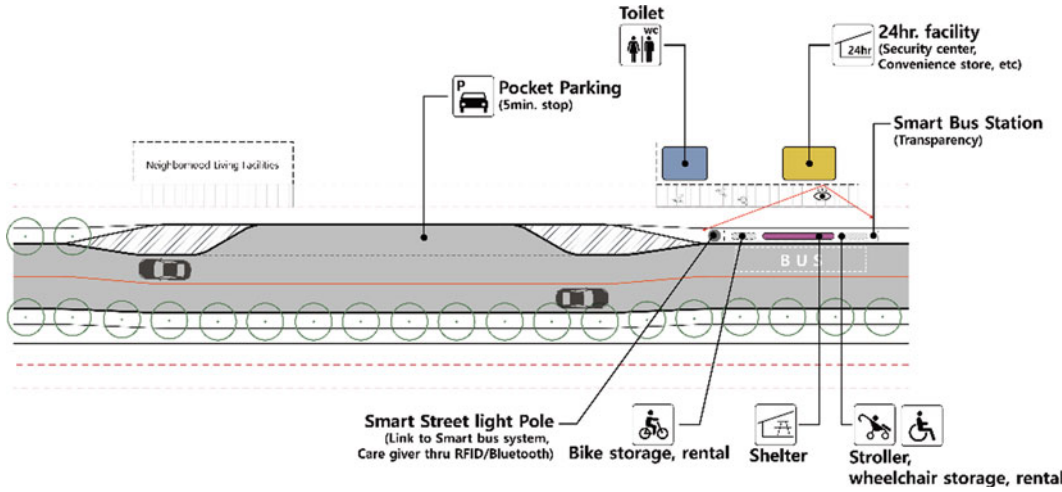

Fig. 37.12 Concept of safe mobility zone for care

facilities and transparent storefronts and smart mobility zones are carefully laid out along the community corridor. Based on research regarding the most commonly mentioned items that hinder aging in place (Ko and Choi 2020), clean and safe paths and staggered resting areas with appropriate climate control are provided in this community. Appropriate location and quantity of toilet facilities with a universal design verified by many researchers are planned (Hanson 2004; Hoof et al. 2021). The quantity and proximity of green space are not enough for aging in place if the specific needs of elderly people are not addressed. Quality green space supports neighbors' steady social interaction and strengthens the sense of place, including among socially disadvantaged members of the community who depend on care from society.

The final issue related to the walkway concerns the smart city designation. Safety is the number one issue that smart cities hope to address through the use of appropriate aids, such as bracelets with Radio Frequency Identification (RFID) that can be traced by the embedded system along the community corridor and major walkways, providing a safe route to school for children and psychological back up for seniors with weak cognitive ability. Other smart systems using inclusive technology can be helpful for caregivers and care receivers when carefully integrated into the everyday lives of elderly people who serve as helpful sources of support for their peers, disregarding the digital divide between elderly people and younger generations (Hoof et al. 2021). Many technology-related features that can help improve daily life for elderly people can be applied along the community walkway if well evaluated and implemented. A provision for embedded technology is also included in the master plan of this 0–100 special community (Fig. 37.13).

37.6 Conclusion

In the context that global aging and urbanization call for special attention from related professionals, developing a physical environment that is socially inclusive has become a critical determinant for aging in place. As defined in the WHO report on active aging as "the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age", physical environments that can promote mental health and social connections are emphasized to maintain autonomy and independence with aging (WHO 2002). Inclusivity and equity in a built environment promoting independence and autonomy can be achieved by allowing access to limited resources in the city

Fig. 37.13 Bird's eye view of the masterplan

through walkability, public safety, socializing, and participation. These factors benefit not only elderly people's quality of life but also socially weak community members, such as children, disabled people, and women, who are usually in charge of caring for the former two.

This article, with consideration of UNSDG 11, "Sustainable Cities and Communities" (Maha Al-Zu'Bi and Vesela Radovic 2019) concerning inclusive, safe, and resilient city planning, has explored inclusive aging in place in a 0–100 care community where children, the elderly, women, and the disabled are all the objects of care. Given that caregivers and care receivers form the majority of community members in aged societies, we must recognize that inclusive design is necessary to support the majority of community members and that mutual social care is the key to making "aging in place" possible. Taking inclusivity as a major frame that covers issues of care, sharing, and participation, creating a master plan integrating housing, schools, community centers, and parks was proposed with principles that are carefully based on research. Through a couple of strategic locations under the principles of "intergenerational space", "facility share", "inclusive smart city", and "motivation for participation", a 0–100 care community with the goal of supporting aging in place is proposed.

This proposal relies on the fact that design that is based on dignity and respect away from segregation and exclusion can create a truly inclusive society in which no one is left behind. Only when we share a common practical project supported by intense research related to global aging among professionals and researchers can we promote and further rigorous design output for sustainability as a paradigm to convert global villages into livable areas. Further case studies and research based on concrete socio-cultural realities can extend our horizon for making a more inclusive world.

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Children's Rights to Mobility in the City: Paying Attention to Children's Spatial Knowledge

38

Meike Schalk, Elizabeth Calderón-Lüning, and Miro Sazdic

Abstract

Children and young people are among the most disadvantaged groups when it comes to the possibility to move around in the city freely. They are actors with both rights and specific needs who often cannot take part in offers for young people across different urban districts, which tend to be segregated along spatial, socioeconomic, and ethnic boundaries with different infrastructural options leading to unequal opportunities for learning. Extending from a participatory workshop on cultural commons, in physical and digital space, with a group of youths, in summer 2021, this paper discusses children's mobility patterns and mobility consumption processes in the greater Stockholm area through an accidental e-scooter experience and a method we call "following". The study foregrounds the necessity for learning how to access and handle both physical and virtual space, in the context of the Sustainable Development Goals 4, Ensure inclusive and equitable education and promote lifelong learning opportunities for all; SDG 10, Reduce inequality within and among countries; SDG 11, Make cities and human settlements inclusive, safe, resilient and sustainable; and SDG 12, Ensure sustainable consumption and production patterns.

38.1 Introduction

Youth mobility as process is anchored, on the one hand, within institutions with their specific procedural, technological, and legal aspects, public transport infrastructures, and more and more, within a breadth of commercial micro-mobility offers, such as e-scooters. The paper considers young people's ambivalent status as both, minors with rights and subjects requiring protection. Based on our findings, we argue that there is a need for child-friendly policy-making in transport planning and that the issue of young people's limited mobility in our segregated cities is a hitherto underrepresented subject in urban research. Our study shows untapped possibilities to identify needs and develop measurements that can counteract social segregation in early ages in urban spaces. We argue, such policies needed to be developed together with young people, based on their experiences and knowledge.

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38.2 Materials and Methods: "Allemansrätt"/The Right to Public Access and the Method of Following

In summer 2021, a group of six youths in the age of 15, and six educators and researchers in arts, crafts, architecture, and political sciences, as well as a pedagogue from Hovsjö Youth Centre, embarked on a trip from the district Hovsjö in Södertälje, south of Stockholm, to the "centre" of Stockholm, the museum area at the edge of Djurgården (the Royal park), more specifically, The National Museum of Science and Technology. The previous week, we had spent in the countryside, close by, to prepare a workshop for the museum. With us, we had a caravan used as a mobile research station. Our excursion was a research endeavour exploring the notion of the Swedish concept of *Allemansrätt* and inquiring of what this could mean for our group in the specific context of the district, the city, the park, and the museum, and what learnings we can take from it (Fig. 38.1).

Methodologically, we applied an approach of *following*. This means, as researchers in this ethnographically inspired study, we followed the youth rather than trying to exert control. Hence, we acted as participant observers and collaborators whereby we accompanied the youth in explorations around issues that they initiated themselves. There was a kind of "living community engagement" through the sharing of knowledge based on the actions of the young people—as rich, competent, and actively knowing subjects. Therefore, these processes took place as much as possible on the young people's terms so that they became the authors and owners of our collective meaning-making.

Allemansrätten/The Right to Public Access is no law in Sweden but works like a code of conduct that gives everybody equal access to landscape and nature and maximum freedom of movement, connected to the responsibility of handling them carefully. Learning to use a landscape involves observation, the acquisition of an ability to read landscape, to get to know an environment, to understand possibilities and limits for moving around, sleeping over, resting, picking edibles or material from the ground, to be informed about what can be left behind and what not, where and when and with what material to light a fire, etc. This means that there are temporal, seasonal, and situational differences at stake that ought to be registered at any time visiting and considered when deciding what to

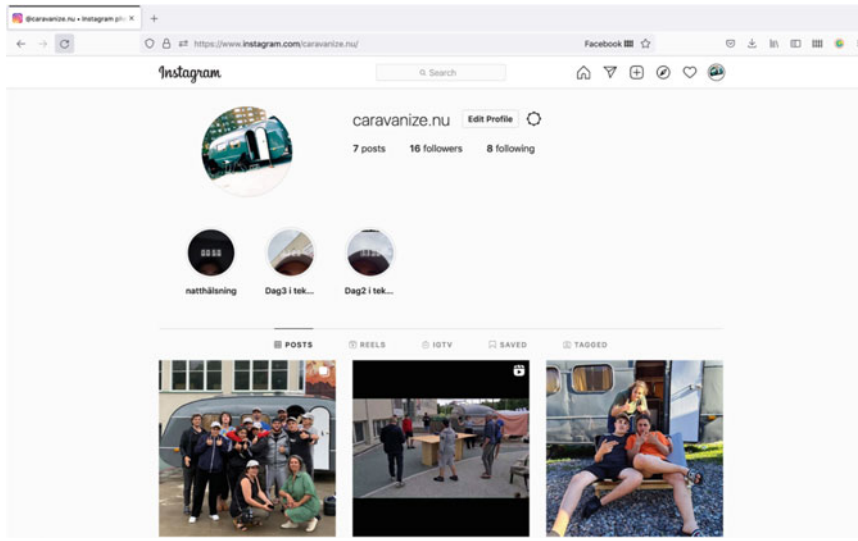

Fig. 38.1 Images from the experience of the workshop Cultural *Allemansrätt*, Stockholm 2021

do and what not to do in a landscape to both access and maintain it.[1] The workshop with the youths took Allemansrätten as a spatioethical concept which potentially could be extended to other spatial situations beyond landscapes for exploring rights and responsibilities in public environments, in both virtual and physical spaces. The National Museum of Science and Technology was one such setting.[2]

In the countryside, we had built equipment for self-sufficiency on our planned journey: seating furniture, pizza ovens, a multi-use table tennis/table, racks to play, and a canopy for the caravan. The caravan was set up in front of the museum. Our program for the next 3 days consisted of the exploration of the museum, as well as the park as environments with rules and opportunities. Our installation also became a place for visitors, mostly school classes, to hang out.

Excursions were made into the landscape park by way of a derive, a notebook, and an open source, a browser-based application called "Memories of the Future".[3] The notebook entailed sets of directions and questions allowing the youths to take "unexpected" routes and focus on different aspects of their surroundings. Working with a map-based tool to document their experience through speech, text, and pictures allows the walker to simultaneously alter and augment the map and experiment with space also in the digital realm. Each youth received a notebook and used their own smartphone to log their information into the app. Some youths needed to borrow a phone since their limited data plans did not allow for an internet connection beyond the use of Wi-Fi, already showing typical signs of the digital gap existing in society. The dérives and the use of the app was a way to explore the surrounding area in the analogue as well as the digital space. The aim of using a password protected and open source-based app was to allow for discussions on rights and data protection in the digital space. The workshop days, in the company with the adults, evolved as expected. It was the light Nordic summer night that opened a possibility for the youths to embark on their own explorations, slipping our supervision, with the help of electric scooters.

38.3 The Scooter Story

E-scooters are a relatively new phenomenon in many cities, and currently, the fastest-growing form of urban micro-mobility (Tuncer and Brown 2020). Within a few years, they have become a popular means of transport, especially among younger generations, albeit also criticized for safety issues, the lack of legal frameworks for their use, their unsustainably short life cycle (Moreau et al. 2020), and the commercial exploitation of personal data by the companies that provide e-scooter systems in urban centres (Nazir 2020). The popularity of the use of e-scooters is due to the travel experience, also mirrored in the usage statistics showing that renting patterns are focused on weekends and evenings (Abduljabbar et al. 2021). When it comes to equitable service standards and inclusion, e-scooters, as many shared micro-mobility systems (SMMS), have several deficiencies. Most e-scooter systems are accessed through mobile apps and payment is done via bank cards. Furthermore, districts further out from the city as

[1] Read more an Allemansrätten here: https://www.naturvardsverket.se/allemansratten/ (accessed 11 October 2022.

[2] The Museum of Technology is run as a foundation, financed by government grants, contributions from foundations, and the business community) with the national mission to take responsibility for technical and industrial cultural heritage, development and education. Read more on the legal form and mission of The Museum of Technology here: https://www.tekniskamuseet.se/om-tekniska-museet/ (accessed 12 October 2022).

[3] Memories of the Future is an opensource and browser-based application developed by the Design Research Lab at the University of the Arts, Berlin. The application is geo-map based and allows the users to geo-tag a location and add information to that point, and to add sound files, pictures or text to the point. Other users can also comment on the geo-tagged points. The app was developed as a community research tool for creating and sharing location-based knowledge. The information sourced by the app is private by design, since you can only access the information with a set password, that is decided upon by the project group, For more information see: https://memories-of-the-future.de/#/.

well as more vulnerable neighbourhoods are often less likely to be covered in e-scooter services.

During the stay at the National Museum of Science and Technology, the youths were considerably interested in the use of e-scooters that could be found around the premises of the museum. This was largely to do with the fact, that no e-scooter services are available in their neighbourhood of Hovsjö or the adjacent larger city of Södertälje. During breaks and after planned activities, most youths were exploring their surroundings by e-scooter. With the previous focus of co-examining children's and youths' rights within the digital space, through the described use of the "Memories of the Future" app, the prevalent use of e-scooters became a vehicle to study the topic further.

In later conversations within the group, we discussed the business models, prerequisites, and rules that apply to the different e-scooter companies. The corporations behind the vehicles used by the youths were all private companies. We jointly wondered why these services do not exist in their own neighbourhoods. Further we discussed that all youths were under the age of 18, and therefore actually not allowed to use the services. The youths questioned this since they all had to use their bank IDs to register to the services, meaning the app should have been able to see that they are underage. Also, the topic of data protection and privacy was easily connected to the e-scooter services. No one in the group had read the user agreements that was a prerequisite to sign during registration. One of the researchers spoke about what these user agreements say, and what it is they are actually signing up to, when they click "agree". The vast data sharing and selling done by the SMMS providers is the actual business model behind the companies, not the renting out of e-scooters. We conversed about what kind of data can and is collected, and what type of companies and entities are using the data. It was widely agreed among the youths, that as long as the data was only used commercially and not by state actors, this was not a big problem, yet.

The unplanned scooter experience opens up for many topics concerning urban mobility, digital platform economies, data protection, and how rules are stretched within these different fields, and the implication of these practices for minors: the fact that youths under 18 are theoretically not allowed to use the services, but neither they nor the companies adhere to this rule; that the General Data Protection Regulation (GDPR) should protect our privacy and data, but that this is bypassed through user agreements that are too long and too difficult to understand; that SMMS are promising better first and last kilometre travels, but mainly exist in urban areas where public transportation is well developed.

38.4 Discussion, Findings, and Conclusion

How to set up a workshop by giving maximum freedom to children to follow their own concerns, to learn from them? This was the adults in the projects' central concern. The program for the workshop had been discussed and decided together with the youths before we had set off. However, despite that the mentioned set of tools was intentionally chosen open-ended, with the aim to guide the activities of the youths as little as possible, and to follow and learn from them, still, the methods, materials, and digital tools were picked by us, and offered to the youths. As we know, tools and methods influence activities and outcomes, as do the localities, which also were chosen by us, with their facilities, house rules and opening hours, as well as the relations among the members of the group, in this case, a stable group of close friends including three girls and three boys, with their trusted *fritidsledare*/ pedagogue from the youth centre, Hovsjö Fritidsgård, and the researchers and teachers (Fricker 2007; Hall and Tandon 2017; Lenz Taguchi 2005; Mirra et al. 2016).

The experience and discussion on the rights and responsibilities of non-commercial public access (Allemansrätt) and the unexpected encounter with the e-scooters and the

conversations it has initiated can be seen as an interesting starting point for further research. Using SMMS as a form of mobility in with youths, may enhance engagement. It also allows for debates on public access and rights, within both, urban spaces as well as the digital sphere, and about who benefits and who is excluded from the experience of micro-mobility according to the commercial provision of the existing systems (SDG 10). Children and youths are still largely absent from research on e-scooter systems and the use of SMMS, although they may be among their main users. This points towards a knowledge gap. As users they operate within a legal grey zone, they are not part of official statistics which prevents measurements to protect them. To gain relevant information for studying children's and youths' use of SMMS and the potentials and problems of such systems for youths' mobility asks for the employment of creative methods such as following to identify children's mobility consumption patterns in the first place (SDG 12).

Explorative co-design workshops of interdisciplinary teams together with youths can open for possibilities of learning together, not only about how to take responsibility for the environment and properly use e-scooters but also about the embedded democratic implications in spatial distributions of open landscapes and micro-mobility options through the direct experience of discrimination as well as privilege (SDG 4, 11). Our study foregrounds the necessity of social-spatial, economic, and legal coordination of child-friendly transport options between different urban parts for providing young people with possibilities to expand their radius of action beyond home and school. Policies are needed that address the inequality of public access. We argue, based on our findings, that they are best developed together with the young people, extending from their experiences and knowledge. A further study shall examine how mobility thinking can be incorporated into the framework of children's rights for more sustainable cities and communities (SDG 11).

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How to Design Inclusive Neighbourhoods also for People with Dementia. The "European Block" as a Potential Space

39

Learning from the dementia village. How can urban neighbourhoods be designed in a sustainable and (age)-inclusive way for people with dementia? The European Block as a Space of Possibility A qualitative comparative analysis

Friederike Asche

Abstract

Due to demographic change, the increasing numbers of older people in urban spaces require new sustainable concepts for an inclusive design of public spaces. People with dementia, as a heterogeneous group with age-related disabilities, represent a growing group of people. Designing urban spaces in a sustainable, (age-)inclusive and resilient way in the sense of the 11th Sustainable Development Goal (SDGs) means planning with the urban spatial stock in the sense of conserving resources and also thinking about people with dementia in the context of architecture and urban design from the very beginning. This paper presents the results of the research work "Living in the quarter. The transferability of the 'De Hogeweyk' model to an urban neighbourhood(....)" (Asche 2016). With the help of a spatially oriented, qualitative comparison of the case studies of the Dutch residential care neighbourhood "De Hogeweyk" as a best practice example and an urban cooperative neighbourhood in the Ruhr area, the paper identifies important spatially oriented processes for the design of an inclusive environment for people with dementia in the sense of SDG 11, SDG 10 and SDG 3. The paper thus aims at the spatial and social concept development for a sustainable inclusive urban space design using the resources of the European Block. The article concludes with the central result that, contrary to expectations, similar spatial processes (variations of individual phenomena) could be identified in the contrasting neighbourhoods. Thus, it can be assumed that urban neighbourhoods can also be designed barrier-free and inclusively for people with dementia.

Keywords

Inclusion · Resilient City · Urban Inclusive Neighbourhoods · Age-inclusivity · Aging · Equality · European Block · Diversity · Dementia · Dementia Village · Resilience · Comparative Analysis · Multi-Perspective Analysis · Universal Design · Docility Thesis · Concept

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39.1 Introduction

The relevance of the topic for architecture and urban planning is demonstrated by the increasing number of people affected, not least due to the lack of a medical cure. In 2019, around 55.2 million people worldwide were living with dementia (WHO 2021). Indirectly, the relatives and family members are also affected, so the topic already affects a large group of people worldwide. The scientific literature on this topic has gaps with regard to a universal sustainable design. For example, in English- and German-language research on an appropriately resilient and inclusive design of public space in existing urban neighbourhoods for people with dementia, only a limited number of studies can be referred to (including Wißmann 2014; Schuhmacher 2018; Sturge et al. 2021). Also in terms of the Sustainable Development Goals (SDG 3 Health and Well-being, SDG 10 Equal Participation and SDG 11 Inclusivity) the focus is not on the integration of excluded people, but on the goal of enabling all people to participate fully in all activities from the very beginning (Federal Government Commissioner for Matters relating to Persons with Disabilities 2014). If people want to live and die where they belong, this speaks for the necessity of an inclusive design of the urban community to enable them to remain in their own environment. An environment in which people with dementia are already known before their illness and networks can already exist as a basis for a community-integrative concept (Wißmann and Gronemeyer 2008). In this context, the term dementia-friendly neighbourhood is used especially in the English-speaking world. It thus stands for an inclusive community with social space-oriented housing, care and action concepts in the sense of the UN Disability Conventions (Wißmann 2014). Inclusion means that people with disabilities can participate effectively and comprehensively in political and social life on an equal footing (Federal Ministry of Labour and Social Affairs 2011). The neighbourhood, when connected to the life story, can also support people with dementia in maintaining subjective well-being and identity (Beil 2012).

The research therefore explores the question of design with the help of the following research questions:

1. How can public space in the urban neighbourhood be designed inclusively so that people with dementia can also use it without barriers?
2. How can the findings from the comparative analysis of the segregated care neighbourhood "De Hogeweyk" and the urban cooperative neighbourhood "Althoffblock" be used for neighbourhood design?

39.2 Materials and Methods

In the following, an overview of the research design for testing transferability and thus answering the two research questions is presented.

The procedure in an inductive approach is rather to be understood as explorative and concept-forming.

The research design of the study is oriented towards spatial and social science research foci and thus towards methodologically complex approaches and concepts of the corresponding disciplines (spatial planning, architecture and social sciences). The empirical results find their reciprocal reference to theory in a circular process in the sense of the field research.

In concrete terms, the research is accordingly based on the two project phases:

1. Exploratory field research (literature analysis, interviews, participant observation) and subsequent multi-perspective neighbourhood analysis in accordance with Meisel (2013) (see Fig. 39.1).
2. Spatial comparative analysis in accordance with Vogelpohl (2013) (see Fig. 39.2).

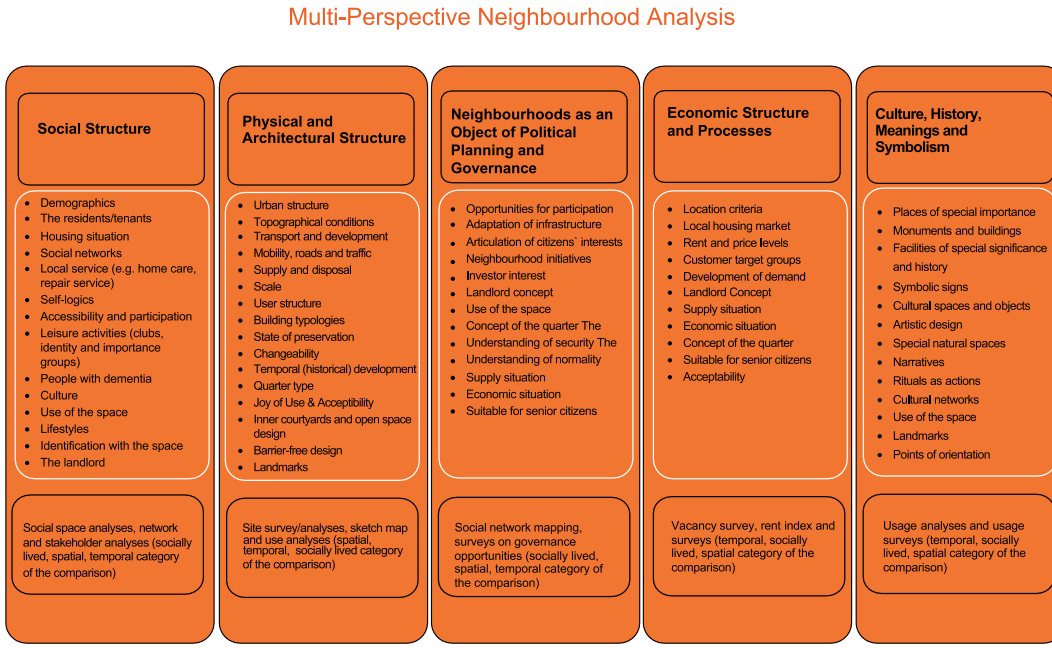

Fig. 39.1 The multi-perspective neighbourhood analysis (own representation)

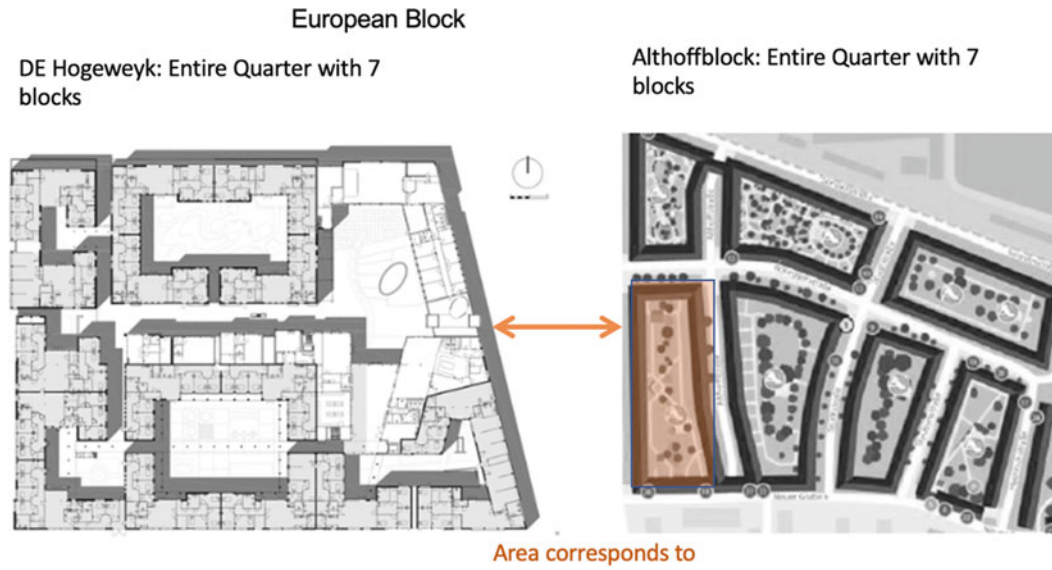

Fig. 39.2 Own representation of comparative neighbourhoods based on the case studies of two quarters: le. the residential care neighbourhood (Feddersen and Lüdtke 2014: 179); re. the cooperative neighbourhood (Spar und Bauverein e.V, 2014: 3–4)

39.2.1 Multi-Perspective Neighbourhood Analysis

Due to the complexity of the neighbourhood space, the methods used to empirically record the neighbourhoods are multi-perspective (cf. Meisel 2013, p. 47ff.).

The data collection in the neighbourhoods is accordingly based on divergent methods depending on the level of observation and the object of investigation. The author makes use of various types of data material, e.g. maps (see Methods) and secondary surveys.

The multi-perspective neighbourhood analysis (Fig. 39.1) is based on Meisel (2013):

After the precise definition of the research questions, the multi-perspective analysis of the neighbourhoods forms the basis of the inductive design and includes data:

(a) On the physical structure of neighbourhoods
(b) The social space and culture of the neighbourhood
(c) On the economic structure and political leadership in the districts

Various disciplinary and cross-disciplinary methods are used to capture the different levels of observation (e.g. including verified indicators, from the working aid "Dementia-friendly living environment"). The work sees a complex methodology as an opportunity to approach the neighbourhood (as a "fuzzy concept") as a complex research object, but limits itself to a multi-perspective, as opposed to an interdisciplinary view. The author hopes that a multi-perspective method of analysis will reduce the "blind spots" (of a one-dimensional view) in the research space. The subject-specific choice of methods was based on previous field research and literature analysis. In the table (see Fig. 39.1), the heading first indicates the level of observation, then the methods and finally the level of investigation.

The field research methodology (Breidenstein et al. 2013) for process representation in the field of cultural and social space is based on various explorative methods of site visits and social space analysis (as meta-methods) (Althaus 2008), literature analysis, surveys, expert interviews and observations. By collecting information on the housing market and political participation (in the sense of participation), the economic structure, political planning and governance are recorded and interpreted. Due to the focus of the comparative analysis on spatial-social contexts, the work does not draw on the corresponding subject-specific methodology in the fields of politics and economics.

39.2.2 Spatial Comparative Analysis

To answer the question of transferability, the method of spatially oriented qualitative comparative analysis is used. The instruments for analysing two contrasting neighbourhoods help to collect data in a qualitative comparison and to put space in the foreground. The theoretical references of the person-environment link (the age-appropriate including the dementia-specific environmental dimensions), as well as the Universal Design and Lefebvre's processual understanding of space (Lefebvre 1977), are reflected in the methodology in the form of a conceptual-normative comparison dimension in the comparison criteria. The comparison is designed to be contrasting rather than universalising, although it also has variation-finding and unifying components (Becker et al. 2014).

The preceding neighbourhood analyses made it possible to compare the characteristics of the two neighbourhoods. The commonalities could be determined very precisely and thus the dimensions of comparability could be clearly named. In other words, the "area of homogeneity" in the sense of Rihoux and Ragin (2009) was found, which does not necessarily have to be the same condition, but can ideally be an effect (in this case, the perimeter block development with its contrasting residential development, as well as the contrasting concept in the pursuit of normality and lived normality). The selection of the concepts and the aspects of comparison form the most important basis for being able to make generalisable statements about the comparison (Vogelpohl 2013).

39.3 Case Studies

The Districts

The cooperative quarter in the Ruhr area in Germany: The cooperative has central design and formative tasks. In addition, the cooperative with its statutes has its own laws of self-determination and participation. This also affects the neighbourhood and its design as well as the needs and use by the residents. In addition, the neighbourhood in Dortmund is "part of the Ruhr area", i.e. it has a double demographic advantage. It consists of around 12,000 flats and, at its core, in the Althoffblock 2000 flats in seven blocks with peripheral development. It was chosen because it already represents a positive example of a cooperative neighbourhood. The positive influence of housing cooperatives on the local housing market and for a senior-friendly orientation is particularly noteworthy here (Wegner et al. 2012).

As an example of the barrier-free design of public space for people with dementia, the author contrasts this urban neighbourhood type with an artificially separated nursing home neighbourhood. This is also designed in the style of a perimeter block development with seven blocks. The selected residential care neighbourhood "De Hogeweyk" in Holland is considered a best practice example for different disciplines also for architecture, especially for the design of spaces for people with dementia. The dementia village/nursing home quarter "De Hogeweyk" is considered a model for so-called "dementia villages". To emphasise the spatial form of the neighbourhood and the similarities between the two spaces studied, the term 'residential care neighbourhood' is chosen in the study (weyk is also the Dutch word for neighbourhood).

By using the method of qualitative comparison with a space inhabited exclusively by people with dementia, the author indirectly includes the vulnerable target group and tests the transferability based on the identified target criteria. The basis for the comparison of the two neighbourhoods is the comparable urban typology of the "European Block", as can be clearly seen in the Fig. 39. 2. Starting from the part of the Althoffblock that corresponds to this architectural style, further comparable elements were identified. In addition, the space studied in the cooperative quarter was adapted in size to the nursing home quarter and thus a single block was chosen that corresponds in size to the dementia village; this has approximately 200 flats. However, when comparing the infrastructure of the neighbourhood, the entire Althoffblock was considered.

Both comparison areas have a similar building structure with the European perimeter block development behind them. This is the basis for further comparative analyses.

Viewing Level (Fig. 39.2)

There are two levels of scale in the neighbourhoods compared: (Scale Block) De Hogeweyk corresponds to a residential block in the "Althoffblock" neighbourhood, both match in area.

(Scale Neighbourhood) In the infrastructure and comparison of the content levels, the space under consideration was extended to the entire cooperative neighbourhood to establish comparability (Neighbourhood scale see Fig. 39. 2).

39.4 Comparison

The following graph visually represents the collection of the homogeneity range. The graphic clearly shows that the collected data are assigned to the comparison categories in a kind of intersection. The analysis categories (of the homogeneity area) are then presented in more detail, thus establishing a link between the empirical objective and the theoretical approaches from a spatial and social science perspective. Critical qualitative empiricism is thus in dialogue with a theoretical understanding of space and society (cf. Vogelpohl 2013, p. 62) (Fig. 39.3).

Sp = Spatial (to identify the spatial specifics that create the space).

T = Temporal (This can be understood as different points in time of the survey as well as the observation of the historical development and thus transformations and stabilisations).

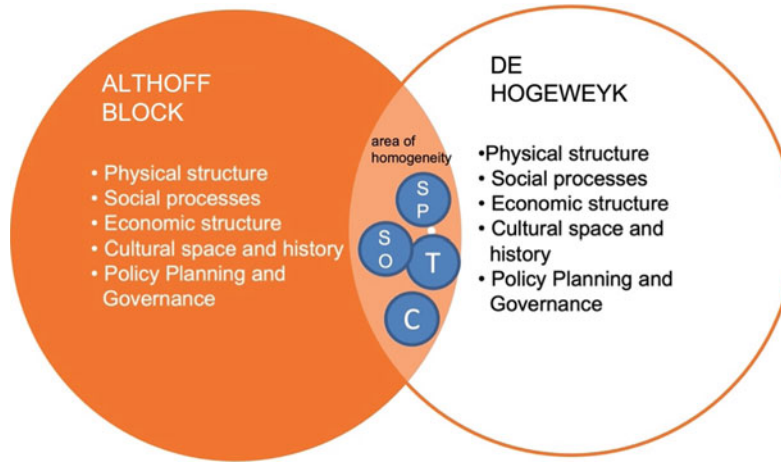

Fig. 39.3 The area of homogeneity: own representation

So = Socially lived (Social conditions are produced and perceived in different ways by different individuals and groups as well as institutions).

C = Conceptual-normative (situations and processes are compared, often implicitly, with known or desired situations and processes).

These categories are not mutually exclusive, but are interrelated and complementary. The categories were adapted to the research question of this thesis. (Vogelpohl 2013).

39.5 The How of the Comparison

The methodology of the comparison is divided into four steps.

1. The characteristics to be compared are determined. Here, qualitative focal points arise from the data material. These flow into the second step.
2. The different contexts as well as the contrasts and the processes involved are identified (contrasting, finding variations, merging).
3. In parallel, scale criteria will be collected to contrast neighbourhoods (conceptually-normatively) using Universal Design (UD) indicators and age-relevant including dementia-relevant environmental dimensions.
4. It is determined which elements are to be considered further and in what intensity in comparison to the theory and the social and spatial context.

In order to approach space not only as a shell, but also to include the human-space interaction, the work draws on Lefebvre's processual interpretation of space. In this way, the spatial interpretations also reveal themselves in the comparative dimensions of comparison. The theoretical references of the person-environment link (the age-appropriate incl. dementia-specific environmental dimensions) as well as the overarching criteria of universal design and the processual concept of space (Lefebvre) are reflected in the methodology in the form of a conceptual-normative comparative dimension in the comparative criteria. The comparison is designed to be contrasting rather than universalising, but also has varying and converging parts. The results are embedded in the context of designing inclusive neighbourhoods for people with dementia in order to capture space in a processual way in the sense of Lefebvre‘s underlying concept of space.

39.6 Results

In response to the question of accessible design, the following chapter presents the study of the comparative analysis based on the different dimensions. In the following sections, a tabular presentation of the comparison using the scale criteria identified in this thesis is presented as an example. For a better overview, each chapter was introduced with the indicators (scale criteria) for

age-appropriate environmental dimensions for people with dementia, which are assigned to the design principles of Universal Design (UD). In order not to achieve undifferentiated results through terminological specification, the work adopts the four degrees for grading UD design strategies (Accessibility, Usability, Acceptability and Joy of Use) as criteria for transferability, but deliberately remains at the higher design level. Researchers of the Generation Research Programme of the LMU Munich distinguish hierarchically ordered degrees of design with corresponding user feedback on the way to the goal of "quality of life" (cf. Herwig 2008).

Now the design also raises the question of the interaction between people and space, between environmental conditions on the one hand and well-being and behaviour on the other.

One of the best-known theoretical concepts in the field of environmental research in relation to older people is the so-called "competence-press model" developed by Lawton and Nahemow (1973). Here, the positive effect of the correspondence between the demands of the environment (environmental-press) and the specific competences of a person is seen (cf. Heeg and Bäuerle 2012). Based on this, the "Docility Thesis" assumes an increasing influence on people with decreasing competences by environmental factors. Thus, people with dementia are more at the mercy of their environment due to their limited ability to compensate (e.g. for stresses such as noise and agitation) (cf. ibid.).

A group of experts around Lawton has thus defined the spatial-social environment as conducive or obstructive in the fulfilment of needs (i.e. for maintaining quality of life) (cf. Zeisel and Gabriele 2009). In this sense, important age-relevant environmental dimensions were identified and criteria based on gerontological and ecopsychological research were developed.

These criteria, along with those of Universal Design, serve the author as a basis for identifying important spatial processes for people with dementia:

- Facilitating perception and orientation,
- Support of functional ability,
- Maintenance of competence,
- Regulated stimulation, i.e. stimulation without over-stimulation,
- Safety and security,
- Opportunity for social interaction and regulation of privacy,
- Continuity, reference to the previous context of life,
- Enabling autonomy and environmental control,
- Adaptation to change

(Lawton et al. 1997 cited in Heeg and Bäuerle 2012; Zeisel and Gabriele 2009).

39.6.1 Accessibility (Barrier-Free) (UD)

With the International Classification of Functioning, Disability and Health (ICF) of 2001, the WHO goes a step further and defines disability on the basis of the bio-psychosocial model with the aim of not being primarily deficit-oriented. It sees the definition less as a classification of the consequences of disease, but rather classifies as components of health: bodily functions, bodily structures, activities and participation (involvement) as well as environmental factors. The ICF can therefore be applied to all people, not only to people with disabilities. It is universally applicable (cf. DIMDI 2016). This shifts the focus away from therapy as the only possible solution and the focus on correction of the individual towards the importance of the environmental criteria in universal design and the absence of barriers, which plays a decisive role in whether inclusion or exclusion takes place. The results of the study are therefore presented in the following table using the example of accessibility as the basis of universal design and highlighting the differences beween the two neighbourhoods. This chapter is divided into the three dimensions of comparison as described in Chap. 39.5.

39.6.1.1 Dimension Contrasting

Residential and Care neighbourhood (De Hogeweyk)		Cooperative Neighbourhood Althoffblock
Contrasting accessibility		
Autonomy in daily life through accessibility		Autonomy in daily life through private known space
Safety and support of functional ability	4 toilets in public space as well as approx. 8 benches and approx. 80 chairs	0 toilets in public space and 2 benches and 5 chairs
Maintenance of competence	Independence = barrier-free	Independence = own flat
Confrontation with accessibility		
Facilitating perception and orientation, safety	No established landmarks	Built arches serve as landmarks
Facilitating perception and orientation, safety, support of functional ability	Barrier-free access to the outside world	Familiarity with the surroundings, places of personal memory

Main Conclusion Contrasting: Both Spaces Create Accessibility in Different Ways

Conclusion (orientation, continuity, reference to the previous context of security and safety). In the Althoffblock, the landmarks have grown historically and exist with a clear reference and uniqueness. In the Althoffblock, it is possible for residents to know places of personal history (memory) through personal reference and thereby build orientation, trust and security (their own territory).

In the residential care neighbourhood, residents usually only live there for two to three years, so a personal connection with a longer history is not possible in this quarter.

Conclusion (safety, maintenance of competence and support of functional ability).

The use of the outdoor space (as opposed to the flat) is generally possible in the De Hogeweyk neighbourhood, in the Althoffblock only in flats with barrier-free access to the inner courtyard and the street. In contrast, there is always barrier-free access to the outdoor area in the nursing home quarter, but hardly in the Althoffblock. In the residential care neighbourhood De Hogeweyk there are many chairs and benches with an inviting character, and there are also publicly accessible toilets. In the Althoffblock there is a bench on every street and chairs only in the courtyard area and toilets are missing. While private space in the care quarter is limited to one's own room, the Althoffblock offers residents the flat as a private space and the street as a meeting space with the neighbourhood in public space, often known for many years.

Conclusion (regulated stimulation, opportunity for social interaction and regulation of privacy, adaptation to change, enabling autonomy and environmental control)

The residents in the Althoffblock can independently regulate the adaptation of the space in the private area and decide on their place of residence as far as it is accessible. In this context, the balcony can also be counted as access to participation in activities in the courtyard and as a designable space.

Independent and self-determined participation can also be controlled with the help of the front zone to the street space via a partially public zone.

In the De Hogeweyk neighbourhood, the courtyards form the meeting space. The space is designed by the institution. Here, autonomy through accessibility and autonomy through private space (own space) and design are opposed to each other. Continuity and familiarity can be granted by the familiarity of the neighbourhood in the Althoffblock through long belonging.

39.6.1.2 Dimension Finding Variations

Conclusion (enabling autonomy and environmental control)

Accessibility to infrastructure is given in both but in the Althoffblock the possibilities are limited by the stairs in the stairwell; in both neighbourhoods, cultural places are present in the neighbourhood (but with different qualities). Autonomy is established in the Althoffblock through private space with possibilities of control and access to public space.

In the De Hogeweyk neighbourhood, autonomy is lived through barrier-free access to the outside. Independence is established in the Althoffblock by having one's own flat and in De Hogeweyk by barrier-free access.

Conclusion (safety and security)

Security in De Hogeweyk is guaranteed by the organisation due to the control at the entrance gate. In the Althoffblock on the other hand, security is given through choosing autonomous different spaces (courtyard, balconies, front yards, streets etc.) and connecting with neighbours in the living context. Safety is offered differently in both neighbourhoods, through familiarity or through professional protection from potential dangers.

Conclusion (opportunity for social interaction and regulation of privacy, enabling autonomy and environmental control)

In De Hogeweyk there are public toilets and more chairs and benches. In De Hogeweyk there are different spaces through indoor and outdoor areas and in the Althoffblock different spaces through public and private areas. In De Hogeweyk, meeting spaces are created by access through the courtyards, in the Althoffblock by meeting on the street. Although both neighbourhoods are bound by certain norms through their spatial affiliation (tenancy law, home law), the normative sphere in the nursing home neighbourhood is more pronounced in the public (semi-public) space. Both resident groups have defined rights, whereby here the rights as clients are contrasted with the rights as fellow residents. Both resident groups are citizens and therefore have a say in the city, but the care quarter is private property, so the city has no influence here. The residents of the Althoffblock can experience nature via the accessible park in the neighbourhood and in De Hogeweyk via established gardens. In the De Hogeweyk neighbourhood, care is always available by only one provider, while in the Althoffblock it is on call, by various self – chosen providers.

39.6.1.3 Dimension Merging

Conclusion (Facilitating perception and orientation, continuity, reference to the previous context of life). In both neighbourhoods in the typology of the "European Block", the street layout is clear so that destinations are visible, and the rooms and street systems are overseeable. In both spaces, there is personalisation via the letterbox and a bell. The entrances to the houses are mostly personalised in both neighbourhoods. In the Althoffblock there are also new buildings with lifts. In both neighbourhoods, there is a strong social bond in the sense of belonging to a social group (cooperative member, customers), belonging to a space (neighbourhood residents) and belonging to a lifestyle (in De Hogeweyk an assumed social bond is determined by questionnaire, in the Althoffblock it is lived).

Both operators state that they aim for a high quality of life for their residents.

39.6.2 Result

As a result, it can be stated that the comparison, which was designed to be individualising, i.e. contrasting, and which proved to be very variable in the course of the study, revealed many commonalities at different levels of observation of the neighbourhoods. The method thus has not only a comparative but also an explorative character. Contrary to expectations, similar spatial processes (variations of individual phenomena, e.g. influence of the landlord) were identified in the neighbourhoods, so that it can be assumed that neighbourhoods in existing buildings can also be designed barrier-free for people with dementia. The work shows the special potential of

perimeter block development to adapt semi-public space to the specific competencies (needs) of people in the sense of universal design.

The results of the analysis based on the examined scale criteria: A central result of the comparative analysis based on the scale criteria is that contrary to the expected stronger fulfilment of the criteria by the care living quarter (as an environment created especially for people with dementia) compared to the cooperative quarter, the care living quarter does not fulfil the criteria more, but differently than the residential quarter. It is therefore not a question of more, but of different. For this reason, the results were compared qualitatively in terms of the analysis in the three dimensions of contrasting, varying and merging:

To answer the research question, the method of comparative analysis helped to capture the potential of the existing neighbourhood that is hidden at first glance.

The contrasting comparative dimension was used to examine the special features of the "De Hogeweyk" model. The transferability of the use and design concepts was made possible through various analytical steps based on generalisable and comparable spatial processes.

In summary, it has been possible to generate the first conceptual indicators for the design of urban neighbourhoods in a universal design taking into account environmental psychological criteria.

During this elaboration, criteria for the evaluation of the spaces to be compared have emerged in interrelations and in feedback with the theoretical level of the elaboration. The Universal Design and the age-relevant environmental dimensions of ecological psychology thus serve not only as benchmarks of transferability, but rather as criteria for the interpretation of the comparative data.

The comparison thus has a second, comparative, conceptual-normative level. It has a multi-dimensional character in many respects. It should be noted that the linking of the different levels (scientific, institutional and action level) is a particular issue in the focus on neighbourhood and dementia (cf. Meisel 2013, p. 49).

The Following Indicators and Concepts for an Inclusive Urban Neighbourhood in the Sense of the SGD Could Thus Be Generated

– On this basis, existing neighbourhoods in the typology of the European Block could be rethought as places of health and social resilience in the city (SGD 3).

– Urban public space can be designed inclusively for people with dementia by designing it in age-appropriate environmental dimensions for people with dementia, respecting the overarching "umbrella criteria" for universal design, in feedback with the user group (SGD 11).

39.6.3 Discussion and Conclusions

To answer the research question, the method of comparative analysis helped to identify hidden potentials of the existing neighbourhood. The contrasting comparative dimension was used to bring out what is special about the "De Hogeweyk" model. The transferability of use and design concepts was made possible through various analytical steps based on generalisable and comparable spatial processes such as building typology.

In order to answer the first research question derived from this: "How can public space in residential areas be designed inclusively so that people with dementia can also use it without barriers,?", the work makes use of universal design (UD). It considers this design as the basis for achieving the goal of quality of life in relation to housing and achieving the sustainability goal of inclusion.

According to the "competence-pressmodel" (the person-environment fit), which describes the positive effect of the match between the demands of the environment (press) and the specific

competences (competence) of a person as well as the age-relevant environmental conditions defined by Lawton et al. (1997), it is not sufficient to meet certain structural standards or to provide physical spaces (see also 2.3), but rather the degree of processual changeability of these spaces is to be regarded as decisive. They must be dynamically adaptable to the specific needs and impairment-related changes of each individual and change accordingly (Heeg and Bäuerle 2012).

However, the meaningfulness of investigating the research question only emerged in the dimension of finding variations and merging them in combination with capturing the specifics of the existing Althoffblock district.

From the many similarities of the neighbourhoods, it can be concluded that an urban neighbourhood can already have many spatial features for people with dementia. Therefore, only partial aspects of the urban spaces would have to be changed so that they can be used barrier-free by people with dementia.

The paper concludes with a recommendation to use existing resources of block development in the sense of sustainable and resilient urban space design for inclusive and equal solutions instead of segregative dementia villages on the outskirts (with a reverse inclusion in semi-public space), but rather in the further development and use of existing resources of block development as the basis of an inclusive urban neighbourhood design. The design concept explored in the work can serve as a basis for a further interdisciplinary, sustainable and resilient solution. This design concept already serves as a basis for further projects to develop solutions in a universal design also for people with dementia. A further transdisciplinary research and teaching project on the topic of the interdisciplinary design of inclusive neighbourhoods with the participation of people with dementia has already started in 2021 as the BMBF project DEIN*ORT. In this project, the author is working with an interdisciplinary team on concrete solutions at the interface between architecture, computer science and social science.

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Part VI
Poverty and Socio-economy

Vessels of Exclusion as Potential Vessels of Life

40

Dimitrios Kapoukranidis and Venetia Tsakalidou

Abstract

There are spaces which are created hospitable, comfortable, bright, and warm; ergonomic spaces that we experience in our everyday lives, designed according to the Vitruvian (Vitruvius 1924) three values "Utilitas, Firmitas, Venustas" (function, solidity, beauty). There are spaces built on the values of life, which, as (Bachelard 1994) describes, instill the friendly coexistence of people, the development of strong bonds between them and the creation of pleasant and eternal memories. At the same time, however, there are certain spaces—completely opposite to the usual ones—where the "virtuous coexistence" becomes submission, the "development of relationships" isolation, and the "forgotten memories" stigma. These are the spaces of imposition and control, which utterly confine and remove the incompatible, the alien, the other. On this basis, if it is assumed that genuine architecture produces spaces with meaning and life, endearing and essential, then the production of hostile and barren forms can only be attributed as a product of a counterbalance force, an unexpected "anti-architecture." The starting point of the present research was born at the core of this intense contradiction, to approach and explore the "spaces of exclusion" and their potential transformation into "spaces of inclusion" as the ultimate epitome of a prison. Can genuine architectural design remove the repressive intentions and the unfavorable environment of a prison? Or is it in its very nature and the reason a prison exists that ultimately foreshadow its course and therefore the spatial qualities which express it, that is the spatial qualities of an "anti-architecture"?

Keywords

Exclusion · Confinement · Social resilience · Inclusivity · Equality

40.1 Introduction

Architecture, as presented by Heidegger (2006) gives birth to, produces and consequently promotes space, allowing the human "Being" to be revealed through it. It points out that the essential texture of the human element lies in "intimacy" and "dwelling," while spaces ought to provide freedom, so that things have their place as useful and familiar without being suffocated and

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oppressed. At the same time, the Sustainable Development Goals, underlined by the UN Universal "Agenda 2030" and according to "Goal 3," define as a fundamental goal of architecture the forging of resilient communities, promoting well-being as one of its constituent features, the formation of appropriate conditions of equality and peaceful living, as well as the sustainable development in an accessible and healthy spatial and social environment (UN 2022).

But even if almost half a century has elapsed between Heidegger's theory and the contemporary "Agenda 2030," a multitude of heterogeneous spaces exist simultaneously in the urban spectrum, each of them serving different purposes and needs. The analysis and study of this distinct asymmetry presupposes the dissolution of the static image of space, while at the same time demonstrating the parallel course of its "sociability" with the inherent "spatiality" of humans (Hillier and Hanson 1984).

Therefore, treating space as a chain reaction of human actions, the simultaneous existence of cherished and hostile forms in the urban fabric is not only logical but also a given, because next to the very human "dwelling" stands an equally human "exile." Such spaces that stand against the original architectural ideal, the free and peaceful living of humans, could not be defined as purely "architectural" even if the existence is justified. For this reason, it is useful to define and construct an alternative diametrically opposed "art," an "anti-architecture."

A deeper understanding of this "sharp" definition presupposes the study of the original intentions of "exclusion" and, as a result, a direct review of the current social composition and function. The given image of society is recognized as a field of heterogeneity, pluralism, competitiveness, and interdependence. The different conditions of life which characterize the modern members of society reproduce daily conflicts of values and interests. The invention and foundation of basic principles, rules, institutions, and laws are a multitude of social constructions that aspire to anticipate and limit these conflicts, promoting the wider social interest and ensuring a harmonious and productive coexistence between all members (Leros 2017). The universal effort to restore a unified and fair justice system according to "Goal 16" (UN 2022) crystallizes the functioning of the above institutions aiming both at the administration of justice and the simultaneous protection of minorities.

Insubordination and violation of established normative frameworks constitutes a derogation for conventional units and conformists of society as a whole, which needs special treatment in order to be balanced and fully restored. Hirschi (1969) argues that deviations are found in people who have not been able to establish resilient social bonding, while Camus (2010) describes the deviant as a person who has left the rest of the world forever.

The restoration of deviations is achieved through the organizational and complete conquest of the individual. According to Stavridis (2006), the concept of conquest "constitutes above all control of space." Prison as an architectural system projects a multitude of social mechanisms that aim at "reparating" the "victims." The resulting spatial manipulations and structures precisely form the ideal conditions for confinement and isolation, surveillance and control, disciplinary exercise and prioritization of subjects (Fig. 40.1).

However, the existence of special and unusual spatiotemporal situations is inevitable, while Martinides (2006) points to this ambiguous quality of the prison to be "a space within society and time of absence" familiar and eerie at the same time, expressing a "socio-cultural otherness in the modern city" (Kotarides 2006).

The recognition of the prison as a "socio-cultural otherness" points out and demonstrates their conception as places with a sensitive and multidimensional content, while at the same time consolidating their distinction against the other spatio-social systems that protect and house the "normal." The same distinction is the one that spreads and ultimately determines the identity of the established whole, making it a social minority of about 11.5 million (ICPR 2021)—a number greater than the population of several European countries—which lives "far" from the rest of the

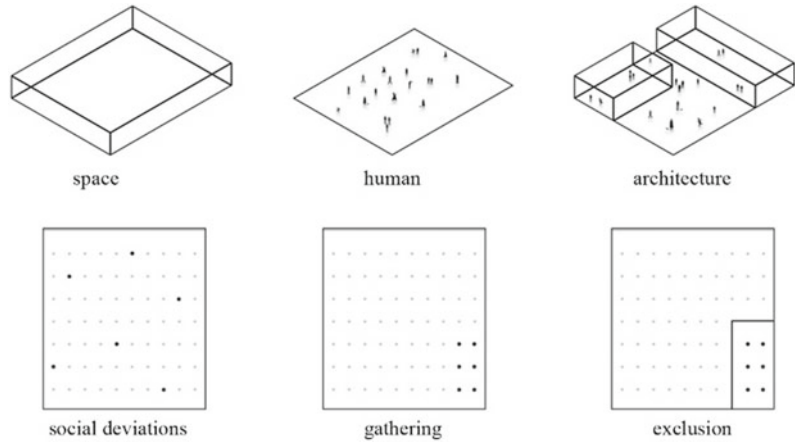

Fig. 40.1 Diagrammatical representation of the architecture and human relationship and the way that deviations are excluded (*Source* Author)

population—physically and mentally—not only during their sentence but also after it.

In this research, prison space is understood and examined as an architectural and social system which is an integral part and natural subset of the rest of the community and could not be approached far from it. In this way, the spaces of confinement are automatically transformed into integrated functional microcosms and as a result reflect the inherent characteristics of a larger society, its goals, and its perpetual effort for an anthropocentric environment. For the understanding of these, the historical review of the evolution of "prisons" is useful, together with the analysis of precedents of confinement for each era.

40.2 Analysis

For about one thousand years, from the fifth to the fifteenth century, almost all parts of Europe have been affected by a wave of barbarism and violence as a multitude of macabre tortures were applied by law as punishment against any transgression (Foucault 2011).

However, the creation and rise of the humanist, educational and scientific disciplines of the past contribute to the formation of the view that hell should have "humanity" and "moderation," leading to the redemptive epilogue of tortures near the end of the eighteenth and early nineteenth centuries.

The proposals of the new system include the deprivation of basic rights and goods by proposing a long daily routine for a convict, with painful deprivations and conditions, without initiatives and real control of oneself (Foucault 2011). This new reality of criminal detention is believed to affect to a greater extent both the subject and society, while its architectural expression and its basic principles are projected through the imposing geometries of prisons.

The objectives of early prison facilities are limited to the strict and safe detention of offenders, as well as to the suppression of violent and reactionary behaviors, thus promoting a punitive and vindictive character of confinement that leads to the impoverishing and humiliating daily living conditions of the individual (Archimandritou 2000). The enclosed architectural designs, following the fenced, centralized city of the Middle Ages eventually generate these dominant divisive tendencies (Reebs 1988).

The most famous model that exists at the beginning of the classical era is the Dutch Rasphuis Foundation in Amsterdam which first operated in 1596. Rasphuis can be considered a fundamental form in the field of deviance, as it introduces and certifies the corrective and educational element in the process and architectural arrangement of confinement. It is founded and housed in an old monastery and consists of a sequential juxtaposition of group cells around central, rectangular free spaces (Johnston 2000).

This structure is chosen because it allows the prisoners to gather in specific spatial contexts aiming at their unhindered hard work during the day and their immediate surveillance.

At the same time, this interest in a geometry that encourages the processes of supervision and control, while transforming the individual, renders the institution a symbol of the reformation of the western world, triggering the creation of corresponding units worldwide, which are established and become known as "workhouses."

The architectural layout and the innovative penitentiary program of the workhouses are also implemented in the Italian capital in 1704, as a new unit of incarcerated living is being erected, in the already existing asylum of San Michele (Howard 1784). However, contrary to the initial ambitions, at the completion of the plan, issues of prisoners' surveillance arise from the large scale of the building. A solution to San Michele's technical matter is Bentham's radical "panopticon" proposal of the late eighteenth century.

Bentham's innovative Panopticon is based entirely on the fundamental principle of surveillance-subordination: "The disciplinary person is kept subdued because it is seen nonstop, because it can always be seen" (Foucault 2011). Thus, the building is built on a circular plan which consists of a ring and a tower placed in its center. The multi-storey ring houses all the cells, the vertical and horizontal circulation and the service areas. The cells are separated from each other by protruding, solid vertical elements, which nullify any visual or physical interaction thus ensuring order. Each of them contains again two openings on the inner and outer boundary; the external opening allows the entrance of sunlight light, while the inner one, which occupies almost the entire facade of each cell, ensures unobstructed visibility from the tower (Bentham and Bowring 1843).

From the tower, the central administration is able to surveil everyone without being surveiled. The lighting conditions within the cells of the periphery perfectly erase the enclosed human silhouettes while the blinds, partitions, and corridors inside the central hall of the tower remove any suspicion of shadow, movement, or human figure within it, ensuring asymmetry and difference (Fig. 40.2). Deleuze (2001) in this agonizing and systematic effort for control and submission distinguishes the transition from one era to another: "It is the societies of control that come to replace disciplinary societies […]."

In this passage, the interest in a single, targeted penitentiary process by the Quakerian religious group achieves the development of the first major system of disciplinary living and control. The Quakers' proposal provides for the non-negotiable and absolute isolation of the incarcerated population (De Puy 2017). The starting point of this penitentiary policy is the reorganization of the already existing prison on Walnut Street, Pennsylvania, in 1790 which will pave the way for the construction of Eastern State Penitentiary, also known as Cherry Hill in 1823.

There Haviland's design provides for a rectangular, compact fence, which encloses the installation of the foundation (Alexiadis 2001). In the center of the surface defined by the fence a tall vaulted structure becomes a point of intersection for seven wings of single cells in a radial arrangement, only four of which include a second vertical level. The cells are placed successively on either side of an elongated corridor and their number per wing varies. Ground floor cells incorporate individual outdoor and fenced areas of physical training and relief, which can be used under appropriate supervision, for an hour daily. Lighting inside the cells is achieved entirely through a small skylight in the center of the arch formed by each roof, while ventilation and heating are implemented through various pipes that run along each cell in the wings (Dimopoulos 2003).

Despite the concerted effort, the Eastern State Penitentiary soon becomes the subject of censorship as the political course of solitary confinement against crime does not take long to highlight its grim disadvantages, leading large numbers of prisoners to insanity (Archimandritou 2000).

A counter-proposal to the horrors of solitary confinement is the introduction of the mixed prison system. According to this, the individual

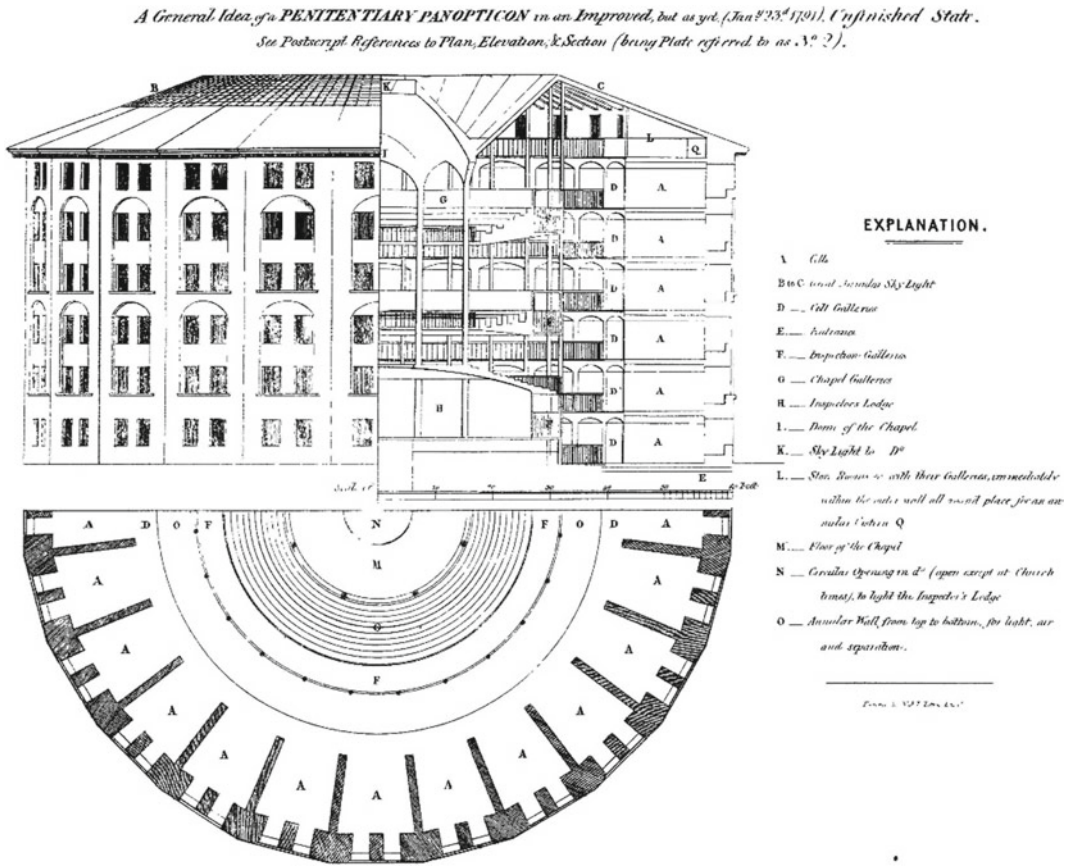

Fig. 40.2 Drawing of Panopticon Prison (*Source* Bowring, J. "The works of Jeremy Bentham")

confinement of prisoners during the night and their collective productive work during the day are promoted, strictly under conditions of absolute silence, while the most representative sample of the mixed system lies in Sing-Sing prison, near the Hudson River (Melossi and Pavarini 1981). The design is led by Lynds, a former military officer and former commander of Auburn Prison. The architectural design, completed in 1825, depicts a monolithic multi-storey oblong form of a parallelepiped, which is surrounded by an additional strong shell (Johnston 2000). The internal large volume consists of five levels which successively integrate all the atomic cells into rows. This space is called "cellblock," a term established in the evolutionary course of incarceration units. The cells are noticeably smaller than those of the isolation system while at the same time they are distinguished by the absence of any lift (Dimopoulos 2003).

With the beginning of the twentieth century, the wider area of criminal confinement is deeply stigmatized by a purely deterministic approach. The prisoner's spatial confinement and the repressive nature of the sentence become the main axes of discussion and renegotiation of the reformers. Of course, the addition of the first essential educational provisions (A/CONF.6/INF.4 1955), the shift of interest toward the person of the deviant as an individual and the offer of technological progress with modern security and surveillance systems alter the shells of the prison system in a similar way as there is an overall upgrade in the conditions of detention. This new approach leads to the example of Halden Fengsel.

The Halden high-security penitentiary, a product of a collaboration between the architectural offices HLM and Erik Møller, is located southeast of Oslo. Their aim and fundamental principle is to highlight the prison environment as a natural subset of a social structure by reversing its sharp and heterogeneous features into smooth and familiar. Halden structures are developed on a wooded plot on the ridge of a hill. Both outside and within the area of the foundation, the presence of the natural element dominates with clusters of pines, soft rocks, low shrubs, and natural paths (Vessela 2017).

The targeted preservation of the natural landscape to the extent of the plot creates two separate zone levels (Fig. 40.3). The two resulting spatial entities acquire different meanings as the lower one represents the "hard" expressing the deprivating dimension of the sentence, while the higher one reflects the "soft" and its reforming and educational role. At the lowest level of the plot, the administrative structures and the isolation unit are included in a linear, building complex. On the contrary, at the highest level, the two incarcerated living units and their service facilities are integrated into four separate buildings.

The two living units are deployed only at two levels in order to maintain the small scale applied throughout the campus. The internal organization of the units provides for individual compartments, common areas, staff offices, and surveillance chambers. The apartments are airy and bright and each one contains its own toilet, storage areas for personal belongings, an office, a TV, and a bed (Halden Prison 2019). These dwelling units are defused in a central, communal gathering place, thus promoting fair play, close cooperation and mutual understanding, removing phenomena of institutionalism and violence (Benco 2015). The results of the architectural gestures are reflected in the incarcerated

Fig. 40.3 Top view of Halden Prison (*Source* https://www.terrapinbrightgreen.com/blog/2016/08/prison-nature-social-structure/)

population: "The aggression of detainees toward other detainees or to the staff of the facility are rare incidents and no incident of physical violence toward the staff has been recorded so far." The same reports claim that "the level of activity and reintegration efforts is the main reason for the low level of aggression and violence, and the overall good compliance with prison regulations—however, based on statements from inmates, they do appreciate the facilities, the surroundings and the reduced feeling of being in a high security prison." (Høidal 2009).

Although it`s difficult to prove whether the above is caused by environment, the level of activity (work, education, cognitive programs, training, etc.), or a combination of these elements, in its entirety, the example of Halden is a crucial point in the history of prisons, redefining the process of penitentiary through functional programs and spatial qualities that respect humans and their living.

40.3 Conclusion

From the relentless execution of torture to the incessant work in the central atrium of San Michelle, from the infallible surveillance mechanism in the tower of Panopticon to the unbearable loneliness on the four walls of Cherry Hill and from the absolute silence in the courtyard of Sing-Sing to the conduct of educational programs in the classrooms of Halden, the criminal process and its architecture are constantly being transformed. This architecture, although it claims to prepare, reform, and include, has in reality and for many decades been un-educating, isolating, and marginalizing by compiling spaces of exclusion, imposition, and power. In this peculiar and oxymoronic syntax lies the genesis of a multitude of thoughts regarding the clarity of its architectural approach.

These concerns are rightly raised, as through the historical approach (Fig. 40.4) and study it seems clear that the institution of prison, as the

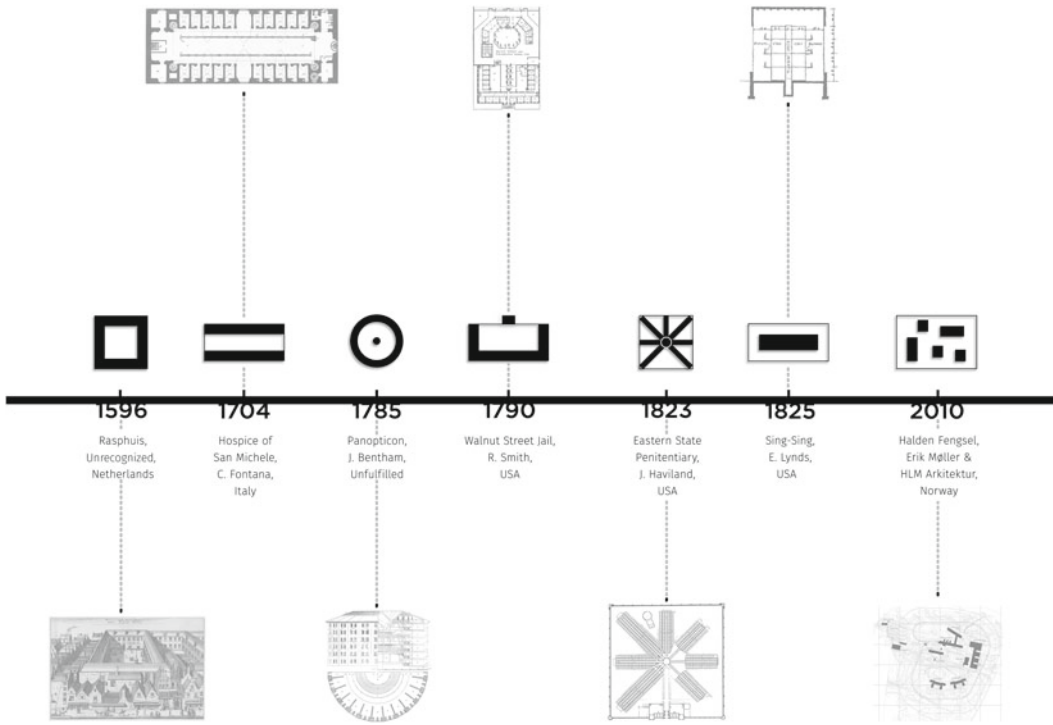

Fig. 40.4 Historical Timeline_the evolution of prison in diagrammatic plans (Source: Author)

extreme of exclusion, with its embryonic and unambiguous interpretation as a "heinous storehouse of bodies" (Martinides 2006), is clearly the product of an "anti-architectural" thought.

However, the same historical course provides an answer to the initial question that arises regarding the reversibility of the institution of prison both in terms of its structure and content. Even if the prison needs to be defined as the ultimate place of deprivation of liberty and inevitably as a place of abstraction or commitment of time—as the only common good that is priceless and irreplaceable for all—the quality, form, and identity of its spatiotemporal characteristics can still be determined differently. "The port directs those on board […]," writes Pascal. In the undeniably disoriented "sailing" of the prisoner, even if the "ship" is firmly unshakable, it can still change the "port" and ipso facto its final destination.

The activation of sustainable anthropocentric design is the only way to create and adapt the appropriate infrastructure, while the mere idea of this revision makes us wonder what would happen if in the end the genuine architectural spirit achieved its original goal and design for inclusivity was the beginning and not the end. What if the inaccessible places of solitary confinement and boredom were turned into places of warmth and interest, if the guard became a social worker (Høidal 2009), if the cell became a room and if the prisoner became a resident?

António Guterres (*Secretary-General, United Nations*) mentions that "we must rise higher to rescue the Sustainable Development Goals—and stay true to our promise of a world of peace, dignity and prosperity on a healthy planet." (UN 2022).

If "healthy planet" not only refers to the protection of the climate and physical environment but also to the protection of our society and the members who constitute it, then "rise higher" probably means "dive deeper" into the issues of minorities, leaving no one behind, through multiteralism, providing on the one hand conditions of unity and well-being and on the other a multidimensional architecture of meaningful content.

In order to achieve this, the prison cannot be treated a priori as a second-rate place with illegitimate content and must be placed in the heart of the social sphere. The notion that it is through callous "persecution" that mild readjustment occurs, apart from being outdated, is also dangerous, for both the "persecuted" and the "persecutor." Taking this assumption into account and having collected a diverse and representative sample of inappropriate, penitentiary facilities of the past, the architectural heritage must protect not only the user but also itself, as in a sustainable world of inclusivity the noble "VESSEL OF LIFE" (Konstantinidis 2013) may be easily transformed into a rough "VESSEL OF EXCLUSION."

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Mitchellian Architecture: Building Code and Informal Settlements in Hong Kong

41

Kachun Alex Wong

Abstract

Informal settlements are frequently pitted as the opposite of building-code-compliant architecture. They are seen as evading essential institutional practices and lacking constraints, relative to ad hoc social conditions, while formal architecture, chiefly defined by their observance of the building code—is celebrated with the rise of modernism as safe, hygienic, civilized, and corrective of past building crises. Applying Timothy Mitchell's 'Mitchellian' perspective to architecture, this paper dismantles the rigid binary between formal and informal architecture, and argues that expertise is what creates the divide between formal and informal. As Mitchell shows, defining expertise is a political ontological project that is inherently exclusionary. This theoretical perspective is illustrated in the case study of Hong Kong's informal settlements, subdivided units (SDUs). While Hong Kong's building code or *Building Ordinance* is largely unquestioned by professional practitioners, a case study on SDUs shows how the building code is entrenched in a history of violence, especially towards historically marginalized communities. This paper firstly surveys academic writing on SDUs and the common mystification on this complicated case of housing, secondly historicizes SDUs within a longer arc of informal settlements in Hong Kong, and thirdly examines the legal-architectural issues surrounding SDUs such as through the advocacy of Subdivided Flat Concerning Platform. It concludes with a short outlook for SDUs, public housing, and the Community Housing Movement. It aims to provide an informed and holistic stance of SDUs beyond inconsistent media and popular portrayals.

Keywords

Informal settlements · Building code · Inclusivity · Slum · Inadequate housing · Inequality · Discriminatory law

41.1 Introduction

According to Ching and Winkel, the contemporary building code since the 1990s established by the International Code Council is defined as "a comprehensive, coordinated national model building code developed through a general consensus of code writers" (Ching and Winkel 2018, p. 3). In a manual written for practicing architects, the illustrations of building code stress impartiality and neutrality that allow architects to

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apply free of emotive, affective, stylistic, and personal judgement. Presented as immediate, unambiguous, authoritative, standardized, and needed in modern society, they also show how the building code is uniformly applied and enforced, irrespective of the reader/user. Most building codes are prescriptive, a "defined solution to an identified problem" (Ibid., p. 8), aimed to correct social ills—and as especially stressed by the authors—against the naturally occurring pre-code crises such as fires.

The discussion on *Building Ordinance* in Hong Kong follows the North American and Western narrative. Building professional and professor Wong Wah Sang portrays the universality of Building Ordinance, stating that "all of us" need it (Wong and Yeung 2020, p. 4). He similarly notes that *Building Ordinance* originated from a concern for building and living safety, against the backdrop of over-crowdedness and mounted housing hazards during Hong Kong's history of mass immigration from Mainland China in colonial times. He notes the affirmativeness of *Building Ordinance*, aimed to improve and secure "the basic living standard" (Ibid., p. 4) for the society's poorest and most needy. Similar to Ching and Winkel, he aims to portray his local practice manual as ubiquitous and referential in as many circumstances as possible.

On the other hand, informal settlements are frequently referred to as problems to be solved rather than solutions themselves. In global literature, informal settlements are degraded, problematized, and slated for improvement. Davis (2004) diagnoses that slums in the Global South are proliferated by the mass in-flux of rural migration into cities, as a result of neoliberal economic reforms. He notes the issues associated with informal housing, including inadequate access to safe water and sanitation, and the insecurity of tenure. In his view, slums are an entrapment of urban poverty that require active intervention. Similarly, the United Nations (UN)-Habitat (2003) calls for urgent policy responses and alleviation of slums, citing issues of health and crime, resident precarity, and lawlessness. This is related to target 11.1 of UN's Social Development Goals (SDGs), which identifies slum or informal settlements as inadequate housing that needs upgrades and replacement (United Nations 2022b).

In Hong Kong, subdivided units (SDUs) are a contemporary form of small-sized informal settlements within the *tonglaus* (Chinese tenement houses) of the city (Fig. 41.1). The Director of Hong Kong and Macau Affairs Office, Baolong Xia, set a goal to eliminate SDUs and cage homes in 2049, a sentiment echoed by local non-governmental organization Subdivided Flat Concerning Platform (SFCP) convenor Po Shan Tang (Wong 2021).

41.2 Mitchellian Architecture

This paper seeks to reconcile the fabricated divide between formal and informal architecture. Following a poststructuralist perspective, this paper understands what is at stake in this categorization within which, political theorist Timothy Mitchell's (1988, 2002) work which influences massively the field of postcolonial Science and Technology Studies (STS), can be applied to the disciplines of architecture and Hong Kong Studies.

In response to the larger UN SDGs, a Mitchellian view responds to target 10 in reducing inequality through inclusive action. Target 10.3 in particular highlights how laws, legislations, and policies could be discriminatory. Building code as an example of law is theorized here not single-sidedly as a safekeeping of people's wellbeing and safety, but also exacerbating some well-ingrained inequalities in the urbanity, concerning especially poverty and socio-economy (target 10.2) (United Nations 2022a).

To summarize, Mitchell refutes modernist claims of expertise as inevitable, especially within colonial contexts. He recounts the convincing case study of nineteenth century Egypt, which under colonization birthed infrastructure such as dams, irrigation, and sugar cultivation. He seminally defies common belief to say that "these projects… don't perform intelligence, but are themselves the science" (Mitchell 2002,

Fig. 41.1 The exterior appearance of subdivided flats (Courtesy Vickywong2222/Wikimedia Commons)

p. 37), documenting how French engineers adjusted and amended plans as their imported expertise was challenged or downright rejected on the grounds. Mitchell perceives the expertise of engineers as constituted in the process of circulation.

This paper furthers Mitchell's insights on Western expertise by three key themes, namely monopoly, authority, and absoluteness. First, it is by far not the only functional expertise, and arguably not the superior kind. As Mitchell reframes, local irrigation techniques existed long before the colonial occupation, are integral to Egyptians' lives, and are lost from colonial stigmatization. Conversely, Western solutions often fail to resolve regional crises. Second, Western expertise is not above the political, but is part and parcel of a colonial legitimacy. Often times, formal expertise is fictively construed as apolitical for its universalizing claims. Third, Mitchell contests that formal expertise is just as relative and arbitrary as its informal counterparts, evident in its social contingencies in the colonizing process. This paper extends this 'Mitchellian' analysis to the building code as an example of formal expertise. (Note the 'Mitchellian' is referred to Timothy Mitchell, which is neither the popular usage that refers to comedian David Mitchell, nor the earth sciences usage that refers to "A stage… in the Upper Tertiary of south-eastern Australia". Oxford Reference 2022).

Within these three themes, this paper firstly surveys academic writing on SDUs and the common mystification on this complicated case of housing, secondly historicizes SDUs within a longer arc of informal settlements in Hong Kong, and thirdly examines the legal-architectural issues surrounding SDUs such as through the advocacy of SFCP. It concludes with a short outlook for SDUs, public housing, and the Community Housing Movement. It aims to provide an informed and holistic stance of SDUs beyond inconsistent media and popular portrayals.

41.3 Monopoly of Formal Expertise

There is an impression that Mitchell is not well-cited in architectural literature. Mitchell (1988, p. 44) in fact dedicates a book chapter to discuss an architectural expertise, what he names "enframing" as the perceived neutrality of Western spatial design and epistemology. He views the enframing function of barrack-like "model house" as antithetic of Egyptian life. Enframing to him is a flattened and linear spatial understanding that perpetuates the signifying and the signified. These Western model houses are contrary to the Algerian Kabyle house which accommodates multiple binaries, ambiguities, and dialectics, as observed by Pierre Bourdieu.

Architectural scholars have coincided/echoed with Mitchell's challenge on the monopoly of Western concepts in their field. They shed light on undertheorized sources of expertise. Whether economic or architectural, informal expertise is viewed as an alternative/parallel worldview that brings into question the limits and complacency of Western epistemology. In Hart's (1973) article on informality in Ghana, the authors point out that informality originates as an economic concept and the perceived need to register an economic phenomenon that escapes Western dualities between employment and unemployment. AlSayyad registers urban informality as a "new" way of life. He notes that informality, originated from Latin America, constitutes its own subject and expertise, which challenges outmoded Western concepts such as the country and town duality (Roy and AlSayyad 2004). This complicates UN-Habitat's (2003) and Davis' (2004) views that informal settlements equal inner-city slums in most developing countries, challenging Western developmentalist categories.

More related to building practices, Yarrow (2019) is among design anthropologists who seek to dismantle the black-box mentality in architectural design industry (see Sect. 41.5). In an interview with an Indian informant Megan (pseudonym), she proposes that it is uneasy for

her to work contractually in the UK, and perceives it as a bad alternative to her home context where contracts are informal or outright absent. Yarrow reminds that formal expertise is only one of the many forms expertise can take, and the decision that it works better or is more superior to others is political and very much contestable.

The monopoly of formal building persists in Hong Kong. As Wong (2016) comments, the building code is the single most definitive factor of Hong Kong's urban form since colonial times. Informal spaces of the city such as SDUs exist extralegally. Subdivision usually involves building works on drains, floor screeding, adding toilets and kitchens, and partitioning undertaken without going through the necessary application to the Buildings Department (Yau and Yip 2022) (Fig. 41.2). If discovered by enforcement (Buildings Department), these properties with SDUs have to be reinstated, while the process will lead to fines, persecution and affect the legal titles of the properties concerned.

This paper does not try to deny the necessity of these enforcements, as it is sufficiently evidenced that such unauthorized building alterations inflict significant issues such as implications on structural integrity, fire safety, environmental hygiene, and health issues for the residents (Chung 2014). This paper however recognizes that an uncritical monopoly waged by formalism can solve some issues but generate others. As anthropologist Alan Smart (2006) insists, demolition of illegal settlements is only as well-reasoned as its subsequent rehousing/repatriation efforts, cautioning the likely outcome that people are forced onto the streets or into housing conditions worse than their previous squatters. As Po Shan Tang notes, the elimination of SDUs without subsequent resettlement plans will only prompt the rise of other forms of inadequate housing (Tang 2022). Informal or illegal settlements always arise for a reason, signalling towards an unfulfilled need by the formal market—a market failure. The emergence of the informal signals to inadequacy of the formal, a resolution to which comes only after the recognition (not the denial) as such.

Mitchell's enframing applies directly to the specific case of SDUs. Former Secretary for Transport and Housing Frank Chan among officials have understood SDUs as transitory for residents in their waiting time on public housing (Cheng 2021), failing to recognize their geographical specificities. Like the Kabyle house, SDUs are not signifiers of what's next, but they

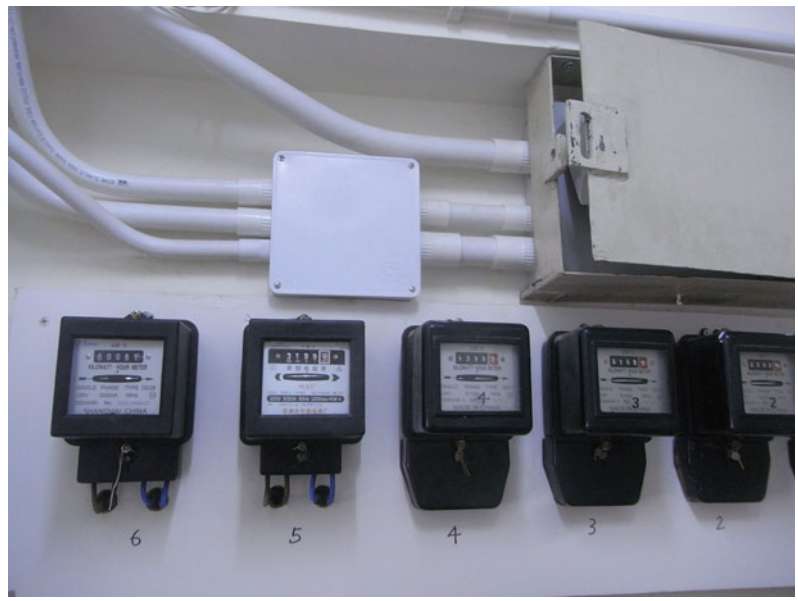

Fig. 41.2 Electric meters of a SDU, allowing different households to pay their own electricity costs (Courtesy Ka Wing Heung/Wikimedia Commons)

occupy this transitoriness as a highly localized space. SDU residents prefer this transitoriness as short, temporary, and flexible housing. The SDUs do not derive value from the public housing it anticipates, but they satisfy the everyday, realistic needs with their spatial situatedness in prime locations in the city where wage-earning jobs and life opportunities (such as education for children) are proximate. As architect and professor Juan Du observes, "People who live in subdivided units in Hong Kong can rent a proper two-bedroom apartment in the New Territories, further away from the city center. The housing supply there already exists, but the demand is not there. The demand is in the city center" (Navidad 2021). This dilemma echoes with architectural historian Colin Rowe's critique of the 1970s established New Towns Program which provided public housing in the New Territories, what he attributed as bedroom communities void of appropriate job opportunities (Peiser and Forsyth 2021, p. 127). Urban planner Anthony Yeh also remarks "a great mismatch between the population's residence and place of employment" in these decentralized New Towns, which were hegemonic of the city's imaginaries towards housing the postwar Chinese immigration (Ibid., p. 191). Other preferred features of SDUs include the nominally low rent, the flexibility of leases, the close ties among neighbours, and the social status of living urban, all owing to their geographic embeddedness in urban areas.

While SDUs are antagonistic to rural New Towns, they are not strictly inner-city squatters envisioned by Davis (2004) or UN-Habitat (2003). As said, they nestle within *tonglaus*, which are formalized colonial buildings. SDUs are informal retrofits or renovations, neighboring other formal settlements. The relative tenant security is in fact contingent on this difficulty in law enforcement.

The informal expertise In SDUs also deserves a Bordieuan treatment. Housing scholars have analyzed the responsiveness of SDU tenants' housing consumption to income, noting the remarkable adaptation low-income households made by "further downgrading housing size and quality, or reducing non-housing consumption, or both when housing rent increases relative to their income" (Leung et al. 2020, p. 2). These families are at the forefront of exploring adaptions to live with limited resources and spaces in a city like Hong Kong. Architects such as the Urban Ecologies Design Lab (Housing in Place 2022), DOMAT (2022), and Jockey Club Design Institute for Social Innovation (2022) have tried to augment these families' ability to adapt in limited spaces, by designing and building kinetic and multipurpose furniture pieces. These architectural solutions are suggestive of heterogenous ways to live informally in the city where socioeconomic unevenness cannot be eliminated in the short run. Of course, as these architects would point out, these short-term improvements are done without losing sight of the long-term ones such as advocations to build better and more housing. In any case, a monopoly of formal solutions is counterproductive.

41.4 Authority of Formal Expertise

In the introduction, it is demonstrated how building code both in Hong Kong and the West publicizes a rhetoric of universality and givenness, that it is removed from personal preferences and arbitrary judgement. Building code epitomizes the formation of formal expertise, being above the political or transcending politics. Mitchell (1988) argues it is far from the case. In "enframing", he compares military plans with that of preparatory schools and model housing, to note these idealized settlements constitute part of a military practice to "fix" people in place and restrict their counterinsurgency. The model housing is designed against an Egyptian village that the French viewed as inaccessible and unable to be surveilled, where villagers were forcibly relocated from. Mitchell alerts that formal expertise comes from a place of violence, and its legitimacy should not go unquestioned.

Elsewhere, drawing on my experience practicing as an architectural and research assistant at UEDL working with SDU residents, I have applied this Mitchellian insight to architecture, calling it "citationary architecture" (Wong 2022).

By applying the citationary nature of Orientalism to architecture, I note the inherently citationary nature of architecture, how architecture, viewed in conjunction with building code, is self-referential and exclusive in its 'citations' or lack thereof. Of which, I note how code is a depository of decades of building crises concentrated in poor neighborhoods but continues to disproportionately dispossess them. For Ching and Winkel (2018), it is undeniable that codes are written over decades of crises in poor neighborhoods, specifically fires in American cities in the 1800s. However, they fail to reference how code can be mapped differently onto (poor) regions prone to further crises. For architect and professor Liam Ross, he notes how Grenfell, neighborhood of the deadly 2017 Grenfell Tower, was historically prone to war bombing and poverty, placing contemporary fires "on a longer historical trajectory" (Ross 2022, p. 4). This paper furthers Ross' findings that poor and minority neighborhoods, historically providing prompts for the enhancement of control in building code through the enactment of crises, are the ones feeling the most impact from a flattening and seemingly even-handed regulation over all city spaces. In other words, the unevenness and asymmetry of the historical city are met with the indiscriminate code. There is an unresolved discrepancy between an existing urban landscape where inequality is characteristic of its development, and code that proclaims equality through blindness towards preexisting differences. Thus, code should be necessarily historicized to avoid double marginalization of poor neighborhoods.

Smart's (2006) seminal study places the infamous Shek Kip Mei fire along the historical trajectory of informal housing in Hong Kong through archival research. Smart's two main insights are relevant for discussion here. First, he accurately frames disasters like fire as "historically produced patterns of vulnerability", "caused by human actions or inactions". This means that as Ross (2022) interrogates, rather than being accidents, fires can be traced historically and along society's own making. The historical explanation Smart gives of the frequent squatter fires in New Kowloon including that of Kowloon Walled City, Tung Tau, and Shek Kip Mei, is that Chinese migrants tended to congregate there. These marginalized populations spiked the density of the squatters, making its urban geography prone to occupational hazards. The geographical uniqueness of New Kowloon originated from consequential colonial leases and designations (Fig. 41.3). Therefore, the fact that fires are spatially concentrated is not coincidental, but constituted within a geography of colonial violence.

Next, the infamous Shek Kip Mei fire is commonly referred to as the driving force for well-praised public housing and resettlement, especially of MacLehose's colonial administration. Smart argues that public housing is not innocuous and apolitical as narrated by colonial administration, and certainly not a gesture of colonial goodwill/altruism, but is very much compromised within the neoliberalism of a self-financing colony. It was pointed out that newly planned and permanent resettlement blocks, with many efforts dedicated to minimizing building costs, saved the colonial government money rather than simply relieving fire victims who grew in numbers and costs over the years (shown in the Wakefield Report, made by administrator James Wakefield). More importantly, resettlement was congruent to political counterinsurgent efforts, as multiple British officials diagnosed squatters as harboring Communist sympathizers and anticolonial agitators, and as "bottlenecks that was holding up development" the colonial government was desperate to rid of but could not afford to due to the risks of public discontent. Smart goes as far as to unearth colonial narratives that described the Shek Kip Mei emergency as an "administrative godsend", allowing Hong Kong Governor Grantham to pressurize the Colonial Office to "do more about the housing and squatter problem" without risks of upsetting local councils (Smart 2006, p. 106). Public housing resulting from these displacement efforts are reminiscent of enframing, and comparable to Egypt's barrack-inspired model housing. The architecture of public housing, while commonly preferred, can be theorized as an extension of colonial power and violence, contrary to how it is often praised as the face of colonial benevolence.

Fig. 41.3 Map of locations of historical fires (Courtesy Alan Smart)

Smart's implications on theorizing contemporary SDUs are enormous. Informal spaces in Hong Kong have not escaped the stigmatization by official narratives, where the justification for their removal is depoliticized as a matter of public health and interest. SDU living hazards like fire safety are always discussed in isolation, when they should be understood in the same trajectory of historical informal spaces like Shek Kip Mei and Kowloon Walled City slums. In studies from the Life Sciences of fire accidents (Leung and Chow 2016) and of bad air quality and hygiene (Lai et al. 2017) in SDUs, scholars single out the high probability of living hazards in SDUs without factoring in the causes of causes. For example, they conclude that fires were "mainly caused by electrical short-circuit and electric meter overload", where multiple and low-quality electrical appliances are used, while "poor fire safety management in blocking escape routes" is blamed for the most casualties and injuries (Leung and Chow 2016, p. 382), but fail to acknowledge the uneven risks exposed to SDU residents precisely because of the socio-economic disadvantages that led them to purchase and use cheap appliances and the lack of useable spaces that led them to utilize the public spaces in the building for storage. An uncritical prioritizing of their safety issues risks further marginalizing these residents. The uncritical prioritization of mitigating high risks could potentially take the form of asymmetric enforcement and policing in these settlements. Also, while SDUs carry a lesser impression than historical squatters of harboring criminals and insurgents, the elimination of informal settlements is equally motivated by image issues, i.e. an avoidance of negative media portrayal.

Next, there is an insufficient understanding of the disproportionate impacts of building regulation on SDUs. As Smart illustrates, cracking down on informal spaces is only as well-justified as the extent of its resettlement schemes. As Yau and Yip (2022) write, toleration with illegal housing is sometimes used because of the lack of governmental capacity to enforce either to execute the ban and/or subsequent welfare policies. The theoretical basis of enforcement should be reasoned such that the wider society does not suffer more than benefit from the discontinuities of these illegal housing, i.e. the government's every move plays within a political game of

balance. As will be detailed in the next section, the constellation or convergence of such conditions is a highly political project and should be evaluated as such.

41.5 Absoluteness of Formal Expertise

Instead of trusting the Western narrative of ubiquity, Mitchell sets off to dismantle formal expertise as based on arbitrary and haphazard contingencies. Extending the infrastructural example, he demystifies the use of DDT in North Africa, which was hailed as the cure-all for pest eradication by the West in the 1940s. The 'miracle' chemical that seemed to emerge from ingenuity was in fact contingent on a chain of random events, including the "US-British rivalry over Egypt, the needs of [second world] war, the accidents and ambitions of a Rockefeller career, and the impact of sugarcane production and irrigation works" (Mitchell 2002, p. 47). It is this entanglement of uncontrolled human and natural events, unrelated but simultaneously occurring in time and space, that took DDT from the Peet-Grady chamber (laboratory in Switzerland) to the Egyptian fields. Needless to say, this product marketed for its inevitability caused havoc to the people and environment of the non-West. Mitchell's point is that when left unchecked, formal expertise or what he calls techno-power is violent. The implication of this seemingly non-architectural example on architecture will be evidenced later in this section.

As in the introduction, architecture is preferred as institutionalized and formal, and adherent to building constraints. Ching and Winkel (2018) show how building code is read as the bounds of creativity of architects and designers, especially in an advanced capitalist and developed world like the US. As previously remarked, the STS or Michellian perspective has not reached architectural literature widely, except for the following instances. Murphy (2016) asks how designers design, in what he calls anthropology of design. He views it is important to understand the social conditions of the design process, which allows scholars to study how designers negotiate with constraints such as the building code. Imrie and Street (2011) present an anthropological study to understand the people and relations involved in the building code. Their study reveals that the building code—rather than being a monolith—is highly varied across architect's practices, regions, cultures, socio-economic and political perspectives, even within the limited variance of the UK. Imrie and Street yield a recursive and relational view that architects and regulators engage in negotiation, disputation, and debate, co-constituting a dynamic building code in action. They dismantle the absoluteness of building code, but describe it as an open process, to "interpretations by building control surveyors", and written to provide flexibility "in design terms" (Imrie and Street 2011). Yarrow (2019) contends with this view that code is not just what is listed in public writing, but implicates the daily interpretation of individual members of the architect's office in different stages of their training and lives, thus is relative and amorphous to those who practice it.

Mitchell realizes that formal expertise is just as relative as informal expertise, the latter of which is theorized as unworthy of the natural or social sciences in the Western context due to its unstable and unsystematic nature. Informal/vernacular architecture/architecture without architects is known to Western scholars as socially contingent and reflective of social relations, and what Western architecture is not (Rapoport 1969; Rudofsky 1964). The following Hong Kong case study further shows how formal and informal architecture can be understood in the same relativistic lens.

Smart (2006) illustrates that the large-scale resettlement estates are not a rational and inevitable result of the Shek Kip Mei fire as conventional Hong Kong studies suggest, but are reactionary, hasty decisions made in a hurry (between London and Hong Kong). In addition, Smart makes the argument that resettlement efforts are organized not by radical shifts, as is conventionally suggested, but by gradual and

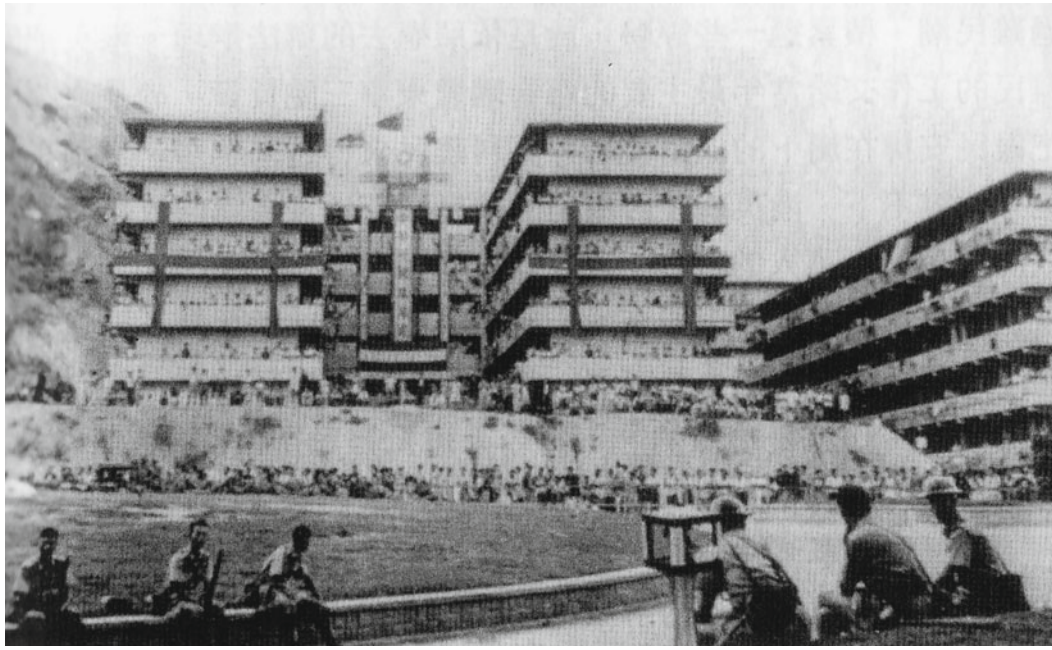

Fig. 41.4 Mei Ho House of Shek Kip Mei Estate during the 1956 riots (Courtesy Hong Kong Police Force/Wikimedia Commons)

subtle ones that can be understood as piecemeal nudges against reluctant forces. This realization goes against the grand narrative of civilizing that the colonial government propagates behind the persistent, master-minded, multi-storey public housing of orthogonal and modernist forms (Fig. 41.4).

The enforcement of Building Ordinance in Hong Kong is also relative. The regulation against SDUs such as building and lease controls are arbitrary due to the lack of adequate "financial and human resources" in enforcement departments and the abundance of illegal building works (Yau and Yip 2022, p. 6). In practice, whether SDUs are tolerated or not depends on the randomized chances of discovery, or worse, on uneven enforcement initiatives (see Sect. 41.2), with most landlords able to get away with subdividing units illegally simply due to the ineffective enforcement. The work of SFCP (2021), a community organization whose work concerns SDU residents' rights, responds to this sense of contingency. While the platform advocates common strategies such as starting rent regulation, rent control, securitization of tenancy contracts, and priority of lease renewal to current tenants, they do so with the awareness of difficult enforcement, such as the invisibility of SDUs and the inherent challenge of protecting unwritten leases. SFCP acutely highlights and attempts to reconcile the informal-architectural conditions with institutionalized control.

SFCP (2022) also helps ground this juxtaposition more in architectural terms. The platform, noting both the urgency of SDU residents' hardships in the subpar living environments as well as the issues' insurmountable scale, recently proposes a grading system that determines the order of the replacement of SDUs. The criteria include (in this order) first, the building's structural issues, second, the conditions of unauthorized building works, third, the building's management and hygiene, fourth, window and pipe conditions, and fifth, fire safety. While their

ultimate goal is to phase all residents out of unfit housing, they advocate for incremental steps that register the realities, logistics, and finances of the situated conditions. Reading into the criteria, note the materiality, from the mechanical–structural and environmental—infrastructure of the house, to the labor networks in building management and securitizing (superintendents, firefighters, etc.). It should be noted that SDUs are derivative of tonglaus that are themselves products of pre-1960s politics (making these buildings at least 50 years old) and outmoded building regulations. In addition, the spatial needs of SDUs have resorted to structural and domestic alterations that contribute to the wear and tear of already obsolete buildings (Fig. 41.5). Architecture becomes the site where historical contingencies coincide and converge, much like the Mitchellian infrastructural particularities of international rivalry, war, colonialism, business and political economy in the case of DDT's deployment. Architecture is the site where mandates adapt, reshape, translate, decentralize, and de-absolutize.

SFCP's strategic maneuvers in the city's impasse embody a Mitchellian outlook, both critiquing and augmenting the city's preexisting and deep-rooted deficiencies through an architectural engagement. More, SFCP architecturalizes Mitchell, as their acute identification of building issues stems from a holistic understanding of people's relationship with their architecture, i.e. the architectural usage. With an awareness towards material contingencies, architecture is historicized contrary to the rationale of formalist discourse (see Glendinning 2014, for a formalist analysis of public housing types in Hong Kong and Singapore), asking how architecture is used, or continually (by various stakeholders) rather than unitarily made. Such a Mitchellian outlook reintroduces architecture as an inquiry of dynamic power relations and influx politics.

41.6 Conclusion

This conclusion returns to and extends the points made about SDUs. This paper seeks to cultivate an understanding of SDUs that are beyond media portrayals that are sometimes mystifying. Moreover, official narratives such as Xia have shaped the public discourse to consider SDUs as nuisances that are aimed to be eliminated (Wong 2021). As Tang of SFCP and Smart argue in their respective case studies, elimination is not an aim, but a means to ensuring the appropriate housing of citizens. Next, this paper's stance on understanding the informal residents' expertise in sustaining life is not a romanticization of the current situation, and certainly should not be read as a justification of the continuity of inaction for the housing problem. This stance is distinguished from libertarian scholars on informality such as de Soto (2000), who supports a formalization of the informal economy while assuming little moral duty towards the informal agents. This paper simply states that residents should be part of the solution to the housing issue, and that solutions should come about not excluding them from the conversation. This ensures that corrective directions are not counterintuitive. Finally, this paper rejects an all-or-nothing approach to real issues, and settles that formal authorities have to be worked with rather than wholly rejected. For example, SFCP is exemplary in examining both the terms of activist-residents and public policy by the government. While initiatives such as the Community Housing Movement (transitional housing initiative by the government) have illustrated that governmental housing does not have to all look and operate the same ways, but can combine public and private efforts, and can draw inspiration from the transitoriness of informal housing (Lau 2020). This paper borrows the important Michellian insight to reconstitute, expand, and unsettle the (in)formal. In the case of SDUs, it means to recognize

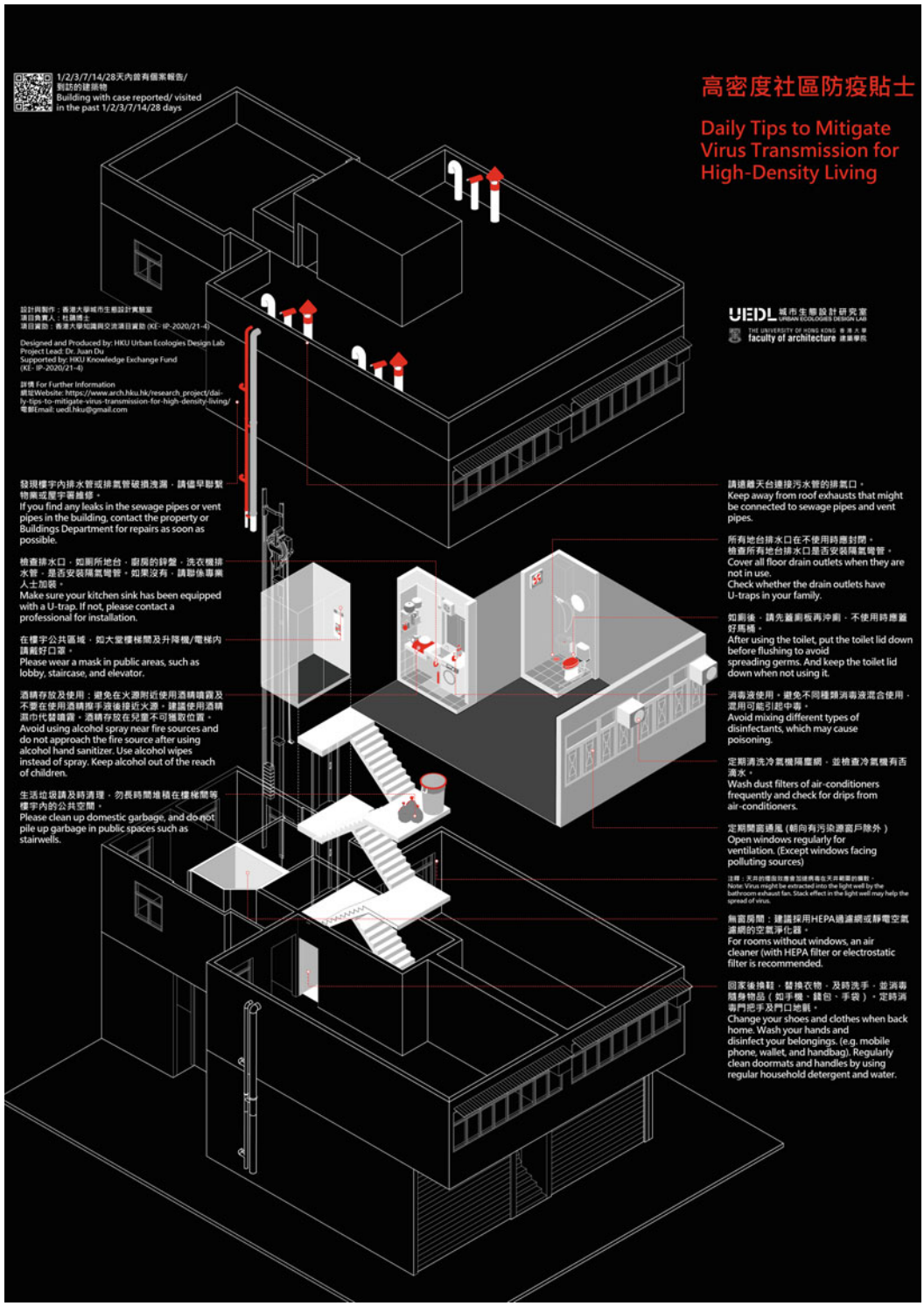

Fig. 41.5 Guidebook for SDU residents to mitigate virus transmission risk (Courtesy Juan Du/UEDL)

that formal apparatuses such as public housing and building code work in tandem with rather than against informal architecture, in housing those in need.

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42 +Favela −Trash: Socio-Environmental Self-Management of Waste in Favelas

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Abstract

Solid waste is one of the biggest problems in major cities around the world. Like other problems, it unequally affects black and low-income populations. In Brazil, it is no different. Favelas do not have sufficient public policies to truly address their conditions. In Aglomerado da Serra, one of the biggest favelas in Brazil, the *Mais Favela Menos Lixo* (+Favela, −Trash) project emerged from a collaboration between the UFMG Architecture School and a public school in the community. The objective of this partnership is to address solid waste management processes in the community with a community-based and self-managed methodology. The project is guided by three axes of action. First, debris treatment features a containment system that reuses civil construction waste and the removal of abandoned cars. Second, urban furniture planning decentralizes garbage accumulation until it is collected in order to avoid attracting animals and spreading throughout the community and waterways by the rain. Third, the dissemination of knowledge via a collaborative map painted on the school wall publicizing social actions and information about garbage collection; posters attached to poles with information about the collection; and collaboration with urban agroecology organizations to discuss composting. In conclusion, the + Favela, −Trash shows the importance of public schools in the community struggle for self-management and territorial affirmation.

Keywords

University extension · Garbage in favelas · Socio-environmental

42.1 Introduction

Urban solid waste is one of the biggest problems faced in large cities in Brazil and the world (Gutberlet 2017). Following the pattern of other social problems, the most affected populations are the

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Fig. 42.1 Location of Aglomerado da Serra

poorest, who live in neighborhoods where access to garbage collection and treatment services, if existing, are insufficient or inadequate. This is the situation in Aglomerado da Serra, located in Belo Horizonte, Minas Gerais, Brazil, one of the largest favelas in the country (Fig. 42.1). Belo Horizonte was a planned city, which deliberately excluded housing for builders and poor people from its design. However, it didn't take long for the first makeshift houses to appear, and, subsequently, the concurrent creation of public policies designed to remove them. The first removal took place 5 years after the inauguration of the city and, as Silva (2016) indicates, the process of occupation-expulsion-occupation led the poorest population, who were those that made up the majority of the workforce that built the city, to occupy the drainage headwaters of urban streams.

Starting in the 1920s, migrants, mainly impoverished and expulsed from the interior of Brazil due to land concentration, unemployment, and hunger, began to settle in the Serra and Cardoso River headwater regions that fed larger regional rivers. These territories sit at the base of the 'Serra do Curral'—a mountain range with significant geographic relevance as it is a physical barrier due to its low placement, as well as a region of national cultural importance. This area, which still does not participate in the formal real estate market, has become a city within a city and boasts a population of more than 50,000 inhabitants (Silva 2016).

Because the favela is a self-produced space, often with little or no formal instruction and without any support or guidance from the public authorities, the favela was built and rebuilt according to the immediate needs of the population, the most notable being shelter. For this reason, public spaces such as streets, sidewalks, and squares were not conceived or planned. Thus, decades after the favela's first residential occupations, some reforms aimed to "improve" the conditions, yet because they simply imported models from other regions of the formal city that do not suit the topography or needs of the population, many interventions failed. This practice also occurred because there is a social imagination that a favela is a bad place, where everything and everyone needs to be improved and changed. The logic follows that transformation is only possible by converting the favela into a formal neighborhood, pursuing the model of those that already exist in the planned city. These practices have guided various intervention programs in Brazilian favelas, including Programa Favela-Bairro (Favela-Neighborhood Program), which occurred in some favelas of Rio de Janeiro and was financed by the Inter-American Development Bank (IDB) (Cardoso 2005).

Symptoms of exclusion, especially those generated by the production and handling of waste, are felt daily by residents. Data presented in 2021 by the Overview of Solid Waste in Brazil (ABRELPE 2021) showed that, just in the Aglomerado da Serra, more than 41 tons of garbage are created daily. Given the magnitude of this data and considering the characteristics of the terrain and the forms of occupation in the

community, the issue of garbage remains urgent. Because the urban layout of Aglomerado da Serra is formed by steep hillside alleys and streets, when it rains, accumulated garbage is swept down the roads, blocking the drainage system, polluting waterways, and negatively impacting the lowest areas in the region (Fig. 42.2). Furthermore, the large accumulation of garbage reduces and blocks the existing sidewalk space.

Another common problem is the presence of animals interacting with the waste on the ground, spreading it out and making it difficult for the Superintendence of Urban Cleaning (SLU), the municipal body responsible for garbage collection in Belo Horizonte (Fig. 42.3), to collect it.

SLU is one of the actors responsible for garbage collection, but it is common for residents to also play a part in the process. Because per capita income in the region is a very low USD $100/month, recyclable materials collection such as aluminum, PET (plastic), and cardboard become an important part of family income. In one instance, this process was made difficult by the construction of an avenue on the site, which removed families from their homes, relocating them to smaller apartments with less space for handling recyclables (Rosa 2010).

The Aglomerado da Serra borders, one of the richest neighborhoods in the city, illustrated by the glaring difference in the HDI (Human Development Index) marks of each neighborhood—0.665 in the favela and 0.939 in the adjacent neighborhood (UNDP, IPEA, FJP 2014). Equally contradictory is the quality of the public services provided which, in order to guarantee equity, should be inversely proportional to the needs of the neighborhood and favela populations. However, in a country as unequal as Brazil, the highest quality services are provided for those who already have everything and less is guaranteed for those who have less. Unlike its neighbors, Aglomerado da Serra does not have publicly available garbage collection data, such as time and route. The schedules that do exist do not reflect the intense work routines of those who live in the region, thus added to inadequate infrastructure in the dense region,

Fig. 42.2 Waste blocking out the drainage system

Fig. 42.3 Animals spreading waste. Photo kindly provided by residents to the work collection

garbage accumulates on the streets. Because there is no publicly available data on the waste services and conditions in Aglomerado da Serra, it is difficult to monitor and fight for rights.

Another notable factor in this conversation is the rich cultural diversity in Aglomerado da Serra. The favela hosts rich and intense cultural manifestations led by MCs, DJs, and Funk Singers, who are among the most relevant contemporary Brazilian artists. 'Baile da Serra', a popular weekly party in the favela frequented by hundreds of visitors, drives the local economy. However, their by-product (garbage) joins everyday urban waste: more bottles, plastic, paper, and glass in the waste system. This rubble is then added to existing rubble that has been produced in the 100-year-old constant occupation and reoccupation activities of self-construction and reconstruction in the community.

The challenges associated with urban garbage were chosen by the Municipal School Professor Edson Pisani (EMPEPI) community as the 2022 transdisciplinary theme of the year. The school, maintained by the municipality of Belo Horizonte, was founded in 1990 for elementary education; however, since 2014, it has grown to include adult education focused on improving literacy for local residents who did not have the opportunity to learn to read and write as a child. For more than seven years, the school has had a partnership with the Architecture and Urbanism School at the Federal University of Minas Gerais (UFMG). This partnership brings together young people and adults from the favela that study at the school, undergraduate architecture students, and local leaders to debate about community conditions.

This partnership and dialog created the + Favela, −Trash project with three action axes: urban furniture; disclosure and information strategies; and rubble and garbage treatment. By engaging the school community to address problems that arise from inadequate handling and disposal of waste, small and punctual transformations were experienced, potentially replicable and self-manageable by residents in the short, medium, and long term. These transformations are also intended to include children and elderly people in their elaboration, implementation, and continuity.

42.2 Materials and Methods

In 1993, John Friedmann proposed a new urban planning method in his text "Toward a Non-Euclidian Mode of Planning". According to the author, projects need to be situated in a real place and time, where knowledge and action are in a single process. Therefore, the process must be normative, innovative, political, and trans-active. These are summarized by "Social Learning", a method that requires "critical feedback and a strong institutional memory" (Friedmann 1993). To do that, planners should open meetings by

inviting criticism, which then allows traditional and "common" knowledge to be consolidated. This translation allows for a mutual exchange between the specialist and the population.

The methodology is reinforced by United Nations Habitat's New Urban Agenda, which defines a "shared vision" of urban planning as a way to:

> promote civic engagement, engender a sense of belonging and ownership among all their inhabitants, prioritize safe, inclusive, accessible, green and quality public spaces that are friendly for families, enhance social and intergenerational interactions, cultural expressions and political participation, as appropriate, and foster social cohesion, inclusion and safety in peaceful and pluralistic societies, where the needs of all inhabitants are met, recognizing the specific needs of those in vulnerable situations (Naciones Unidas 2017).

The works also encourage self-management processes of urban space that can be maintained by the local population itself. Lefebvre understands this method as the only way to achieve development in a contradictory and technocratic society. For the author, "autogestion must be studied in two different ways: as a means of struggle, which clears the way; and as a means for the reorganization of society, which transforms it from bottom to top, from everyday life to the State" (Lefebvre 1966).

The +Favela, −Trash project was conceived in response to the community's demand to improve local solid waste management. Leveraging the Municipal Public School Professor Edson Pisani (EMPEPI) as the reference center, the activities were structured together with adult students, elementary school students up to 10 years old, and UFMG Architecture School students. Efforts were made to strengthen community integration, integrating traditional and academic knowledge in the creation of alternatives for the accommodation, transport, and disposal of waste.

The methodology started with participatory diagnosis, bringing together students and teachers from both institutions on walks through the community in order to obtain information about waste challenges. The walks resulted in a photographic report that summarized three areas of findings, including the existing garbage and rubble accumulation points, the presence and states of garbage can, and existing strategies that community members use to address the waste management issues. To enrich the diagnosis, discussion tables were held to emphasize daily residents' experiences in relation to garbage and their main difficulties with its disposal. Finally, extensive research on waste management experiences in Brazil was performed, mainly in areas of precarious settlements where limitations to conventionally used strategies may exist.

After this exploratory phase, groups with students from both institutions were created with the objective to propose intervention measures that could compose the waste self-management program. Group meetings to discuss progress and evaluate the proposals were held with all students and teachers. Afterward, all the initiatives were summarized in three axes: urban furniture, dissemination and information, and treatment of rubble.

42.3 Results

42.3.1 Meetings Between Students and Local Leaders

Since its creation, EMPEPI has been the neighborhood association headquarters, hosting trainings, meetings, and thematic assemblies for residents. This space is a crucial gathering point in the neighborhood. Thus, youth and adult education students, who are residents of the Serra, in addition to architecture students, met with representatives of three projects. The first one was the Roots Ativa Collective, which built community gardens in an agroecological production and inputs for self-consumption of food. Roots Ativa performs micro actions of composting, planting, organic, and homemade production of food and personal hygiene items and sells the surplus. These actions guarantee their subsistence and that of people in the surroundings. The second project visited was Itamar Project, which carries out numerous activities such as community gardens and libraries for

children in places previously used for garbage disposal. The last project was Coopersol Leste, which is a cooperative of Recyclable Collectors that manages and sells recyclables for the benefit of associated families.

42.4 Actions

42.4.1 Rubble Treatment—Abandoned Cars and Mini-Gabion

In Belo Horizonte, the Urban Cleaning Superintendence is responsible for the collection of abandoned vehicle carcasses and other rubble on public roads. Specialized teams transport the rubble to specific points where it can be treated and disposed of. These policies seem appropriate for the formal city, but they don't work in the Aglomerado da Serra. As public agents do not promptly act on requests for vehicle carcass removal and the rubble collection points are far away from the community, it is difficult for the population to transport the material to these official points.

To address the specific issue of abandoned cars, the team first mapped the abandoned car locations and then placed stickers on the vehicles in order to notify owners of the risk of car removal (Fig. 42.4). If the owner doesn't take the necessary actions to solve the issue in a predefined time span, a protocol is submitted to the Municipality of Belo Horizonte requesting the removal. In addition, newsletters were produced, teaching the step-by-step process for realizing the requests. This resulted in significant community mobilization, including the removal of some of the notified vehicles.

Regarding construction rubble, there was a recent instance in which a region that had residences alongside a river was declared an environmental protection zone by the city. With plans to build a park in that area, the city demolished the houses. However, the park plan never went forward, leaving construction rubble where the community used to sit. Transformed into "no man's land" unsupervised by public power, it has been re-occupied by the informal political forces in the community, including drug trafficking which has expanded into the real estate market.

Fig. 42.4 Vehicle carcasses with the sticker

Fig. 42.5 First Mini-Gabion prototype

The Brazilian geologist Edezio Teixeira de Carvalho developed a system called the Geological Method in the 1980s. The process consists, first, of admitting that the soil lost in erosive processes is a non-renewable resource. Then, the geologist studies the possibilities of using civil construction rubble to structure gully areas. As most houses in Brazil are made of ceramic bricks, the rubble is relatively inert chemically. In addition, due to its high dimension, the rubble still allows water to pass through maintaining its stability. This method was carried out in several cities in the state, with special emphasis on the treatment of water, which comes out clean from the slope (Carvalho 1999).

Based on the Geological Method, the rubble from the houses can be packed in baskets made with metallic screens, and folded with the help of 18-L paint cans. Thus, it is possible to create mini gabions with the same volume as the can. The gabion containment system can then mitigate the high slope by forming terraces of new public spaces and will fulfill an important function of restoring the natural reservoir of rainwater, without transferring impacts downstream. This project already had a prototype (Fig. 42.5) and the team performed several studies to occupy the lot next to the school with public space (Fig. 42.6).

42.4.2 Urban Furniture—Waste-Hook

The intense routine of formal and informal work means that trash disposal happens at night and on Sundays, periods in which there is no garbage collection in the favela. Until it is collected, the garbage is spread by animals or even people. Access to predetermined places is also difficult, sometimes requiring extensive walks, stairs, or steep paths. Furthermore, community dialog showed that the trash cans installed by the government are insufficient for local demand. Where and how can this garbage be stored until it is collected at the times determined by the public administration? One idea was to install new dumps, designed considering the conditions of tight roads and high demand. However, two problems soon appeared: lack of both a funding source and interest in hosting the trash can on doorsteps.

Due to the high cost of production, the difficulty of transport and community fear of attracting garbage to the site, the possibility of a punctual and more financially viable solution was elevated. Thus, the seal of good practices emerged, combined with an individual artifice for accommodation from the garbage before collection. The object developed consists of a personalized sign and a hammock hook to support the

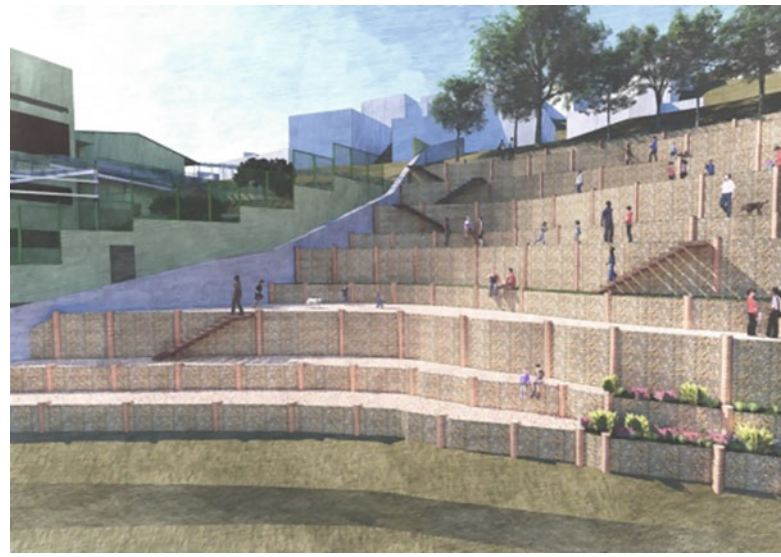

Fig. 42.6 Study of Mini-Gabion use

Fig. 42.7 Personalized Sign and Hook fixed with screws

garbage, fixed with screws, and plugs on the walls (Fig. 42.7). The hook holds a considerable volume of bags, enough for one residence, but does not allow the accumulation of garbage and, as it is suspended, it prevents animals from scattering waste in search of food. To reinforce the individual use of the hook, the street and the number of the house or trade where the object will be installed were highlighted. The sign also has information about the days and times of collection, informing when to place trash there. It also has a map of the region as the background image, an aesthetic choice to reinforce local identity. In addition, the plate has a QR Code that, when accessed, opens a request form. Afterward, the associated QR code link will point to a tutorial that will allow individuals to produce the board and base model themselves.

The manufacture and purchase of materials for the installation of a garbage hook cost USD

Fig. 42.8 Sticker being pasted by demand

$2.50 (USD$1.10 for the manufacture of the PVC signs, USD$ 1.30 per hook, and USD$ 0.10 for the four screws used for fixing).

The first installation of 15 pilot garbage hooks and plaques took place on Saturday, June 4th, on Ritmo Street. As there was no list of residents interested in the pilot installation, the signs only had street names, with numbers printed separately, so the sign could be made as requested later (Fig. 42.8). One EMPEPI student, a resident of St. Ritmo, who suggested the intervention area, was the first hook recipient.

The work started with fixing pilot garbage hooks, followed by the group walking along part of St. Ritmo explaining the proposal to the other residents, some of whom accepted the placement of the garbage hook. All boards produced for this first day of work were installed, the registration via QR Code was opened, and the residents submitted new requests. Over the course of the week, the group received several photos of residents using the hook and encouraging new residents to participate.

The second installation took place on July 2nd on the additional 61 houses and businesses that requested an installation via the QR Code. The field of action expanded also covering St. Flor de Maio (Fig. 42.9). Guided by a suggestion of a member of the group that helped to fix the initial garbage hooks on June 4th, screw markings on the plates were added. Another suggestion was made by a teacher at EMPEPI and a resident of St. Flor de Maio (St. Flower of May or Thanksgiving cactus) to add an image of flowers to the background of the plaques (Fig. 42.10).

42.4.3 Spreading the Word: Map of Aglomerado da Serra, Composting Techniques, and Lambe-Lambes

In the meeting process, Roots Ativa, Coopersol, and Itamar Project expressed that "being known" is one of the most important parts of their job. The map also includes shops and other landmarks. So, to promote the action of these groups and make public the information about municipal garbage collection in the favela where it was historically denied, the students designed a map for the school

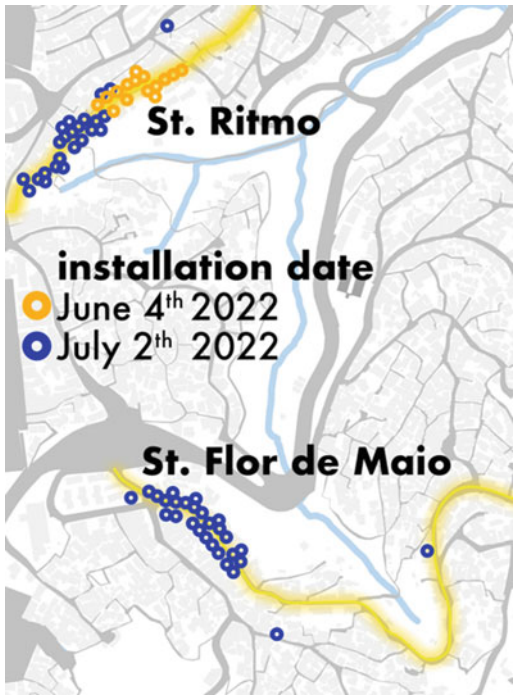

Fig. 42.9 Installation location of hooks

Fig. 42.10 Board with the suggestions

wall, which is located on one of the most important streets of the Aglomerado da Serra.

A printed version of the map was displayed at meetings with residents, who were encouraged to collaborate with the creation of the map (Fig. 42.11). The records made by residents were then georeferenced by architecture students, creating a digital map, and then graphically translated into graffiti projected onto the school's walls. The wall was measured, and several tests were carried out, not only to check that the work was technically possible, but also to create interest in the school community for the last step: the painting itself. At night, the maps were marked on the newly painted wall, and the next day, with the participation of children, residents, students, and teachers, the map was painted, keeping space for future expansions (Figs. 42.12 and 42.13).

During the process of painting the map, students gave children and adults seedlings of plants with instructions on how to participate in Roots Ativa´s agroecology project. The initiative receives organic waste from neighbors and recyclables, who deliver the material in specific containers. The recyclable waste is collected by Coopersol (cooperative of recyclable materials), while the organic material is processed at Fazenda Vista Alegre, an urban farm. There, it is composted at an organic plantation to guarantee food security free of pesticides that poison people, soil, water, and air. As it is a natural process, residents who collaborate with the initiative are also instructed to distinguish which items are good for the system.

While the other projects were being developed, another group publicized the actions on social networks and on posters nailed to posts, known as Lambe-Lambes. The objective was to include the residents beyond the school community. Nine poster designs were developed, with a focus on information about garbage collection. For example, they said that the less time the garbage is exposed, the less likely it is to be spilled on the sidewalk by animals or the rain (Fig. 42.14). The posters were also a vehicle for information about recyclable materials and composting, using texts produced by the municipal authorities as a reference, but which had not been applied there before.

Fig. 42.11 Collaborative map

42.4.4 The Impacts on Partners

Highlighting the partnership between the university and the school shows that the possibilities of the exchanges, learnings, actions, and transformations were felt by all who participated in the project. The moments of exchange between teachers–teachers, students–students, students–teachers, and students–teachers–community allowed for effective thinking, reflecting, and acting. The interactions also broke with the logic proposed by the public authorities of imposing outside interventions that tend to disregard the unique characteristics of each population and location. Throughout this experience, both partners experienced growth. The favela exercised critical thinking and reflection skills regarding their local problems. Simultaneously, the university provided its students with unique learning possibilities outside the classroom, expanding spaces for reflection and knowledge building.

It is important to point out, especially for architecture students, that historically interventions in favelas are carried out by the government (for "various reasons") but designed by teams of architects. The new dwellings of those evicted from their homes were also designed by architects. Was the architecture the savior or just part of the system? Even in places where the government invited the population to discuss the works, the presence of architects can imply they are guardians of the truth. Thus, regardless of the specialization that architecture students choose, a critical analysis of their impact is necessary.

The project continued into the second half of 2022 and will continue into 2023. In addition to youth and adult education students, children studying at EMPEPI have also become part of debates and actions. Every semester, new students participate in the activities and other proposals are added, always accompanied by an analysis of the activities that were already carried out.

42.5 Discussion and Conclusion

+Favela −Trash is intricately linked to the struggles that the community faces daily, which is reflected in several Sustainable Development Goals proposed by the United Nations (2017): Quality Education (Goal 4); Clean Water and Sanitation (Goal 6); Reducing Inequality (Goal 10); Sustainable Cities and Communities (Goal 11); Decent Work and Economic Growth (Goal 8); Responsible Consumption and Production were addressed (Goal 12); and Life Below Water (Goal 14). The most relevant topics covered by the project are Goals 4, 6, and 10, as they involve the education of young adults and future architects, the quality of sanitation and waste management, and the reduction of inequity of access to information and services in the favela.

The Aglomerado da Serra map and Lambe-Lambe posters were intended to disseminate

Fig. 42.12 Mark process at night

information about garbage and other topics of local interest. Thus, the theme of urban waste, a topic in everyone's life, was highlighted, in favor of Goals 10 and 12. The treatment of debris related to abandoned cars, through the notice posted on their bodywork, had an immediate effect. A few hours later, the banners were taken down (probably by the owners) and silently the cars began to be dismantled. The informative material was sent in WhatsApp groups, which

Fig. 42.13 Painting process

helped community members understand the services that are the responsibility of city hall.

As a prototype, the mini gabion of rubble proved viable for a new staging, requiring new prototypes. The place, however, was incorporated by a residence, removing its public access. The new lot expansion creates the possibility of treating the rubble locally, avoiding the spreading of the problem while creating new public places. There is also the possibility of this

Fig. 42.14 Lambe-Lambes being placed

technique being managed by the population itself, generating new jobs, which is in line with Goal 8 of Decent Work and Economic Growth.

The garbage hook and sign were immediately and successfully affixed to the walls of the homes of the residents who requested them. It is believed that their positive receptivity is facilitated by recommendations of the pioneering residents. After the two rounds of installation, other residents also received the hook and installed it on their own. The sign is also an ad stand that can be used by local businesses to finance the installation of the next phase. The use of local labor and materials also helps the favela's economy and strengthens the bond between neighbors. By removing garbage from the ground, there is less chance of it being carried into water sources, favoring Goal 14 of guaranteeing Life Below Water, in addition to guaranteeing access for people by clearing roads (Goal 10).

The benefits of self-managed and cooperative production are significant. In addition to eliminating intermediaries in the production process, the joint establishment of rules for self-government favors collective interests instead of favoring private accumulation through the exploitation of the collective worker and nature. Decentralizing environmental management also makes it possible to investigate appropriate solutions for each territory, without spending resources on the thoughtless application of standardized solutions. In this context, architecture emerges as a way to enhance local self-management initiatives. For this, however, it is necessary for the professional to lose his academic distance and work side-by-side with the population. When there is space to be heard, and especially when ideas are implemented, people's interest is multiplied, favoring the democratic development of the region, especially the feeling of belonging to the place.

It is especially important to recognize the role that public schools like Professor Edson Pisani Municipal School play as a main articulator in communities. These schools can lead reflection processes as well as transfer awareness from the school to the surrounding neighborhood, leveraging partnerships inside and outside the favela, including university education institutions. This characteristic, added to the educational context that brings new students every semester, enables a constant reassessment of past activities and new rounds of debates to expand, renew or propose future actions. Thus, the +Favela −Trash project, a result of almost seven years of partnership, will continue to positively impact the students and community.

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Integrate and Redefine Popular Built Environments

43

María Teresa Trejo

Abstract

University teaching that builds bridges between architecture, urbanism, history and society contributes to the understanding of territorial dynamics. With the study of urban form that provides readings of what has happened and is happening in places and the practice of transurbance, it is possible to understand significant changes in buildings. Ethnography allows us to approach the sociological imagination of people and guides us in the understanding of changes that can be made to the culture and identity of neighbourhoods. It presents a research and design process developed as a case study that considers intense group work and involves the practice of competencies that contribute to redefining quality education so that future architects can propose inclusive architectures that contribute to making a sustainable city and community. In Mexico, the phenomenon of poverty is often evidenced in self-construction. It is in contemporary popular architecture where there are still traces of identity and tradition that must be integrated in future interventions. The city of Querétaro is more than the sum of its buildings, it is a collective and dynamic hypertext. Knowing the social imaginaries of its inhabitants contributes towards reflexivity and the approach to the built environment, and in the proposals for new architectures for equality; this social reality is perceived with a certain historical coefficient that implies the anthropic element as the instrument for reading the territory if one wants to interpret the present.

Keywords

Structures · Permanence · Changes

43.1 Introduction

Involving ideas and processes in a coordinated manner that seek to bring about changes in the pedagogical task denotes complexity and plurality. The construction of an autonomous thinking identity in architecture students in public education in Mexico implies creativity and volition. For Trejo, "learning, interconnecting biological, psychological and social elements, is a metacognitive process" (2016, p. 48) therefore, how one has learned is reflected in the process and retrieval of information, problem solving and decision-making. Teaching and learning architecture and urban planning involves creativity, Trejo (2015, p. 765) writes: "in creativity,

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various aspects such as personality, emotions, previous experience and in general the context in which human beings develop". The author writes of Landry that, "some argue that why should people want to be creative, if being creative implies adaptation and change? The answer is profound, because in short, creativity is the ability to step back and see the whole again", Trejo (2013).

Indeed, seeing the whole is necessary when designing, and its consideration in architectural education is a priority. This article argues that having a holistic vision in the act of designing architecture and urban planning leads to a better result because, given the speed with which people settle in cities, the urban-architectural conception becomes more complicated. Given the dynamism that the city of Querétaro (Mexico) has experienced in recent years, it is prudent to rethink the way in which things are done locally, as it is clear that the triad of sustainability is moving away from equity, as it does not correspond to the most vulnerable part, society.

Building bridges between different disciplines in order to make a "better reading" of the complex and contrasting city hypertext is presented as an alternative vision based on the relationships between project, history, place and society; logically, the specificities of the project mark the degree of participation of these disciplines. Something important to recognise is the heritage value of Mexican popular architecture whose vernacular origin, manifested in the strong identity of self-construction, more than 70% of housing in Mexico is self-construction: "the understanding of the specific depends on culture and sensitivity, on the ability to appreciate and understand the nuances" (Mijares 2008, p. 78). Fostering interdisciplinary links in the new generations of architects contributes to reflexivity and a better approach to the built environment in order to propose integrated and inclusive architectural proposals, in accordance with the culture of the place and its historical time, that is to say, in accordance with its "specific modernity". Among the questions that arose were: is it possible for architecture students at the Tecnológico Nacional de México (TNM) to readjust academic paradigms; is it possible to build bridges between architecture, urbanism, history and society in order to understand territorial dynamics and make inclusive design proposals in the city; are decision-making, leadership and teamwork a possible practice for all students; and are decision-making, leadership and teamwork a possible practice for all students?

The research drives the United Nations Sustainable Development Goals four, ten and eleven, towards an inclusive and equitable Quality Education that promotes learning opportunities. The teaching of architecture is seen as a tool that contributes to social equality in the future construction of environments because it considers the social imaginaries of the people who inhabit the place; this contributes to the reduction of spatial inequalities and, therefore, to making cities more inclusive, safe, resilient, prosperous and sustainable; it also promotes access to knowledge for students according to the specific modernity of the places.

43.2 Methodological Approach

In Querétaro, the phenomenon of spatial and social exclusion and segregation is manifested as in other cities around the world. In the year 2019, in accordance with the teaching of classes in the ninth semester (of ten that indicates the grid), of the Bachelor of Architecture, in the specialty subject called Sustainable Urban Architectural Design Workshop (TDUAS) taught at the National Technological System of Mexico (TNM), Campus Querétaro, this writer, as a result of her doctoral thesis, initiates the insertion in the programme of this subject, of two tools to support design, ethnography and the analysis of urban form, thus giving continuity to the research. The academic year is a semester rather than an annual cycle; the duration of the semester is sixteen weeks. Prior to the subject of this paper, there is another subject called Sociocultural Sustainability in Urban Architectural Projects (SSCPUA), this subject is considered as the first part of the design process (diagnosis) and the second part is understood as the development of

the project already in the TDUAS subject; thus the complete project is studied in one year. When students arriving at TDUAS have not studied the SSCPUA subject with the same vision, a group levelling is done. Unfortunately, there is only one lecturer per subject, and in the absence of an assistant lecturer, the work is exhausting. The students are forced to seek guidance from teachers of other subjects who, previously informed of the project, have given them support according to their expertise.

Two examples developed at TDUAS in the year 2022 are shown (corresponding to two different semesters). In the January-June semester, groups B and V participated, with 25 and 14 students respectively; in the August-December semester, groups B and V participated, with 24 and 14 students respectively.

This work shows the relevance of maintaining a sensitive position in the exploration of the city and, from an interdisciplinary vision that considers the history of the territory and social imaginaries as linking elements. The work proposal is carried out in a group, as a team, in the manner of an architecture office, so that the students who are about to enter the world of work organise their activities under the guidance of the teacher. The hypothesis is that interdisciplinary learning is possible by developing field research as a group and generating design proposals that consider people and their social imaginaries.

The methodological approach is based on the theoretical background of the research and an approach is made to the spatial–temporal relationship, describing the historical background of the territory. This is followed by the development of the research project in two stages. The first corresponds to the diagnostic stage of the so-called Satellite Project carried out in semester 1–2022, showing the fieldwork resulting from ethnography (participant observation and interviews); in the second stage, the Carrillo Square Project is presented, carried out in semester 2–c2022, which shows the urban-architectural project resulting from a governmental call for architecture schools at a local level. Subsequently, the results of each of the two stages of the study are presented. Finally, the discussion revolves around the urban, social-inclusive, economic and educational aspects. The article closes with a concluding reflection.

43.3 Theoretical Background

The study considers different theories, which are related by the passage of time in the place: chronotope, urban form, transurbance, ethnography with its sociological imagination and identity in architecture are linked to history.

All the activities of society, with their diversity, take place in a specific territory. Trejo (2020, p. 17) refers that “time and place form a particular palimpsest, what Mikhail Bakhtin calls “chronotope”. Trejo (2021, p. 54) writes that “the chronotope is understood as an instrument of analysis, interpretation and even logical deconstruction, as a systemic support in architectural and urban projects” and that, “architecture is the general study of how entities relate to each other” (Trejo 2021, p. 45), thus, “one cannot be understood without the other, and the simultaneity of results is not a principle but an inclusive one. Thus, everything is in dialogue. When Trejo writes that for Bakhtin, “every word has a relational character generated from preceding ones and, in turn, is an agent of others to come” (Trejo 2021, p. 20), the relational character of time over territory is denoted. Urban form is considered as an integral interpretative tool, in relation to a “simultaneity of events… the meeting and linking of everything there is” (Lefebvre 2017, p. 112) and which arises from a “dialectical movement” (Lefebvre 2017, p. 113) that allows for the definition of content. Thus, the preceding and binding urban form of all there is, determines the specific moment in ‘that’ place, it is inferred then that the urban form is also cumulative and is in deep dialogue in time.

The phenomenological fact of walking and ‘traversing’ or travelling through a territory and its psychogeographic reading and interpretation by mapping or simply using memory and recollection is what Careri (2022) refers to as transurbance, which is understood as a research instrument that contributes to discovering and

interpreting the meanings that urban and architectural spaces generate in the inhabitants of the territory in terms of the manifestation of a sense of belonging and identity. Walking and conducting research in situ, through observation, recording and analysis corresponds to ethnography. It is important to 'record' social discourses as this material is susceptible to being consulted again. Osorio (2013) refers that this new information is close to the people and the study site, but it must be correlated. Ethnography allows us to approach the sociological imagination of the inhabitants of the place and guides us in the interpretation-description of what the student-researcher heard and observed. From the writer's point of view, ethnography as a support for design can contribute to transducing, interpreting and capturing the social reality in a particular space in their proposals. Trejo refers from Guber (2011) that it is the reflexivity that arises in the process of interaction, differentiation and reciprocity between researcher and informant, "knowledge is revealed not to the researcher but in the researcher" (Trejo 2021, p. 219).

The cultural and historical complexity of Querétaro urges us to look at social theory because time and space are the context of social life. Trejo (2021, p. 54) quotes Sztompka "the distinction of time, past, present and future is not really conclusive, strictly speaking there is no present because social processes are always in motion". The sequence of social events is cumulative and this offers various opportunities to infer that society is chronotopic. Thus, according to Trejo "the sociological imagination contributes to understanding the meaning of the historical epoch and to the explanation of the context in which we live in this territory" (Trejo 2020, p. 20). Architecture is an expression of society and a manifestation of local identity. Today, faced with the phenomenon of global connectivity, architecture and identity are in a state of liquidity and the categories space and time are present in an open and permanent way, their link must be dialogical; it is confirmed that "the logic of simultaneity in Bakjtin is therefore dialogical" (Trejo 2021, p. 45). Identity designates character and differences. The identity of a collectivity is cumulative, elements such as values, history or traditions participate and, although it is changeable, tangible (buildings) and intangible elements (language, customs, etc.) define it. In architecture, the phenomenon of hybridisation manifests the essence of a society's identity over time. In Mexico and Querétaro, a strong identity is still evident, mainly in the popular built environments and where Mexican popular architecture predominates as a dynamic and living genre, which generates new practices and creates symbols, manifests interests and a marked influence of its inhabitants.

The aforementioned theories seek to sustain the necessary holistic vision that implies understanding the dynamics that occur in the territory under study, all of which entail an important chronotopic relationship. It now corresponds to an approach to the history of the place.

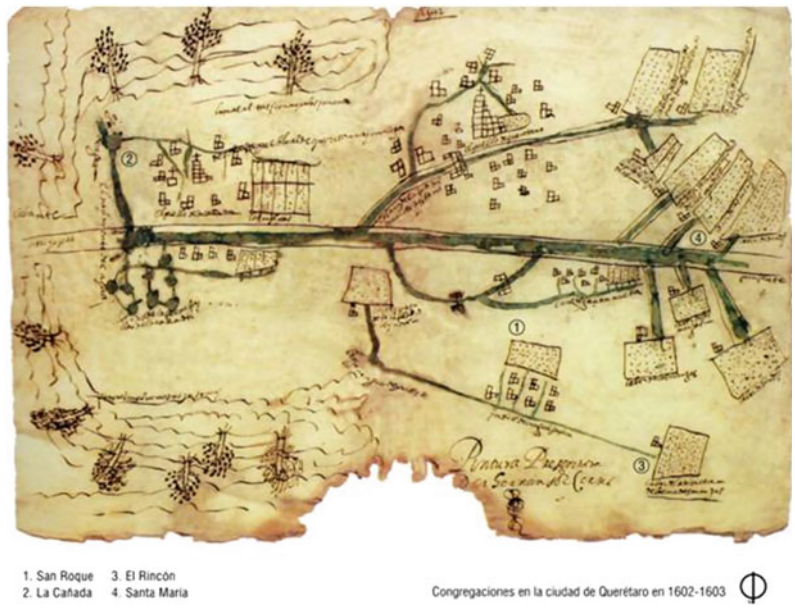
43.4 History of the Territory

The city of Santiago de Querétaro prior to the conquest was called Tlachco, but by 1537, it was re-founded as "Pueblo de Indios" (Indian Town), thus initiating the possibility for natives and conquerors to cohabit in the same place. thus initiating the possibility of cohabitation between natives and conquerors in the same place. John Tutino (2016) writes that, by the end of the eighteenth century, the city of Querétaro denoted beauty, wealth and prosperity to the eye of the visitor and quotes Urrutia regarding Querétaro: "the largest and most opulent of the Intendencia de México" (de Urrutia, quoted in Tutino, p. 434). In the conquered territory, exclusion, segregation and inequality were manifested, in contrast to the dynamism mentioned by Urrutia; the pre-Hispanic system faced a turning point in the economic, political, social and religious spheres. Gathering the natives together in order to implement a new system and build the new cities occurred with the "Congregaciones de Indios", which, "not only came about through the "Congregaciones de Indios", but also through the "Congregations of Indians". This "not only changed the urban-spatial distribution, but also

changed the social relations and the way of living, in the first instance towards the imposed" (Trejo 2021, 175). Map 43.1 shows the congregations of Querétaro between 1602–1603, with the number four showing the congregation of Santa María, whose traces survive as a cultural hybridisation in the present-day Delegación Felipe Carrillo Puerto. The second project shown here corresponds to one of the entrances to this delegation which borders the Paseo 5 de Febrero, currently being remodelled.

Trejo (2021, p.103) writes: "Querétaro was called in the seventeenth century as 'The Pearl of the Bajío' and was also considered by the then Crown of Castilla and León as the 'third city of the Kingdom'. Time and place form a splendid chronotope". There are material traces such as the once plentiful river that flows through the city, the Camino Real de Tierra Adentro (Royal Road of the Inland) that crossed through the centre of the city coming from Mexico City to the northern mines of the then New Spain, the arrival of the train station in 1903, or the opening of Avenida Corregidora to connect the city with the first manufacturing areas in 1967 and, in general, the entire Historic Centre, today declared a UNESCO World Heritage Site. As immaterial traces, the historical memory includes the epidemics in which millions of people died and the resulting culture that today gives Mexico its identity.

From the governmental period 1955–1961 the first intentional change of industrial development was manifested in the city and, today, the city continues to promote this territorial vocation (auto parts and aerospace manufacturing); the geographical location of the city has been and is attractive, even touristically, with respect to the country. More recently, the city of Querétaro, in its quest to achieve Urban Prosperity from UN-Habitat (Q500 Programme), in 2017 obtained a rating of 56/100 (moderately weak), concluding from this rating that the Querétaro capital has: "a dispersed, exclusive and disconnected urban form; unequal distribution of infrastructure for housing and basic services; high environmental impact and



Map 43.1 The Congregations of Queretaro between 1602–1603. 1. San Roque, 2. La Cañada, 3. El Rincón and 4. Painting presented by Hernán Sánchez Cortés in 1620, who was administrator of the convent of Santa Clara. *Source* Dos planos para Querétaro, Government of the State of Queretaro, Oficialía Mayor de Gobierno, Archivo Histórico, Provincia Franciscana de San Pedro y San Pablo de Michoacán, Querétaro, 1999. *Source* Own elaboration (OE). (2019), recreated from Somohano (2006) and Arvízu (2005)

Map 43.2 Location and general orography of Mexico in the northern hemisphere of the American Continent, between the parallel 14°32′27” and 32°43′06”. *Source* Own elabaoration (OE), reinterpreted from internet

Map 43.3 Geographic location of the State and Municipality of Querétaro: it is located in the centre of Mexico, between parallels 21 º 40′12” north and 20 º 00′54” south and between latitudes 99 º 02′35” east and 100 º 35′48” west. *Source* OE

low quality of life and public space equipment for sport, recreation and social coexistence” (Trejo 2021, p. 104), see Maps 43.2 and 43.3.

It is clear that the city of Querétaro is, to paraphrase Trejo, a confrontation of diverse narratives that, in their different stages, inevitably maintain a spatio-temporal relationship (Trejo 2021, p. 249). Bakjtin's historical chronotope, in addition to being an instrument of analysis and interpretation for understanding this territory, is also a support for urban-architectural proposals (let us remember that urban form is cumulative). Thus, the simultaneity of events, where everything that exists is linked, must be understood as a dialectical movement in which society participates with its sociological imagination, which contributes to understanding the meaning of the historical period and the contextual situation of this territory, which contributes to making well-integrated urban-architectural design and redesign proposals that manifest the accumulated identity of that particular community; that correspond to its “specific modernity”.

43.5 Project Development

The project starts by selecting the intervention area as a group (sometimes by specific request). In the diagnosis stage, competencies such as teamwork, leadership and decision-making are put into practice in order to join forces and save hours of individual work by sharing the information generated in groups. The basic theories that are linked to the project are soon approached. According to the study site, the historical background is considered; the students organise the distribution of the search for the necessary information on the site in terms of the natural and artificial physical environment (the urban form is analysed).

In the next stage, the approach to society begins, as it is the people who provide chronotopic information. Once organised by groups and quadrants, the student brigades practice transurbance (analysis of urban form) and ethnography (participant observation through interview). The interviews are recorded and reviewed to develop a “social cartography” (map of location and of what was said by the informants), the resulting information is captured in a group ethnographic categorisation table, the recurrences in which indicate the spatial needs and the sociological imagination of the inhabitants-informants as well as the strong identity manifested in the territory. The next step is to graphically construct a Diagnostic Sheet, which captures the information collected and seeks to link society as an open, sequential and cumulative process that manifests the reflexivity of the ethnographic experience in the researchers (Guber 2011) and represents a

first approach to proposing possible spaces in accordance with the research.

The next step is to develop the design proposal. The information is analysed and synthesised to develop the integral project, the integral needs programme (urban-architectural) is generated with its interrelationships as a system; the resulting projects (proposed and/or requested) are distributed and developed by work teams whose number of members varies according to the complexity of the project. The different stages of the process are guided by an agreed schedule of revisions, evaluations and deliveries, leading to the final exhibition of the project in front of the public.

43.6 Results

They are presented in two parts. The first corresponds to the exercise developed in the subject TDUAS semester 1–2022, Satellite Project. The second corresponds to the exercise developed in the subject TDUAS semester 2–2022, Carrillo Square Project. The didactics is developed by organising the group in the manner of an architecture office, the research done by teams is shared until the moment of projecting; the resulting projects are assigned by team, initiating the project stage. The executive project is delivered and exhibited in public. The sequence of both projects is organised by means of a chronogram of deliveries by stages and revisions (proposed by the students themselves), including evaluations and co-evaluations, as well as revisions by the teacher, thus controlling the fulfilment of the expected scope.

For the Satellite Project (semester 1–2022), only the results of the diagnostic stage are presented: Social Mapping Sheet (Fig. 43.1), Ethnographic Categorisation Table (Tables 43.1 and 43.2) and Diagnostic Sheet (Fig. 43.2).

The Social Mapping Sheet represents the sociological Imagination (what informants say) when conducting ethnography and transurbance. It is about representing graphically, the location

Fig. 43.1 Social Cartography/Ethnography (Representation of social mapping). Satellite Project. *Source* TDUAS Group 1–2022

Table 43.1 Ethnographic categorisation, satellite project (first section). Indicates the recurrences resulting from the sociological imagination of the interviewees

Source TDUAS Group 1–2022

Table 43.2 Ethnographic categorisation, satellite project (second section). Indicates the recurrences resulting from the sociological imagination of the interviewees

Source TDUAS Group 1–2022

(quadrants) of occurrence of the interviews and the highlights of what informants said on a chart/map. See Fig. 43.1.

The Ethnographic Categorisation Table results from the interviews conducted. As human beings are immersed in a linguistic unit, it is possible to study culture from the semantic point of view of social issues. Thus, some categories resulting from the research and from the architect's vision, such as infrastructure, memory or history, are proposed from the beginning, and other new categories emerge. Once the informants' statements have been written down, the various recurrences are marked with colours, and those that recur most often indicate the importance of the sociological imagination of the interviewees (what they think and say), thus becoming information to support the design. Over forty interviews were conducted and, due to the size of the table, only two sections are presented. See Tables 43.1 and 43.2.

The Diagnosis Sheet shows the information gathered in a graphic way. It is a 'transduction' of what people think and say, it includes a

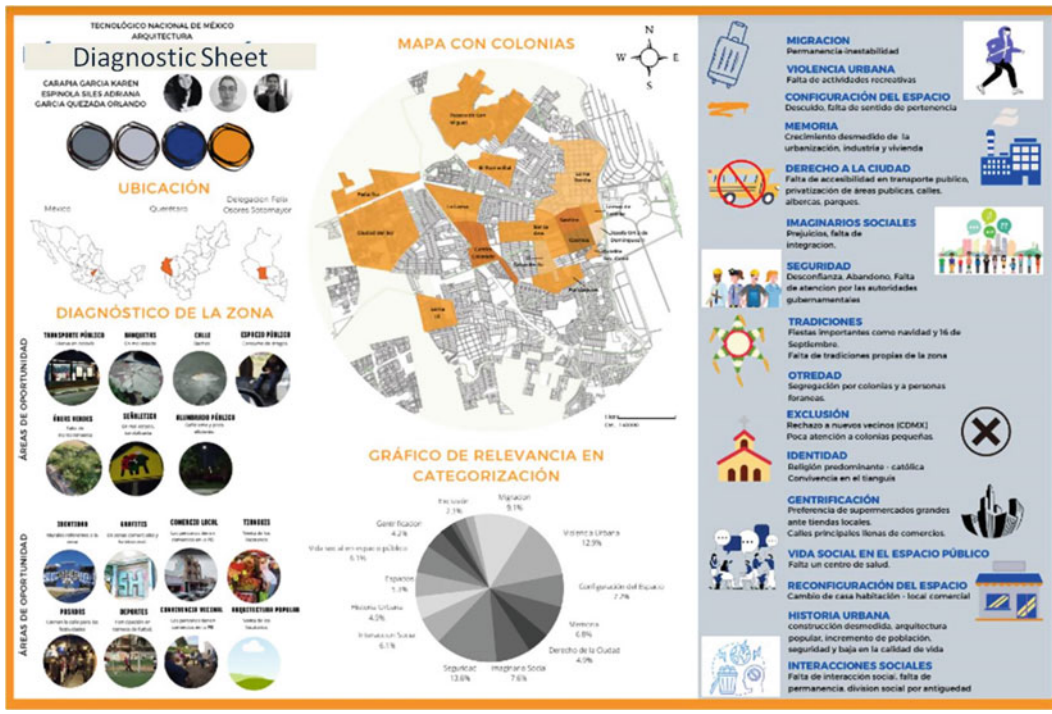


Fig. 43.2 Diagnostic Sheet for the Satellite Project. *Source* TDUAS Group 1–2022

problem statement, objectives and hypotheses, as well as a first approach to the proposal of possible spaces in accordance with the research. A cultural relationship can be seen, based on social issues with an intense manifestation of identity. See Fig. 43.2.

In particular, the Carrillo Square Project (semester 2–2022) was put out to tender by the Secretary of Urban Development of the State of Querétaro as an urban park for the rehabilitation of the 5 de Febrero Corridor. The diagnostic stage is developed in the same sequence as the previous project and then moves on to the design stage. For the students, the reflexivity resulting from the ethnography allowed them to give value to the various chronotopes present in this community, although the diagnostic stage took time, it was helpful in the consideration of strengthening the neighbourhood identity that today is manifested in this territory. Time was a determining factor and the experience of participating in a real project was the greatest learning experience; the desire to win drove the students to put into practice decision-making, leadership and teamwork.

The following LAEREC and CENESTESIA teams competition sheets are shown: Social mapping and project summary (Fig. 43.3), Ethnographic categorisation sheet (Fig. 43.4). As Design Proposal, Figs. 43.5 to 43.11 comprise the sheets: Introduction and Conceptualisation, Conceptualization and Architectural Plan, Problematics and Architectural programme, Social Impact and Façades; Overall plan, finishes and perspectives; Finishes and Perspectives, Isometric Perspective and Perspectives and Social Impact.

43.7 Discussion

To attempt to create architectural and urban projects that are formally attractive but discordant with the social, economic, architectural and historical contexts of today would be to go against the idea of architecture for equality and

Fig. 43.3 Social mapping and summary of Plaza Carrillo project. *Source* LAEREC-TDUAS Group 2–2022

Fig. 43.4 Ethnographic categorisation sheet for the Plaza Carrillo project. *Source* LAEREC-TDUAS Group 2–2022

Fig. 43.5 Introduction and conceptualisation.. Carrillo Square. *Source* CENESTESIA -TDUAS Group 2–2022

therefore to fail to take advantage of it as an essential tool for achieving the UN Sustainable Development Goals.

The teaching given to students of architecture at the Tecnológico Nacional de México must educate them in the intention of caring for cultural value. If it is understood that the design process is the research method, it is necessary to carry out exercises with the students that place value on the importance of the passage of time in the place, considering the chronotope as a support tool, analysing the urban form, carrying out transurbance in search of information on the territory, having dialogues with the people who inhabit that space, as they are the ones who can really help us to understand how and why that society with its identity is unique and unrepeatable. Considering the above, it should be possible to generate integration architectures ad hoc to the inhabitants and their imaginaries, so that the identity of the place is not lost in the collective and dynamic hypertext of the city. However, to paraphrase Bakjtin, it is necessary to work by fostering a scientific and investigative audacity to

Fig. 43.6 Conceptualization and Architectural Plan. Plaza Carrillo. *Source* LAEREC-TDUAS Group 2–2022

be able to descend deep and then rise high, achieving projects that correspond to a "specific modernity" for these territories. Knowing the social imaginaries of the inhabitants contributes to the reflexivity and the approach to the built environment and, in the proposals for architectural and/or urban intervention. It is important to consider that, for the integration and redefinition of the popular built environments in the city of Querétaro, the anthropic element is the best instrument to read the territory if one wants to interpret the present in order to create a better future, where no one is left behind.

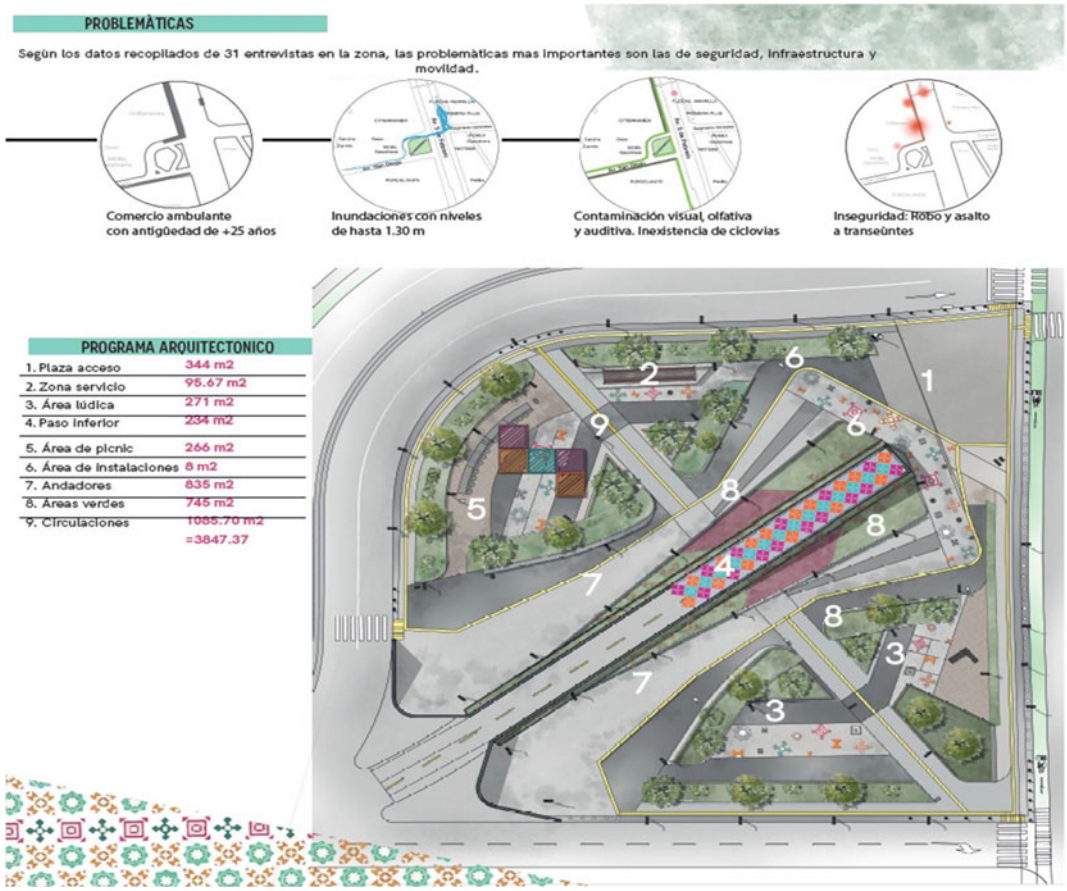


Fig. 43.7 Problematics and Architectural programme. Carrillo Square. *Source* CENESTESIA-TDUAS Group 2–2022

43.8 Conclusion

Although the understanding of the specifics depends on sensitivity, culture and the ability to appreciate and understand nuances, it is in the teaching–learning process that one has the opportunity to apply it. The process of research and design of an architectural and/or urban planning project involves group work, precisely in order to be able to appreciate those nuances that sometimes may not be seen. The chronotope states that one part cannot be understood without the other, as the simultaneity of results is an inclusive and not a principle, and that the parts must be in dialogue, seeking a better approach to the built environment in order to propose coherent design proposals in accordance with the place and its historical time, according to its specific modernity: "each place has the potential for projects capable of achieving a specific modernity that cannot be found in any other historical–geographical circumstance before or after" (Muntañola 2016, p. 61). Readjusting

Fig. 43.8 Social impact and façades. Carrillo Square. *Source* LAEREC-TDUAS Group 2–2022

academic paradigms in the TNM student body is possible if interdisciplinarity is considered as a bridge between the different areas involved in the different design exercises. Examples such as those presented in this article show that the practice of competences such as the assumption of leadership, teamwork and decision-making contribute to the future architect graduating from the TNM to ensure that their proposals for design and intervention in architecture and/or urban planning have a holistic vision that considers the integration and redefinition of popular built environments in Querétaro.

The research is still in progress. It is hoped that in one or two more semesters of application of this subject and, after making the pertinent

Fig. 43.9 Overall plan, finishes and perspectives. Carrillo Square. *Source* LAEREC-TDUAS Group 2–2022

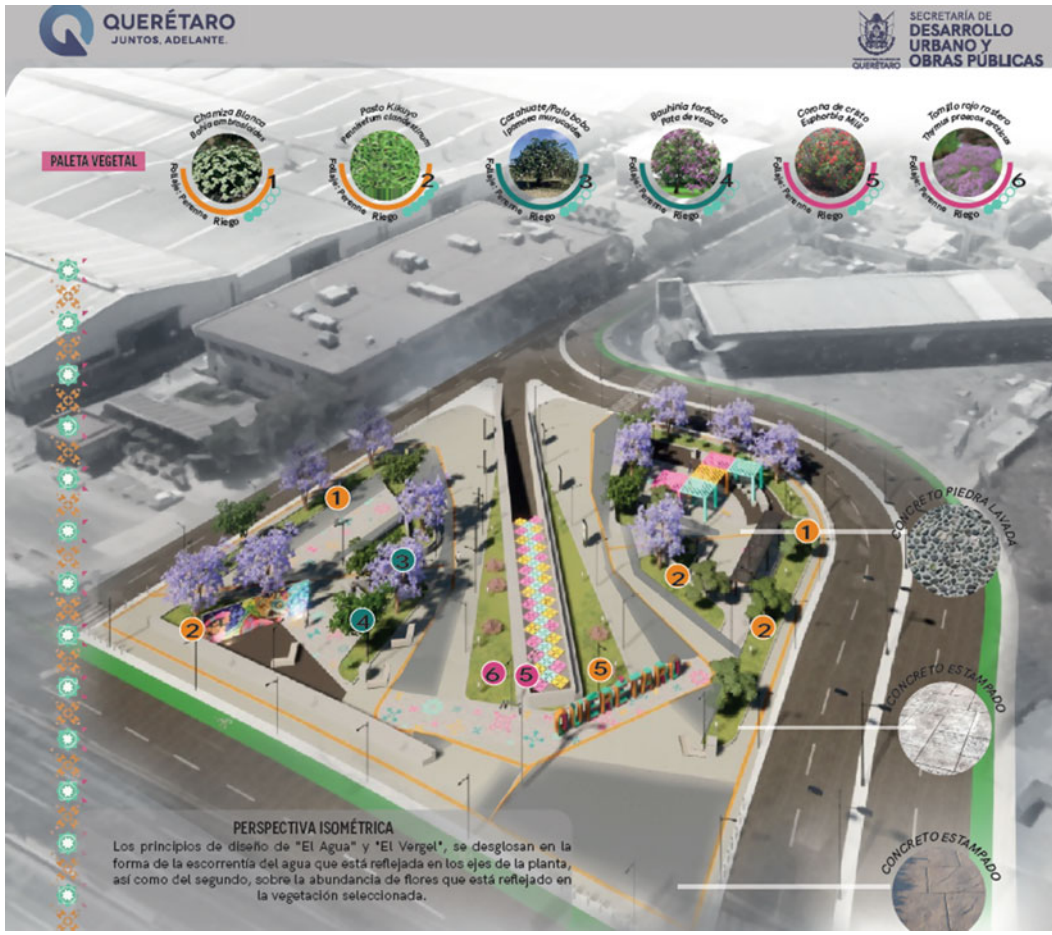


Fig. 43.10 Isometric perspective. Carrillo Square. *Source* LAEREC-TDUAS Group 2–2022

adjustments, to present to the corresponding body of the Tecnologico Nacional de Mexico, the proposal for the integration of the workshop subject of Sustainable Urban Architectural Design in the grid of the degree at national level; as was written at the beginning of the article, today it is a speciality subject exclusively for the Instituto Tecnológico de Querétaro and its application at national level will imply contributing, through education, to achieving the Sustainable Development Goals of the UN.

Fig. 43.11 Perspectives and Social Impact. Carrillo Square. *Source* LAEREC-TDUAS Group 2–2022

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44 "Back on the Map": Developing a Multi-scalar Informal Settlement Mapping Framework Based on a Case Study in Dhaka

Tanzil Shafique

Abstract

Over 2 billion people will live in informal settlements by 2030, often in slum conditions. UN-Habitat has recommended countries adopt city-wide participatory slum upgrading projects and integrate the informal settlements into the formal plans of the city. While there might be honest intentions by the formal governance bodies to do so, often the settlements are invisible from the gaze of the state. In other words, often they are quite literally "off the map." More problematically, even when mapped, the maps are reduced to a single aspect, based on the agenda of the mapping body such as an NGO and often become useless for any slum upgrading purpose. How could these settlements be put "back on the map," and more importantly, in a way that matters? In this paper, firstly, I share a "multi-scalar mapping framework" developed for my dissertation research in Karail, the largest informal settlement in Dhaka. Secondly, I briefly describe the methods used to produce the 94 maps. Thirdly, I use an auto-ethnographic narrative to provide a thick description of the process of mapping that I conducted for six months in Karail. The particular methodology can provide pointers to other researchers enabling better practice in informal settlements globally. Lastly, I end the paper by analyzing the maps that were produced based on their potential to be used in a city-wide slum upgrading project. I conclude that such multi-scalar mapping is essential in understanding the socio-economic complexity of informal settlements and engaging as architects and urban designers.

Keywords

Informal settlement · Mapping · Spatial justice · Multi-scalar · Slum upgrading

44.1 Introduction

There is hardly any paper on informal settlements that do not begin with the number of inhabitants in informal settlements globally. There are even a few monikers for this pervading phenomenon such as an "urban tsunami" (Forman 2008), evoking a sense of an apocalyptic future, captured eloquently by Davis in Planet of Slums (2006). Informal settlements are often theorized in two different contrasting narratives. The first one, with a dystopian accent, looks at the structural conditions of global capitalism and the neoliberal world order producing the slums as an after-effect (Rao 2006). On the other hand,

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informal settlement is often seen as a utopic condition of "heroic entrepreneurship" (De Soto 2000) and a place to learn from the "existing practices of self-management" (Purcell 2013). One stresses the societal structure while the other celebrates the agency of the dweller. The reality of informal settlements is that it is both. More importantly, beyond the theorization, it is self-evidently the dominant mode of urban production, especially in the Asian and African contexts.

Millions are being added each year to the absolute slum population figures. As noted in a recent UN report: "The proportion of the urban population living in slums worldwide declined by 20% between 2000 and 2014 (from 28 to 23%). That positive trend recently reversed course, and the proportion grew to 23.5% in 2018. The absolute number of people living in slums or informal settlements grew to over 1 billion, with 80% attributed to three regions: Eastern and South-Eastern Asia (370 million), sub-Saharan Africa (238 million) and Central and Southern Asia (227 million)" (UN 2019). The enormity of the numbers, particularly in light of the exacerbating climate crisis, cannot be overstated.

Large-scale multi-laterals such as UN-Habitat and grassroots local non-governmental organizations (NGOs) have been operating on the ground in a more pragmatic yet piecemeal manner, failing to address the challenges at scale. Similarly, international instruments, such as the Sustainable Development Goals (SDG) and New Urban Agenda (NUA), while having provided direction to national-scale policies, have rarely been translated into transformative action on the ground. However, the consensus is clear—particularly regarding informal settlements—that the most effective mechanism for reducing "slums" is to enable a city-wide participatory slum upgrading project (UN-Habitat 2016).

Before pursuing any further, the terminology perhaps should be made clear. We have stated elsewhere (Author, 2021) four key points:

> First, the distinction between slums and informal settlement is evident in UN-Habitat data that suggests that informal settlement has rapidly expanded while slums have not. Second, informality is a paradoxical condition that can be identified with the illegality, insecurity and inferiority of the slum, but also with the incremental self-organisation of urban commoning and the right to the city. Third, while the language of the 'slum' will inevitably persist, the UN-Habitat definition is both too broad and too narrow - conflating material conditions with overcrowding and tenure insecurity while excluding overdevelopment. Finally, if we want to understand 'informal settlement' as a dominant mode of urban production then we need to stop using it interchangeably with the term 'slum' and engage with how it works as the design and planning of housing and urban infrastructure. (Author, 2021)

This paper takes these as points of departure and stresses the importance of understanding the informal settlements from a socio-spatial perspective as an essential step before upgrading strategies are put in place. One of the major impediments to implementing such strategies can be attributed to the fact that often times the informal settlements are quite literally "off the map" (Shatkin 2004; Dovey 2015). Even when their locations are mapped, usually through remote sensing data, the settlements are reduced to only their location and area within the larger city or regional scale. In other words, maps usually operate at a larger scale and only pertain to singular data sets, that reduce the settlements and the complex social lives into statistics. One such case is the map of the slums in Dhaka (Fig. 2 by Gruebner et al. 2014).

Multiple criticisms can be raised against such remotely sensed maps. On one hand, given its limitation of only identifying irregular street patterns, the map has included parts of the city that are informally planned and developed but are neither illegal nor are they in squalor. On the other hand, by restricting the map to a singular scale, the map gives little insight into the differences present in the internal urban configurations of the slums, both signaled spatial and social. To carry out a city-wide participatory slum upgrading project, even if the political will is there, will be difficult without a more nuanced understanding of the settlements and will result inevitably in a "policy-implementation gap" (Hudson et al. 2019).

This paper proposes a multi-scalar mapping framework that can be utilized to understand the urban condition of the informal settlements at multiple scales. By including various factors often missing from urban mapping and analysis, such as tenure, interface, and services, the mapping framework aims to provide a comprehensive account of the urban form and processes in informal settlements. Even the most recent studies of the urban fabric of informal settlements leave out such crucial features as tenure (see McCartney and Sukanya 2018 for a similar framework). A more detailed comparative analysis escapes the scope of this paper.

The Multi-scalar Mapping Framework was developed as part of my dissertation research on Karail, the largest informal settlement in Dhaka. It's a settlement with a population of over 300,000 within an area of about 36 ha. My research looked particularly at the urban form, function, and governance in Karail and how they evolved over the last 40 years. The maps produced were instrumental in that investigation. They were used forensically to investigate the social processes that underlie the urban production there.

In particular, during my conversations with the grassroots workers engaged in slum upgrading within Karail, it was pointed out that these maps would be incredibly useful for their work. I explore these potentials, informed by these conversations as well as analysis of the UN-Habitat documents on slum upgrading later in this paper.

Here it must be noted that I use the notion of a map following Corner (1999) and Dovey (2015). According to Corner, "the exploratory inventiveness integral to acts of mapping" enable acts of emancipation, rather than thinking of mapping as tracing already-existing reality. Furthermore, Dovey notes, "mapping is the production of spatial knowledge that cannot be reduced to words and numbers. Urban mapping constructs interconnections between the ways the city is perceived, conceived and lived, revealing capacities for urban transformation—the city as a space of possibility" (Dovey et al. 2017).

In the next section—methods, I describe the mapping framework devised for the study, the mapping methods used, and the methodological narrative.

44.2 Methods

44.2.1 Part 1: Multi-scalar Mapping Framework

Multi-scalar frameworks are suitable to study different urban attributes operating at different scales, as elaborated by the empirical work done by Duric, Pafka, and Kamalipour conducting spatial analyses.

The spatial data is collected at five different scales. They are as follows:

1. The City-Regional Scale
2. The Settlement Scale
3. The Neighborhood Scale
4. The Street Scale
5. The Building Scale

The elements to be mapped are listed under each (Fig. 44.1).

Such a multi-scalar approach takes into consideration attributes from different disciplines and cuts across geography, urban planning, urban design, and architecture. For example, features such as the geomorphology and high-intensity job centers, which often affect where the slums are located, are as important to understand the city-wide spread of informal settlements as is the construction practices at the building scale. Spatial knowledge of such practices can help tailor a policy to particular households on an as-needed basis. For example, the mappings in Karail showed that the knowledge of constructing two-story homes was located in particular households based on the location of their rural home. Such houses effectively became a place for horizontal knowledge exchange for the local craftsmen. It is one thing to know that such uneven distribution of knowledge, practice, and adaptations exist and another to locate them spatially since the spatial

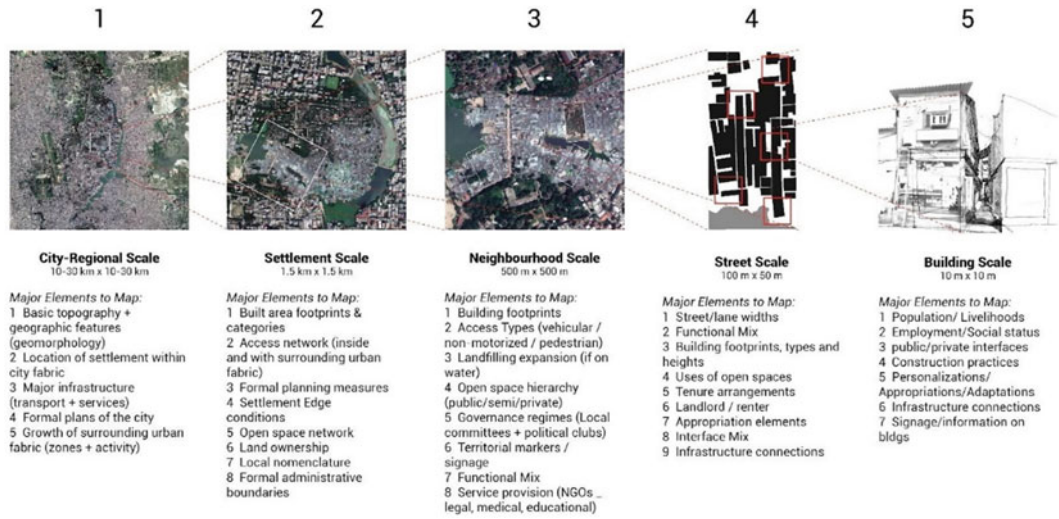

Fig. 44.1 Multi-scalar mapping framework (*Source* Author)

distribution often can make or break the implementation of a policy.

The list under each scale is not exhaustive and was based on the research questions in my dissertation. It is possible to modify them as needed for a particular investigation or policy, along with the particular dimensions at each scale.

44.2.2 Part 2: Mapping Methods

The following methods were utilized in collecting the spatial data:

1. Morphological mapping

Morphological mapping consists of techniques for mapping and investigating various layers of urban data. This method is about generating spatial data that cannot be reduced to images, texts, or numbers.

2. Participatory mapping

Participatory mapping is a "bottom-up approach" to mapping that allows the inhabitants to produce maps using their cognitive familiarity with local spaces. This was used to complement the morphological mapping, as a way to identify the local perception of the morphology as well as empower the dwellers, by allowing self-awareness while revealing the inherent complexities.

3. Archival research

Archival research methods include accessing databases that log data historically to investigate the documents and often act to supplement other research methods. For my research, the primary source of archival material was the Google Earth/Digital Globe database, satellite images, aerial photography, and GIS data.

4. Videographic Survey

The videographic survey is a method to use digital image capture for producing data of a specific place. Often the survey is geotagged. The source of the image can be the researcher, the people where the study is taking place, or non-human machines such as drones. The photographic survey was conducted using a standard handheld GoPro Hero 5. In addition, I utilized an HD-photographic drone (DJI Mavic Pro) to survey photographically the settlement aerially generating detailed plan views that were used to create the base maps.

5. Semi-structured Interviews

Semi-structured interviews consist of an interview with open-ended but pre-set inquiries, which allow the participant to give in-depth responses. The semi-structured interviews were used to identify intangible/invisible entities such as the tenure boundary.

6. Participant observation

Participant observation is a method of research that involves extended engagement in culture and participation in its day-to-day activities. I used this research method to subject myself to the various practices related to the urban form in Karail to get a deeper insight. The insights were captured using field notes on the base maps.

44.2.3 Part 3: Methodological Narrative

As opposed to the research methods described in the previous part, by pointing to the methodological narrative here, attention is drawn to certain practices, stances, and desires that influenced the fieldwork activities and the use of the methods. This is a key result of the research in itself (in addition to the findings presented later). The framework can only be understood in terms of how it was produced. To reflect on this underside of this research process, the narrative outlined below follows loosely a chronological order of the fieldwork, and are presented as a series of tactics used to do the research. However, the tactics overlap and are not mutually exclusive to any singular phase.

A. Selective ignorance (Phase 1: Preparation)

In this preparation phase before starting the fieldwork, I used archival research materials to prepare the morphogenic maps at the city, settlement, and neighborhood scale—producing primary data. Additionally, I looked at NGO reports to identify the possible participants of the research. However, I selectively ignored most of the literature on Karail as a tactic. Karail is one of the most researched informal settlements in Dhaka and therefore well represented. Google Scholar search returns more than 100 research articles on Karail from different disciplines, many regarding urban production itself. Smithson reminds us that ignorance is not the same as neglect—it is constructed and purposeful. What was the purpose here? It was to avoid a "loss of the creature" (Percy)—in other words, to avoid building a pre-conceived hypothesis by absorbing the particular ways Karail was already conceptualized by others. While there may be no escape from my positionality and background becoming a lens through which I would experience Karail, the first tactic was to avoid any self-confirmation bias or premature hypothesizing concerning urban production.

2 Unstructured immersion (Phase 2: Beginnings)

This particular frame of mind—to experience Karail on local terms—consequently meant an unstructured beginning. While I made contact with the resident whom I already knew, I tactically refrained from conducting any research activity except informal conversational interviews. For about three weeks, I immersed myself socially there. I participated in various everyday practices, was shown around Karail by the new acquaintances that I made, I sat with the elderly in the street-side tea stalls, went to the community NGO meetings as an observer, ate in their houses when invited and shared my life stories, the research project and the mapping tasks in plain language. While the immersion was unstructured, the nascent desire was well-defined—to establish multiple beginnings and relationships, to learn the locand al norms, dialect and to understand how best to relate to their lives. However, this was more than just social capital and trust-building for the social inquiry to follow. The immersion helped me to familiarize myself with the spatial layout. While initially I was getting lost, over time the smallest differences in the urban fabric were becoming visible. Later, this embodied spatial knowledge was crucial to map large sections at a fast pace. A significant unforeseen benefit of such unstructured

immersion that, at about three weeks into this process, one of the local leaders called me and asked me when would I start the actual mapping—he even started to start with his neighborhood out of the many. He invited me to the next community gathering and introduced the research project himself. This conveyed a sense of ownership of the research project by the members of the community and signaled to me that it was time to move toward a more structured data-gathering phase. During this time, I learnt to converse in the local dialect as well.

3 Analytical Improvisations (Phase 3: Spatial Inquiry)

Phase 3 focused particularly at mapping and initial spatial analysis. The primary method was in-situ morphological mapping, aided by the photographic survey. The first step was to prepare a base map for the neighborhood scale—the key study area (500 m × 500 m). The google earth image was not of sufficient resolution to allow for detailed mapping, which I discovered only after starting to map. The issue was solved by using drones to generate aerial images, as outlined previously. While this was not planned before, next, the laneways were identified in the base map and then each of them was videographed. It is often difficult to stand for a longer duration and note physical data on a map in situ. The video was useful to go through the laneway multiple times later to identify different aspects. This was possible for the physically evident attributes such as material conditions, cantilever lengths and building types and uses. The mapping was interjected with periods of participant observation of different practices. Since many of these practices are informally arranged, it was difficult to plan. Rather, the tactic was to improvise by "following the actor themselves" as I encountered them during mapping (Latour, 12). This often led to unfinished mapping and surveying for that day but revealed insights for other practices. Wherever applicable, the observations were also integrated into the draft final maps.

While some researcher has followed the procedure of mapping manually on-site using field notes (van Oostrum, Khan) and producing analytical maps once returning from fieldwork, I opted to produce drafts of the final maps in-between fieldwork days. Fieldwork mapping was conducted four days a week, the rest being invested to process the field notes and the videos to produce the analytical maps. This process was instructive to raise very particular questions regarding morphogenesis that were asked later during the social inquiry. Furthermore, mapping at one scale also pointed to entities that needed to be pursued at a more micro-scale. Therefore, the progression of morphological mapping from the neighborhood scale to the street scale, and then to the building scale was particularly helpful. Based on the learnings from the process in one neighborhood, the method was fine-tuned for the next. In this way, the analysis informed the ongoing improvisations of mapping. However, certain maps such as identifying the tenure boundaries required interviews and hence were pursued only after the social inquiry had begun in the next phase.

4 Micro-sensitivity (Phase 4: Social Inquiry)

At the end of phase 3, I had spent more than three months in Karail. By then, many local connections were established and from the larger pool of 200, 50 key respondents were identified for semi-structured interviews and focus group discussions. The sampling criteria were to reduce bias due to gender, age, and their relative position within Karail's social structure. As for the interviews, moving beyond asking the "right" questions, a key methodological imperative is to be "sensitive" toward the research participants and the process itself. The illegality of the settlement, the precarity of the tenure condition, and the internal conflicts meant that the subject matter of investigation—asking questions regarding why they built their houses/laneways the way they did—was perceived as a sensitive topic to talk about. Several tactics were employed, closely following Lee's identification of relevant considerations. Firstly, informed consent was not treated as a singular event at the beginning since often particular topics emerged out of the conversation that required re-iterating the need to "ongoingly negotiate" (Shaw and

Gould, p. 13) consent. Secondly, interviews and particularly group discussions often led to competing narratives and tensions between neighbors/leaders/residents that required a reflexive adaptation and maneuvering of the topic using interpersonal skills. Lastly, but most importantly, the interviewing conditions were crafted for each conversation paying close attention to the personal preference of the respondent (leaders often liked talking in front of tea-stall crowds, some in the quiet space of the mosque following the prayer service, and some in rooftops to avoid being seen). Co-presence during interviews was a significant issue, as what was said depended also on who else was there. What helped particularly during the interviews was my ability to speak in the local dialect as well as the knowledge of the everyday situation and the individual background of the respondents (accumulated during the first three months). In other words, the friendly conversational tone that was beyond just a "data collection" disposition was crucial. Taken together, these tactics underlie a "micro-sensitivity" practiced during the social inquiry.

5 Continuous Reciprocity (Phase 5: Ending Fieldwork)

Toward the end of the fieldwork, as a gesture of reciprocity, I conducted workshops presenting the maps to the different neighborhood communities and discussed their potential use in collective upgrading and better management of the community problems. The workshops allowed the community to visualize themselves spatially for the first time, analogical to self-enumeration (Appadurai 2012). This was followed by handing over both paper and digital copies of the maps to the local community leaders for their use in negotiating with the government bodies as well as the NGOs. These reciprocal acts underlie an "ethical research relationship" (Maitler et al. 2008).

However, beyond the transactional nature that ends with the fieldwork with vulnerable communities, there is a deeper commitment to "research justice" (Roy, personal communication) that permeates this thesis to its end. Such a commitment is not a negation of the intellectual detachment needed to analyze urban production. Rather, it is an acknowledgment of the role of the researcher beyond the fieldwork. Developing an understanding of the everyday processes underlying the urban production in Karail can contribute in changing the current stereotypical narrative and have policy implications for how informal settlements are managed more equitably. In a way, this intellectual project for me is in itself a form of continuous reciprocity.

44.3 Key Findings and Their Potential Uses for Upgrading

In total 94 maps were produced during the data collective process, which was arranged into 11 sections. However, for the sake of brevity here, I use samples from each of the scales and note their potential use in settlement upgrading processes.

1. Location of slums at the City-regional scale:

This map can be used as the base for a city-wide slum upgrading process to proceed in Dhaka. Without first identifying the spread of the informal settlements, it is difficult to "develop city-wide slum upgrading strategies and pro-poor National Urban Policies to achieve the integration of slum dwellers and to promote sustainable urbanization" (UN-Habitat 2016). Maps at this scale can be juxtaposed with ecological, social, and economic infrastructure to identify areas for future growth of settlements, as well as identify areas to avoid. However, understanding the locational dynamics alone is not enough (Fig. 44.2).

2. Access Network at the Settlement scale:

One of the recommendations from Un-Habitat is to develop "linkages between different interventions and how the urban context is 'a system' with interlinked components" (2016). The settlement scale maps, which captures the whole of the settlement nested within the larger urban

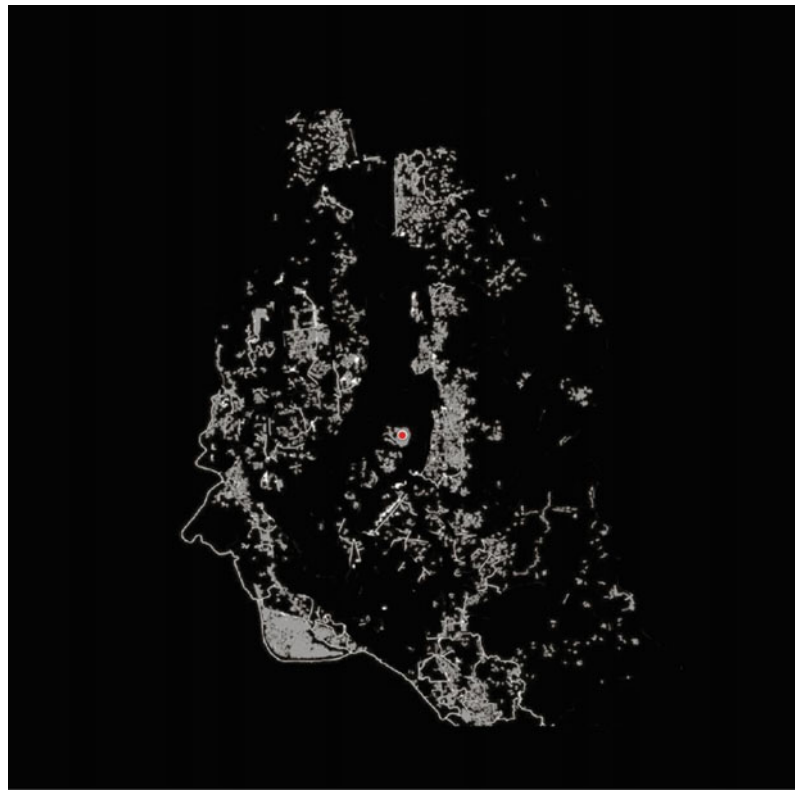

Fig. 44.2 The location of remotely sensed informal settlements and slums in Dhaka (*Source* Reworked from Gruebner et al. 2014)

fabric can be effective to establish linkages, prevent the formation of a ghetto through ensuring equitable access (note how Karail can only be accessed from the western edge). In an earlier document, Streets as tools for urban transformation i3n slums: a Street-led approach, UN-Habitat unequivocally addressed the need to make the streets the centerpiece of any slum upgrading effort. Streets work as an assemblage and without looking at multiple scales and elements, effective policies cannot be formulated (Fig. 44.3).

3. Functional mix at the neighborhood scale:

The functional mix map at the neighborhood scale reveals the different uses and the particular they coexist. This map is useful as a base in identifying amenities distribution, inequities in walkability, and the potential places to upgrade based on the uses. Note the blue-agglomeration toward the north in Karail, which is the place where all the workshops and garages of rickshaws are located. Such a place could be an ideal place to plan an interventionist project such as a Mechanic Training School. What this map hints at is the lived lives of people in Karail, and it is essential to understand to functional mix of a place before programmatic decisions are taken (Fig. 44.4).

4. Tenure pattern at the Street scale (5 sites):

Karail has an informally established and socially negotiated form of tenure structure, which ensures the development rights within the settlement by the owner. Although they don't own the land legally, everyone is aware over which land they have de-facto tenure. Karail has about 20% landlords and 80% tenants. This map is useful both in slum upgrading as well as equitable resettlement if needed. By providing an accurate registry of who has the current tenure of which land, they can be compensated

Fig. 44.3 The access network in and around Karail (1.5 km × 1.5 km) (*Source* Author)

accordingly. The lack of a tenure map is one of the main reasons why the most corruption occurs during resettlement, with the money being pocketed by some. The tenure map is also quite useful in creating road-widening scenarios as different options will mean negotiating with different landlords to extract the land needed. Development planning within Karail with respect to slum upgrading can be facilitated largely by this map. According to one of the NGO workers from BRAC, this map "should become a must for starting any work in informal settlements" (Fig. 44.5).

5. Appropriations and uses at the Building scale:

Usually at the level of architectural plans, these maps become useful to understand local adaptations and appropriations, particular uses and nuances not revealed in maps at the higher scale. For any upgrading program, information at this scale will provide crucial information for structural safety, construction, and technical aspects.

44.4 Discussions and Conclusion

While so far this paper may appear as a technical one, elucidating ways to incorporate mapping at multiple scales into slum upgrading practices, the actual process of getting informal settlements "back on the map" is anything but. The people of Karail are currently facing eviction threats from the government which wants to build a software park in its stead. It is one thing to technically produce the maps but another to ensure that the voices are heard and the maps are seen by the relevant policy and implementation bodies. The social battle of getting Karail, like thousands of other settlements across the world, "back on the map" rages on and UN-Habitat needs to facilitate social change rather than provide purely technical assistance for slum upgrading to make it the norm. In that process, it is no longer enough to look at slums and informal settlements at particular scales or from disciplinary silos. What is

Fig. 44.4 Functional mix at the neighborhood scale (500 m × 500 m) (*Source* Author)

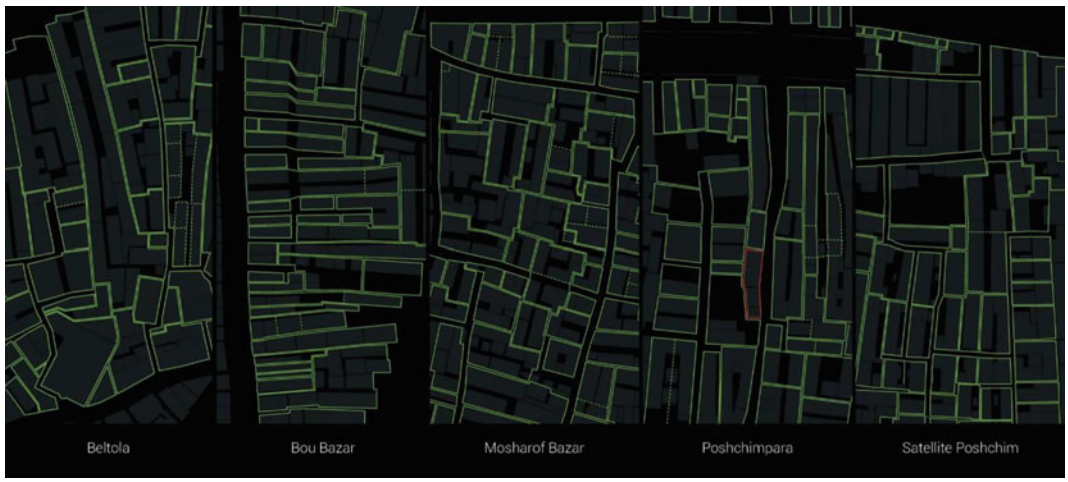

Fig. 44.5 Tenure pattern in five different neighborhoods in Karail (50 m × 100 m) (*Source* Author)

needed is a multi-scalar, multi-sectoral, and relational understanding of the socio-spatial complexity. This paper hopefully will enable thinking in that direction.

Additionally, while not discussed here, the paper raises the question of how mapping at these different scales could be integrated with digital platforms such as google maps, and be

made open-source, in a way that allows the community to self-identify themselves back "on the map."

This paper has pointed to the lived reality of mapping and doing research in informal settlements, as well as how sensitivity, inclusivity, and reciprocity are key to generating meaningful and useful data. It has shown that the comprehensiveness of the mapping is not just in the nuance of the framework alone, but also in the way that is carried out in the field. Blurring the boundary between the mapped and the mapper could be a key to getting back these informal settlements back on the map, in a way that matters.

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Sustainable Rural Development Through Generative Design

45

Mlondolozi Hempe and Cebisa Mafukuzela

Abstract

South African apartheid laws between the 1940s to the late 1980s kept black families in poor rural areas, formally known as Bantustans, which weren't considered part of South Africa. Only young men were allowed to move to cities, where they were used as valuable labor. After the end of apartheid in the mid-1990s urbanization increased rapidly. This led to further poverty in rural areas as very little development took place, limiting economic opportunity. We will look at how this lack of action impacted the Rural Eastern Cape and what sustainable development solutions can be applied to provide more inclusive development solutions. We analyze the current development conditions in the Rural Eastern Cape and learn from them; we look at the current sustainable development conditions in urban areas and how design interventions can be extrapolated for improved development methods in rural areas using existing data to provide generative design solutions in the long term. Generative design is an iterative design process involving a program that will generate a certain number of outputs that meet certain constraints. It will assist in refining feasible solutions that are contextually relevant and achieve the following: Provide sustainable design solutions to reduce a need for retrofitting in future developments, improve quality of life and minimize rural migration by providing a comprehensive method of producing easily interpreted sustainability guidelines that can be applied in various conditions for the best possible design development strategy.

Keywords

Development · Generative · Sustainability · Design · Socio-economic

45.1 Introduction

When looking at the rural Eastern Cape in South Africa, the current approach to development is reactive instead of proactive and presents little opportunity for purpose-driven intervention. This results in superimposing conventional development practices that have been seen to be ineffective in urban areas; the introduction of the RDP model is an example of how a traditional solution, that has been applied in cities but has not managed to address the housing crisis fully, has been used in rural areas to combat increasing

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population (Makgetla 2010). The rural eastern Cape presents a unique opportunity to redefine urban spatial planning as rural areas develop and more people seek to leave the cities.

This paper will investigate the possibility of implementing generative design solutions in the rural context and identify how well-considered development practices could improve people's lives and reduce migration in these areas.

The concept of generative design is to use an iterative design process that involves a program that will generate a certain number of outputs that meet certain constraints and a designer that fine-tunes the feasible region by selecting specific results or changing input values, ranges, and distribution. This process is predominantly used as an efficient method of exploring design possibilities used in various design fields to reach design goals that are better defined over time.

Generative design is a design exploration process; the process is focused on identifying the end goals and setting parameters, limitations, and spatial requirements that will result in the best outcome or design solution. Using a generative design approach in Urban Planning would focus on identifying and considering the local conditions, building typologies, existing codes, and regulations and focus less on the specifications of the final project or intervention. The outcome is a result of the non-linear design process, which responds to a series of contextual urban factors instead of schematic intentions that can be superimposed in any context (Radosavljević et al. 2019).

A generative design approach tells us that we cannot know in advance what the best solution might be or what the outcome might look like and challenges designers to focus on a critical analysis of the area, its people, their needs, the contextual shortcomings, and opportunities to develop a solution and ultimately a proposal.

With the above understanding in mind, we have identified a need to explore how this process can be used to create data-driven design solutions at a high level by using easily accessible data to drive sustainable solutions by selecting contextually relevant interventions. The interventions can, over time, become a matrix of guidelines that can be used across governing bodies within rural areas in the Eastern Cape for a more directed development approach.

The data which can be deemed easily accessible as a test bed to start building algorithmic parameters that may assist in identifying which interventions are more likely to be successful in developing a sustainability masterplan can be categorized into the following:

Social:

Employment Rate, Crime statistics, population density, Level of Education in the region, teenage pregnancy, the mortality rate.

Natural:

Rainfall data, Solar data, wind data, relative humidity, dry-bulb temperate.

Physical:

Landscape, landmarks, building typology, infrastructure (sanitation, power, roads).

The designer/end user can modify the above parameters to best pick from a sitting database of sustainability interventions which assists the designer in shortening time in identifying a relevant design approach to start solving the problem, and it will equally eliminate unnecessary interventions from the onset, saving time (Fig. 45.1).

45.2 Impact of History and Urbanization on the Rural Landscape of South Africa

As the world develops, it is looking more at inclusive and sustainable solutions to increase the earth's life span, and Africa is no different. However, it faces unique challenges. It is said that While Africa is one of the least urbanized regions in the world, it is also the region where towns and urban cities grow the fastest. By 2001, 57% of the South African population was urbanized. This percentage has risen during the last decade, with the United Nations estimating that 67.9% of the South African population will live in cities by 2025.

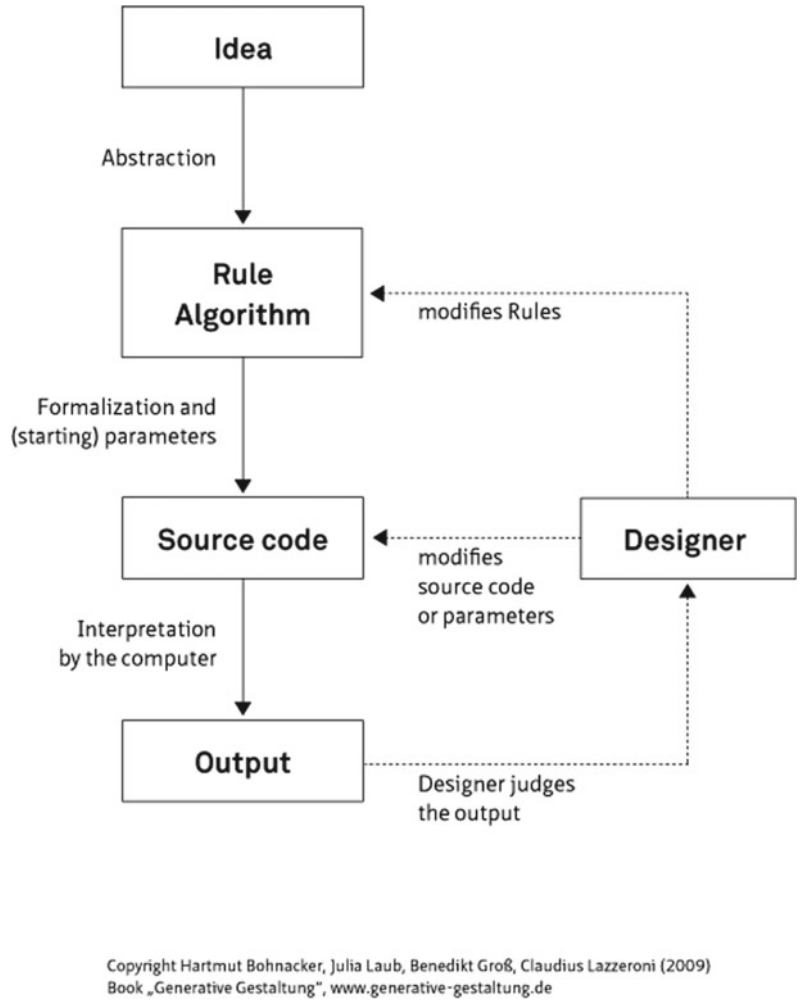


Fig. 45.1 Generative Gestaltung (Bohnacker, H; Laub,J; Lazzeroni, C; Gros, B - www.generative-gestaltung.de)

This has several effects on the Urban Cities that experience the influx, and the rural areas lose critical human resources. The downside to this phenomenon includes physical, social, and environmental issues (Makgetla 2010). The unplanned nature of urban, peri-urban, and rural development creates sprawling development and poor utilization of ecological resources. Most metropolitan areas in South Africa, like most parts of the global south, are dealing with deteriorating environmental conditions and a weak public sector struggling to provide adequate services (Yankson 1999).

The urban areas experience a shortage of employment and housing due to the influx, increasing poverty, and causing unpleasant social environments, including urban environmental concerns. Health risks associated with overpopulation, all while rural areas are left drained and peri-urban areas experience mixed land uses where rural activities and modes of life are in rapid retreat. Many forms of urban land use are being established (Yankson 1999).

These issues are all linked to rapid urbanization, and understanding the cause is necessary. Why are people leaving rural areas at such a rapid rate, and how do we reduce the urbanization curve to slow down, better prepare cities for growth, and better equip rural areas for population retention? (Figs. 45.2 and 45.3).

There are various reasons for this which are historical, cultural as well as economic.

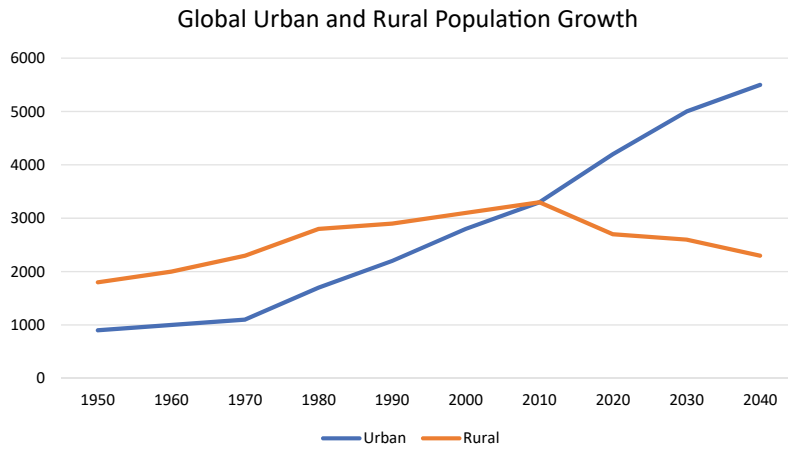


Fig. 45.2 Urban and rural population of the world, 1950–2050 (*Source* UNDESA 2014)

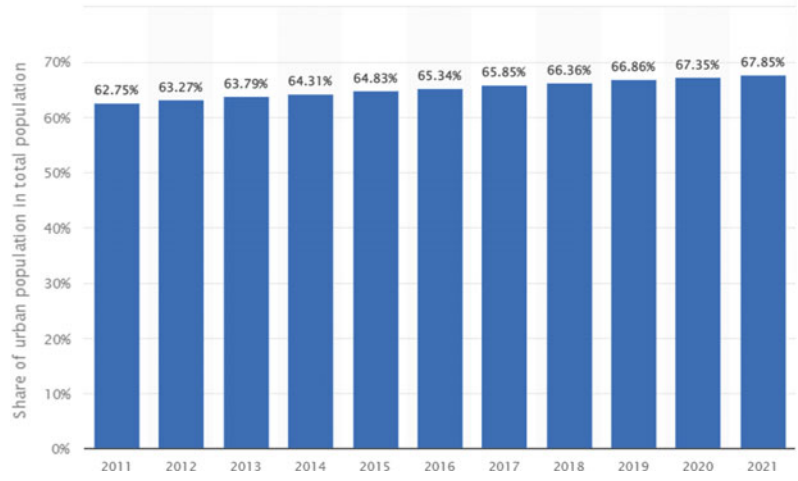


Fig. 45.3 Urbanization rate in South Africa (*Source* Stats South Africa, www.statssa.gov)

Historically, the rural areas of South Africa were characterized by unusually high levels of poverty and joblessness, combined with minimal employment in agriculture (Van Schalkwyk 2015a, b). This situation primarily reflected economic structures shaped by colonialism and apartheid. In particular, the apartheid system established in 1948 aimed to force much of the African population into rural reserves, which the state called "homelands" or "Bantustans" (Van Schalkwyk 2015a, b). The result was a dualized system on the land. Based on poorly paid farm labor, an advanced and diversified commercial farming sector stretched around impoverished, often densely populated communities with limited natural resources and government services.

After the transition to democracy in 1994, the main challenge for rural development was to end marginalization of the rural poor and farm workers. That required significant changes in access to resources, including land and water; significant improvements in the provision of education and skills; transformation of market institutions to make them serve smaller producers; and improvements in rural infrastructure and other government services (Makgetla 2010).

According to the South African Government, the challenges in rural areas in South Africa include unsustainable use of natural resources, inadequate access to socio-economic and cultural infrastructure and services, lack of access to water for both households and agricultural

developments, a low literacy rate and skills levels, migratory labor practices, a decay of the social fabric, and an abundance of unexploited opportunities in many economic sectors.

The facts above make quality sustainable development critical for the rural Eastern Cape as it forms an inclusive environment for its citizens to participate equally in the financial and social economy. Inclusivity becomes essential in this sector as it presents new opportunities to people who need access to further knowledge, technology, and infrastructure. They can provide improved quality of life regarding jobs, food security, and safety, potentially reducing diseases and improving life expectancy. So, these regions must be counted in the global movement of sustainability as they can play a critical role in the development of our society.

45.3 Defining Sustainable Development

To understand what good sustainable urban development looks like and what principles should underpin it, we looked at understanding sustainable communities. Defining sustainability has always been a broad topic; we need to understand the key drivers that help facilitate sustainable communities on a micro and macro level to create a truly circular economy maintained over time. Portney states that "a sustainable community can be anything from a small neighborhood, to a group of people who share some interest, to a program operated by a governmental or nongovernmental organization, to a rather localized ecosystem, to a multistate region encompassing numerous ecosystems" (Portney 2003). In the case of our study, we will look at sustainability around urban planning communities and then touch on neighborhood-making in a geographically bounded area that can be influenced by residents meeting their diverse needs while making use of natural resources, enhancing the environment while supported by governmental organizations.

Van Schalkwyk sees the ideal sustainable community being defined along five typical dimensions (Van Schalkwyk 2015a, b), as shown in the Table below Fig. 45.4. All five of these dimensions articulate the three spheres of sustainability: society and environment economy. On a broader scale, these speak to local and international standards like the UN Sustainable Development Goals. South Africa is one of the member states, making the government a key stakeholder in developing Rural communities in South Africa.

45.4 Methodology

The method of study for the paper was based on a precedent case study and qualitative observation analysis; the reason for precedence was to look at how can the implementation of good sustainability and design interventions improved and rejuvenate an area that was previously run down and to make it a hub of activity and present economic opportunity and improve quality for life of people. This was most relevant because it draws similarities in environmental decay, like lack of employment, safety, and the need for collaboration between municipalities, professionals, and the end user. Our area of interest needs to solve similar challenges by defining helpful interventions that will be successful. Although the site is urban, we think that the notion of creating a community an environ with footpaths and public spaces resonates with that of the rural eastern cape as there are vast areas of the open plan which can be used for public space, and people walk long distances, so walkability to resources is critical. The site also had existing infrastructure that needed to be redeveloped and reused to empower its immediate community. In the rural Eastern Cape, there is a need for energy production and water scarcity; we looked at the precedence as a way of having insight in terms of how alternative methods for producing energy and water management can be strategically used

Dimension	Description
Increased local economic diversity	Economic development strategies should place an emphasis on increasing the local economic diversity.
Self-reliance	This includes the development of local markets and local productions. Products that were previously imported should be locally produced. Cooperation among local economic entities should be encouraged.
Reduced energy consumption and management and recycling of waste.	Ideally the use of energy and materials would be in balance with the earth's ability to absorb waste. The recycling of waste can also be used as an economic gain if managed correctly.
Protection of biodiversity and careful stewardship of natural resources.	The community should protect and enhance the biological biodiversity of the area in which they function. The careful stewardship of natural resources can also aid in the reduction of energy consumption and management of waste.
Social justice	A sustainable community is a community that provides for the housing and living needs of all its residents without any prejudice. There isn't any class and race-based spatial separation of households or neighborhoods and everyone enjoys equality of access to services.

Fig. 45.4 Five dimensions of sustaianable community delveopment (Van Schalkwyk 2015a, b)

while having the ability to research our own contextually relevant interventions.

45.5 Case Study

Hammarby Sjostad, Stockholm

Hammarby Sjostad was known for being an industrial and residential area that was unsafe, with high pollution levels, and generally run down and unpleasant. Now Hammarby is one of the most successful urban renewal districts, becoming home to 25,000 people and offers work opportunities to a further 10,000 people.

Sustainability

Sustainability was a key design driver in the design and development of this district and sustainable alternatives have been implemented for water management, energy, and waste

The district is a result of an integrated collaborative process between municipal authorities, urban planners, developers, architects, the energy company Fortum and the Stockholm Water Company. It incorporates a few principles from traditional Stockholm's nineteenth century urban planning principles and modern architecture. Based on the strategy of a compact green town, a favorable balance has been found between buildings and public spaces. The absence of fences and the presence of public spaces with footpaths yield a district with various atmospheres that offer a high quality of life (Iveroth 2013a, b) (Fig. 45.5).

Energy

The primary source of heating in Hammarby Sjöstad is district heating. Thirty-four percent of this heat comes from purified wastewater, 47% from combustible household waste, and 16% from biofuel (2002 figures). When the heat has been extracted from the warm, purified wastewater, the remaining cold water can be used for district cooling, which is used for cold storage refrigeration in grocery stores and office buildings as a replacement for energy-guzzling air conditioning systems.

Hammarby Sjöstad is experimenting with different energy supply solutions, including integrated solar power solutions that partially provide power to the building and community services like street lighting. Over 900 of the flats in Hammarby use biogas cookers; the biogas comes from the residents themselves. Using biogas reduces electricity consumption by 20% (Iveroth 2013a, b) (Fig. 45.6).

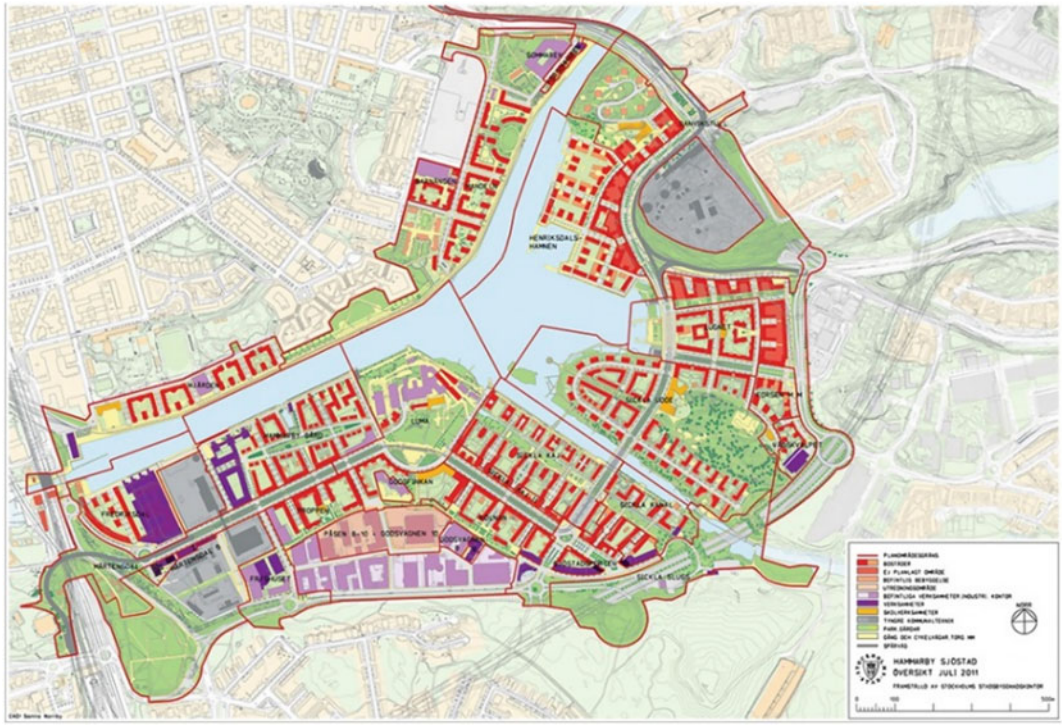


Fig. 45.5 Hammarby Sjostad (*Source* Stockhom City Planning Administration)

- The town has several environmental goals, mainly focused on public buildings.

Water

The first step in sustainable water management was a proper participation and education model for the district's residents, ensuring that residents could reduce daily water consumption by half. The additional focus of the education process and strategy was on reducing pollutants present in wastewater by 50%, by raising residents' awareness of the impact of detergents and other household activities. The residents also have access to a water metering and monitoring system to increase awareness and the chance of habit change.

Wastewater

Wastewater is treated locally. The sludge produced by the treatment process is recycled and used for fertilizing farmland and forestry land. The waste releases biogas during processing. That biogas is used as fuel for vehicles such as buses, taxis, and waste collection trucks, and to heat 1000 homes in the area. Heat is extracted from the treated water in the treatment plant, which is then used for district heating, which has temperatures ranging between 10 and 20 °C over the whole year. The wastewater is highly suitable for heat and cold extraction and is used for cooling during the summer months.

Rainwater

Rainwater infiltrates the ground directly or is drained off through canals. The many small channels are part of the design of the urban landscape. Some roofs have been designed as green roofs that buffer much rainwater. Runoff from roads is captured separately and drained to treatment pools before infiltrating the ground. The Hammarby model shows that wastewater can be used in multiple ways and that rainwater can be returned to the natural cycle. Hammarby

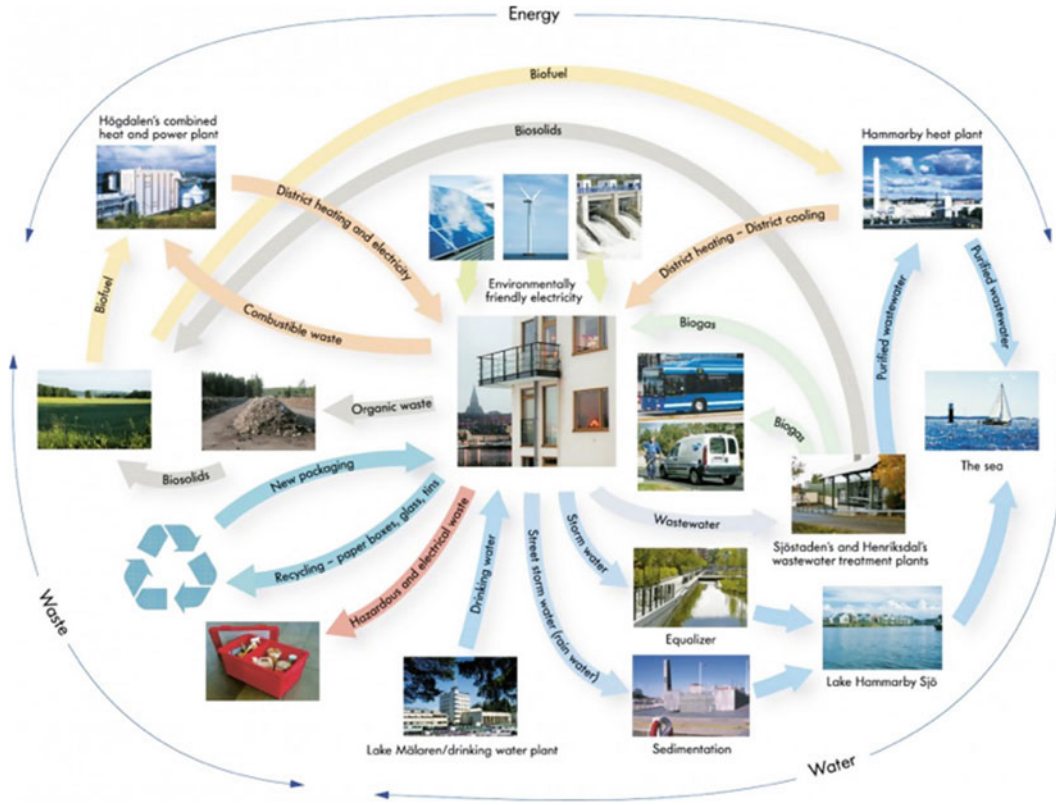


Fig. 45.6 Internal energy, waste, and water systems (*Source* Urban Green Blue Grids, copyrighted to Bumpling AB, www.urbangreenbluegrids.com)

has become an example of sustainable urban planning. For instance, it inspired Toronto's Waterfront (Canada), London's New Wembley, and many cities in China and Thailand.

The sustainability interventions brought into this area create several benefits, the most obvious being the reduced environmental impact. However, they also add value in other tangible and non-tangible ways. The most valuable is the economic and social value brought into the area by this development, which together provides a high quality of life. This is an example of how well-considered and place-specific interventions can create a different lived experience for the residents.

The people in this community have access to heat and energy, reducing the cost of living from an economic standpoint. New economic and social nodes have converted this industrial property into residential and commercial property. The development provides opportunities for residents to live, work, and play within the district, further a well-being component that may increase the residents' quality of life.

This case study presents us with practical examples of how sustainability-focused initiatives can create opportunities for designers, developers, and governments to create spaces/places that improve affordability, better access to amenities, and economic opportunities without compromising on the quality of the design of buildings and outdoor spaces.

Taking our precedence into consideration, we focus on our identified Rural Town of Tsolo in the Eastern Cape of South Africa, a small, poorly planned, and highly congested rural town serving multiple villages. The challenges faced by the community living in this region can be addressed with similar interventions should they be tailored to the local context.

The interventions should address accessibility and mobility, creating circular economies, access to potable water and sustainable energy sources, better quality sanitation that prioritizes sustainable water uses, and capitalizing on the existing infrastructure—utilizing Hammerby as a reference to develop guidelines for the rural town of Tsolo, identifying challenges that may need similar interventions to create place-specific solutions that are sensitive to the cultures and preferred lifestyles existing in this community. We will examine if our interventions can be applied in other parts of the Eastern through generative design initiatives.

45.6 Development Guidelines

Fundamental principles to take out of our precedence project are the good use of interventions related to water and energy and then educating residents about the importance of sustainability and how to use the systems that have been put in place optimally. To be contextually relevant, these interventions need to be reviewed against our needs, and additional interventions can be added. A sustainability matrix needs to be established to set our goals for the Eastern Cape Rural Development and our site location.

The SDGs have been considered as part of the development of good practice guidelines for developing projects that are socially conscience and are in line to be building sustainable communities. We believe they can serve as a strong driver in rural development. When developing the guideline matrix, ensure that each strategy and approach aligns with an SDG. This creates a design process that will ensure that any new development and its interventions are considered and developed with the UN Sustainable Development principles embedded in the process and implementation.

Category	Sustainability feature	Aim	SDG
Energy	Energy efficiency	To minimize energy requirements and greenhouse gas emissions through the energy hierarchy	SDG07: affordable and clean energy
	Renewable energy production	To reduce the environmental and economic harms associated with fossil fuel energy	SDG07: Affordable and clean energy
Water	Indoor potable water use reduction	To encourage and recognize design that minimizes extreme reliance on indoor potable water use	SDG06: Clean water and sanitation
	Drinking water quality	Provide access to drinking water without unpleasant taste and odor and appearance that complies with health-based limits	SDG06: Clean water and sanitation
	Basic water quality management	Implement protocols to reduce the risk of water quality and legionella colonization	SDG06: Clean water and sanitation
Health and well-being	Local food environment	Encourage a local food environment that increases the availability of plant-based food options, promotes humane livestock practices, limits environmental degradation, and reduces dietary exposure to pesticides	SDG02: Zero hunger
	Nourishment	To encourage the creation of food environments where the healthiest choice is the easiest choice	SDG03: Good health and well-being

(continued)

Category	Sustainability feature	Aim	SDG
Health and well-being	Nutrition education	Encourage the selection and consumption of healthier food choices through advertising and massaging	SDG03: Good health and well-being
	Places of respite and connection to nature	To encourage and recognize developments that create appropriately designed areas where people can relax in a place of respite and connect to nature	SDG03: Good health and well-being
Ecology, land use, and biodiversity	Urban consolidation	To encourage and recognize integrated planning and shared land use in developments by providing on-site outdoor facilities for use by the local community	SDG11: Sustainable cities and communities
Materials and embodied carbon	Building life cycle impact reduction	To encourage adaptive reuse and optimize the environmental performance of products and materials	SDG13: Climate action
	Storage and collection of recyclables	To reduce the waste generated by building occupants and hauled to and disposed of in landfills	SDG13: Climate action
Emissions and pollutions prevention	Discharge to sewer	To encourage and recognize developments that minimize discharge to the municipality sewerage system	SDG06: clean water and sanitation
Transport, mobility, and universal access	Access to quality transit	To encourage development in locations shown to have sites that has limited to no form of integrated transport systems	SDG11: Sustainable cities and communities
	Neighborhood development location	To avoid rural development on inappropriate sites. To reduce traveling long distances, improve liveability, and improve human health by encouraging daily activity	SDG11: Sustainable cities and communities
Socio-economic aspects	Employment creation	To encourage and recognize developments that create employment opportunities through design decisions that include facilities for micro-enterprises and targeted employment for priority groups	SDG08: Decent work and economic groth
	Empowerment	To encourage and recognize projects committed to and have made achievements in implementing the principles of local Economic Empowerment	SDG08: Decent work and economic groth
Community and placemaking	Integrative design	Facilitate a collaborative project process and support adherence to collective well-being and sustainability goals	SDG11: Sustainable cities and communities
	Housing equity	Promote housing equity through the allocation of healthy, affordable housing units	SDG11: Sustainable cities and communities
	Diversity and inclusion	Promote an equitable culture by implementing and disclosing diversity and inclusion policies and initiatives	SDG11: Sustainable cities and communities
	Support for victims of domestic violence	Increase availability and access to support services, resources, and care for victims of domestic violence	SDG05: Gender equality

45.7 Implementation

With the overall understanding, a matrix can be used as a guide for Rural development. We want to explore different cases in the rural Eastern Cape to map out our thinking and how something of this nature can be implemented, looking at a typical conventional approach of having the insight into an area to start developing interventions and using data as a way of selecting interventions.

This is to beta test our theory of extracting comparative data and match it to helpful interventions from the same data set of interventions pre-developed across the sustainability profession over the years. However, what will be different here is that each intervention will only act as a driver to design thinking as it will enable the designer/end user to ask the right question based on data-driven knowledge, and from this point onwards, they can apply contextually relevant answers. The idea is to create a user-friendly tool that can be used by non-specialists who are not necessarily industry professionals but policy-makers in government to have an early test bed for their planning policies for each area in question to ensure that the correct information is used upfront. Some areas in the rural Eastern Cape are fairly remote to do a site survey, and research technology like this can be used as a starting point by simply extracting data to have an overview of how the sustainability master plan for the area in question can be achieved.

Example 1—Tsolo: Qualitative knowledge based on the experience of the area.

Example 2—Libode: Quantitative knowledge based on data.

Area Tsolo "CBD," Eastern Cape, South Africa

Challenge: *Sustainable densification to prevent sprawl;*

The CBD has a single main road overburdened by public transport, making it impossible to navigate around at peak density times of the month when the local community and people from surrounding villages do their grocery shopping which is the most anticipated activity in this area due to government grant pay-out. This location can be densified and pedestrianized to make it safer and easier to navigate during peak times and increase its economic value. An alternative route can be mapped, which aligns with town planning regulations. It can be linked to feeding into neighboring villages, creating more accessible avenues to access the town.

This would also be ideal for preventing unnecessary development outside the existing town, preventing sprawl, and lowering embodied energy.

Interventions:

Land use: Urban consolidation

Socio-Economic Aspects—Empowerment

Transport, Mobility, and Universal access—Neighbourhood Development Location

Health and Well-Being—Places of Respite and connection to nature

Energy—Renewable Energy Production

Mock-up Intervention proposal below 1 (Fig. 45.7).

Food Security:

Agriculture can be a driving force in ensuring food scarcity for the community in this region can be a thing of the past. There is also a strong history and tradition of subsistence farming with evidence of fields that used to be regularly worked, evidently in aerial footage (Fig. 45.8).

We see a unique opportunity on the land around the wastewater treatment plan. Its positioning could prove strategic as it is positioned 1 km from the CBD and 2 km from the Agricultural college. The water from the treatment plant can be used to start various farming activities for the community, and the product can travel to the CBD, which is closer. At the same time, the students can use the area as a training ground and prototyping for new farming methods. This presents efficient use of land within the local community and creates a form of circular Economy with low embodied energy.

Fig. 45.7 Pedestrian streets, Ease of access (*Source* Mlondolozi Mafukuzela, Cebisa Mafukuzela)

Fig. 45.8 Formerly use subsistence land (*Source* Google Maps, Mlondolozi Hempe, Cebisa Mafukuzela)

To support further economic activity around the Agricultural School, introducing a program that helps the students and the homes that are currently subsistence farming to commercialize potentially—introducing a program to assist families in identifying the correct product to farm and establishing a farmers' market that can occur once a month at the Agricultural School or an identified location near the town. This would allow families to generate income and reduce dependence on social grants and government intervention. This initiative would also give students access to markets (Fig. 45.9).

Interventions:

Health and Wellbeing: Local Food Environment

Health and Wellbeing: Nutrition Education

Socio-Economic Aspects: Employment creation

Mock Intervention proposal below 2:

The above gives us insight into how these interventions can be integrated into existing and new spaces should they be well thought out and what potential challenges they can solve or prevent. This is a snapshot of the application as many goals can be listed under these measures and their applicability in different scenarios.

Generative Design

With the world becoming more technologically driven and quick turnaround, data-driven solutions are becoming mandatory for answering design questions. One of the questions we had was, can green design interventions be easily applied using algorithmic process drive solutions like generative design methodologies? How can we start having iterative design processes to

Fig. 45.9 Roadmap to Circular Economy and Food Security (*Source* Google Maps, Mlondolozi Hemper, Cebisa Mafukuzela)

deliver flexible output using data? What data is most valuable, and how does each intervention find its applicability? This, of course, will be done with an understanding that each area needs contextually relevant solutions that can impact its immediate environment.

How do we then achieve this iterative data-driven process? What we are proposing for this process is using already existing information to carve out a path to drive policy-making and design thinking. We see a close relationship between design interventions that are already existing and generally publicly accessible data. The interventions have been living and have been tried and tested in the professional space on various projects like Hammarby Sjostad.

We see these interventions being collated into a data bank where they can be pulled and aligned according to our starting parameters. Our starting parameters in this instance would be statistic data of the region or area where we can deduce what in the intervention is most valuable. Once this desktop process is complete, further in-depth studies can be done using the extracted interventions as they would be aligned with researched information. This system can also assist in reducing the focus on unnecessary interventions by filtering them out and saving more time (Fig. 45.10).

The below data is an example of what type of data can be used to start driving the process.

We used Nyandeni Municipality as a test bed for data collection to try to inform our interventions, for Libode since it falls under this municipality.

Using the data matrix, we start looking at what interventions can apply only using data for our assumption. This process can be automated in the future using different data banks and can be integrated with rural municipalities as a tool for early-stage development. For our paper's sake, we can do a desktop exercise on the various interventions needed.

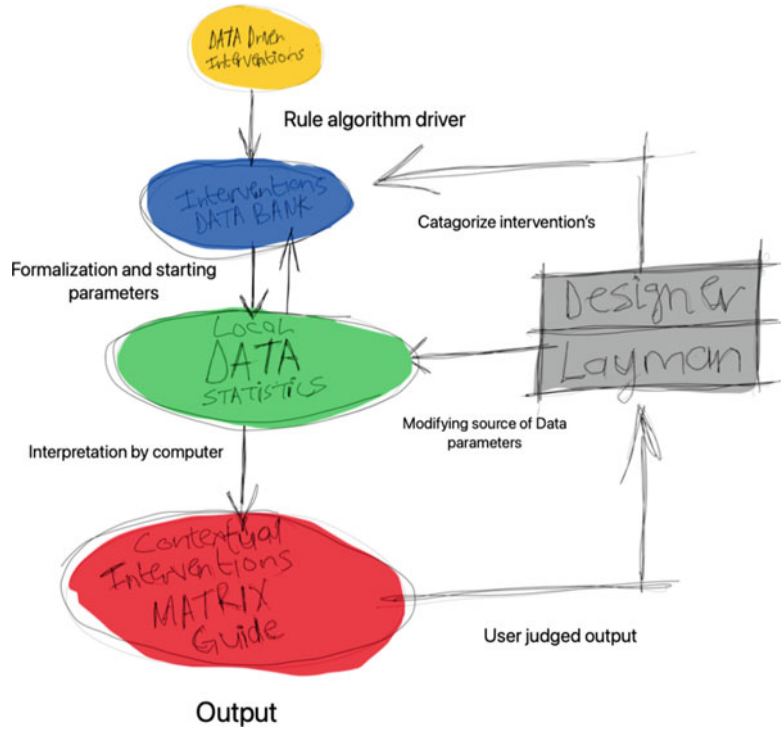
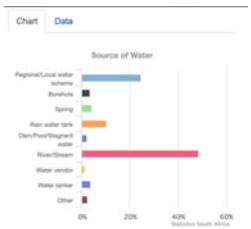
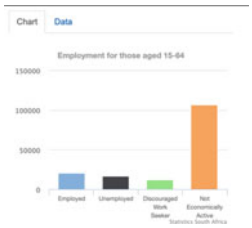
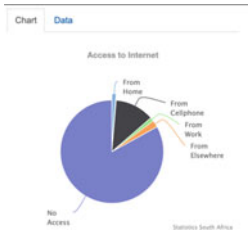


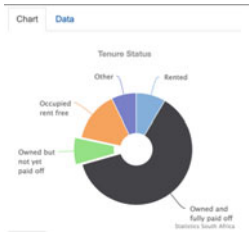
Fig. 45.10 Proposed Scheme of Generative Design (Mlondolozi Hempe)

Data	Category	Sustainability feature	Aim
 Chart 1: Water Sources in Nyandeni Municipality (*Source* StatsSA)	Water—48% of the water source comes from streams and rivers	Water quality management	Implement protocols to reduce the risk of water quality and legionella colonization
 Chart 2: Employment rate in Nyandeni Municipality (*Source* StatsSA)	Socio-economic aspect	Employment creation	To encourage and recognize developments that create employment opportunities through design decisions that include facilities for micro-enterprises and targeted employment for priority groups

(continued)

Data	Category	Sustainability feature	Aim
 Chart 3: Refuse Disposal in Nyandeni Municipality (*Source* StatsSA)	Material and embodied carbon	Storage and collection of recyclables	To reduce the waste generated by building occupants and hauled to and disposed of in landfills
 Chart 4: Access to Internet in Nyandeni Municipality (*Source* StatsSA)	Socio-economic aspects	Empowerment	To encourage and recognize projects committed to and have made achievements in implementing the principles of local Economic Empowerment

Interventions that can be pushed further out or excluded due to being low priority

Data	Category	Sustainability feature	Aim	Reason for exclusion
 Chart 5: Tenure Status in Nyandeni Municipality (*Source* StatsSA)	Community and placemaking	Housing equity	Promote housing equity through the allocation of healthy, affordable housing units	62% of the population in this region owns their properties. This intervention is not a high priority and can be pushed further down the line or excluded

- LIBODE, Eastern Cape, South Africa

The metrics can be used and adapted to address the different challenges faced in other rural towns. We will look at Libode, a rural village that is about 50 km away from Tsolo. Libode had a population of about 5000 in 2011 and is situated between Port St Johns and Mthatha and serves as the administrative location for Nyandeni Municipality. This town has some similarities but has its own set of challenges and opportunities for intervention. Using the data from Nyandeni Municipality and developing the intervention metrics, we can apply these findings to identify place-specific interventions for Libode (reference).

Libode has one main road that runs through the town. The matrix has given us multiple challenges that Libode and other towns in Nyandeni Municipality Offices. The last zone could potentially become a cultural zone with the Mendi Memorial as a focal point. This method of urban planning will require a considered transport system that connects the four urban residents' nodes so that residents and visitors can easily access and enjoy them. The transport infrastructure will need to prioritize public and pedestrian transport as those are the most accessible modes of transport to the residents of the town and of surrounding villages.

An integrated transport system that is focused on pedestrian mobility and connects the activity nodes via the implementation of corridors. The vital modes of transport should include high levels of unemployment, with a high percentage of people who could be more economically active. The absence of economic activity increases the number of households living below the poverty line and economically excludes a large portion of the population of Libode. Financial inclusion is a high priority in Post-Apartheid South Africa as the demographic of Libode is almost entirely black. Other challenges and interventions include the need for a waste disposal system and the collection and sorting of recyclables. Introducing a waste disposal system focused on recycling is itself an opportunity to increase economic activity, create jobs and educate residents in Libode about waste management.

Below, we will extract one of the challenges and interventions highlighted in the matrix and unpack it to make it place-specific and to understand how it can be developed.

Challenge:

– High unemployment and economic exclusion.

Intervention

Livestock Agricultural Development

The Marubeni Piggery Project is located toward the east of Libode. It is a small-scale project that could catalyze the community to develop an agricultural livestock center—the creation of an enterprise that will provide employment opportunities and food security. The existing Piggery Project is adjacent to vacant land, allowing for gradual expansion. The current piggery project and vacant land face the R61, the main road to access Libode from the N2 and the town' (Fig. 45.11).

The challenge with agricultural enterprising in this region is the earning potential. Data extracted from Stats SA shows that within the Nyandeni municipality, only 40.5% of households with agricultural activity on their land make a profitable living. This is because some of the households farm for subsistence purposes; however, those that farm for commercial purposes struggle to increase turnover and profit because of limited access to markets. The development of Livestock Enterprise would need to be supported by the creation of a supply chain to access markets (Chart 45.6).

Of the agriculturally active households in Libode, 29% are involved in livestock farming. This means that many homes have the resources and skills to maintain livestock. This presents an opportunity for a historically, economically, and systematically excluded community to develop a self-sufficient industry based on existing skill sets and resources.

Fig. 45.11 Location of Land for Livestock Farming (*Source* Google Maps, Mlondolozi Hempe, Cebisa Mafukuzela)

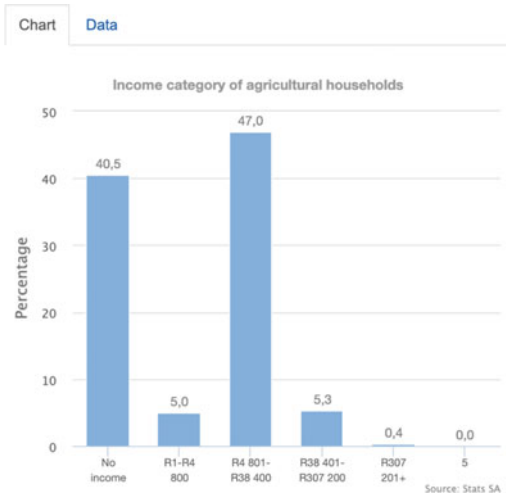


Chart 45.6 Location of land for livestock farming in Nyandeni Municipality (*Source* Stats SA)

45.8 Closing Argument

Much-needed foresight is required to be at the forefront of developing and integrating technology or the ways we can tackle this challenge. Rural environments should be included in these advancements with the world moving into AI technology and other mediums to create practical and quantitative design solutions. Creating methodologies that help foster new and different ways in these regions is critical hence progressive ideation methodologies like generative design can make a springboard for such. Its iterative design process way and multiple output solutions can bring variety and creativity to how development policies are created and design solutions are implemented.

Rural South Africa can potentially reduce the rate at which people are exiting the rural community, and skills are developed if they are set into places where people can live comfortably, have access to services, and access opportunities to make a living. Creating development tools can be a starting point to change how we respond to development in our rural and peri-urban towns.

The SDGs have been put in place to help not only the state, but also private entities to move toward sustainability; building the sustainable development goals into development guidelines assists in creating better rural towns that can provide quality lives to the villages and communities they serve.

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The Role of UN Sustainable Development Goals in Designing for Refugees: The Case of Sidewalk Occupation at the UNHCR in Pretoria, South Africa

46

Yolanda van der Vyver

Abstract

Architecture and the built environment can impact the well-being of our societies and shape the future of our cities. The United Nations (UN) has identified seventeen Sustainable Development Goals (SDGs), which include the world's best plans to end poverty, reduce inequalities, and ensure good health and well-being, as well as access to quality education and clean water and sanitation, to name but a few. A sustainable world is one with room and consideration for all people, but in order to achieve the aim "to leave no one behind", architectural discourse and debate must include the accommodation of refugees in the urban landscape. This article aims to critically evaluate the current South African refugee situation in terms of the UN SDGs, and to specifically comment on the occupation of the public sidewalk in front of the Office of the United Nations High Commissioner for Refugees (UNHCR) in Pretoria. The article identifies the failure by various public and private groups to consider these goals, which has had a detrimental effect on the human dignity of asylum seekers and refugees, is in contravention with the Constitution of the Republic of South Africa, 1996 and the Punta del Este Declaration on Human Dignity. It proposes to rethink refugee accommodation in temporary tent camps and to present more sustainable urban settlements. It presents architecture as a human right, which should also be available to refugees.

Keywords

UN SDGs · Designing for refugees · Sidewalk occupation · UNHCR in Pretoria · South Africa · Public urban space

46.1 Background

In October 2019 hundreds of asylum seekers[1] and refugees,[2] mainly from the Democratic Republic of the Congo (DRC), started to camp out in protest on the public sidewalk in front of the UNHCR in Pretoria, South Africa (Fig. 46.1) following deadly xenophobic attacks led by locals against foreign nationals. They demanded to be moved into camps and then to be relocated to safer and less corrupt countries like Australia and the USA. Although the public sidewalks belong to the local municipality,

[1] Act no. 130, 1998, the South African Refugees Act (iv) defines an "asylum seeker" as a person who is seeking recognition as a refugee in the Republic.

[2] Act no. 130, 1998, the South African Refugees Act (xviii) defines a "refugee" as any person who has been granted asylum in terms of this Act.

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Fig. 46.1 Public sidewalk in front of the offices of the United Nations High Commissioner for Refugees (UNHCR), October 2019/Photographs by the author

officials claimed that the plight of the refugees was outside its jurisdiction and that the Department of Home Affairs (DHA) or the UNHCR should resolve the matter. The UNHCR told the demonstrators that it could not resettle or relocate them,[3] because it requires an agreement from a third country to give them permanent residence. Two homeowners' associations filed an application with the High Court to have them removed from the upmarket neighbourhood.[4]

The High Court ordered that the protesters be removed, and when they resisted, police used force.[5] Many were arrested or detained, and others were sent to the Lindela Repatriation Centre in Krugersdorp west of Johannesburg (Fig. 46.2).[6] Lindela is run by the DHA and for decades its management was contracted out to Bosasa, a company synonymous with abuse, bribery and corruption associated with state capture.[7] Bosasa was paid per person per day, so there was a financial incentive to increase the number of inmates. Deportation became a for-profit industry and the effect on migrants was devastating.[8] Refugees complained that they were unable to renew their status in a country where government officials have become notoriously corrupt. It did not take long before the same and other refugees returned to the area.

[3] https://www.unhcr.org/resettlement.html.

[4] https://ewn.co.za/2019/10/25/pretoria-residents-head-to-court-to-help-refugees-camping-at-unhcr-offices.

[5] https://www.news24.com/News24/refugees-police-officers-injured-in-battle-to-clear-unhcr-offices-in-pretoria-20191115.

[6] https://www.aljazeera.com/news/2019/11/17/south-africa-monthlong-unhcr-sit-in-ends-in-violent-eviction.

[7] *Judicial Commission of Inquiry into Allegations of State Capture, Corruption and Fraud in the Public Sector Including Organs of State, Report Part III, BOSASA*, Chairperson Justice R.M.M. Zondo, Acting Chief Justice of the Republic of South Africa.

[8] https://mg.co.za/article/2019-12-11-00-how-lindela-became-bosasas-meal-ticket/.


Fig. 46.2 Lindela Repatriation Centre/https://mg.co.za/article/2019-12-11-00-how-lindela-became-bosasas-meal-ticket/

46.2 Sustainable Development Goals

This conference focuses on Sustainable Development Goals (SDGs) and designing the future of inter-cultural societies. Architecture as a design discipline, is an essential part of this vision, especially when it concerns designing and re-designing the city. Architects are obsessed with space and place, and this paper stresses the need to challenge the existing spatial order and design urban space that addresses the problems and challenges of a modern society. Mass migration, climate change and increasing social inequality have necessitated changes in the profession of architecture. If architecture is understood only from an aesthetic and artistic perspective, its focus remains on a very small elite. Architects should ask how they can contribute to a changing social climate and improve the lives of millions, and design for inclusivity and the needs of different people. They cannot ignore the suffering and plight of much of the population. There are seventeen SDGs, but only the first six will be discussed below since they are relevant to the sidewalk occupation by refugees in Pretoria. This section also aims to suggest how architecture can help obtain these goals.

46.2.1 No Poverty

The refugees that camped out in protest on the public sidewalk in front of the UNHCR may have lost everything before their displacement. They initially ended up with the city's poor, but xenophobic attacks drove them to seek help at the UN. According to the UN's *Sustainable Development Goals Report 2022*,[9] (hereafter the *UN SDG Report*), the drive to end extreme poverty was severely set back by the Covid-19 pandemic and refugees, without access to social protection systems and cash benefits that attempted to mitigate the consequences of the pandemic, may have fallen deeper into poverty. The *Architecture Guide to the UN 17 Sustainable Development Goals* (hereafter *Architecture Guide*)[10] states that architects and urban

[9] Retrieved from https://unstats.un.org/sdgs/report/2022/Goal-01/.

[10] Retrieved from https://issuu.com/kadk/docs/aechitecture_guide_un17_vol.2_web_single_pages.

designers can address the impact of poverty on people's lives by providing access to affordable housing, sanitation, education, health facilities and spaces for recreation. Thus, when designing for refugees, whether it is social housing, urban upgrading or public space, architects should pay special attention to low-cost, safe construction, natural light and ventilation, and local and re-used materials. Buildings and public spaces must be affordable and accessible for the marginalised and poor and the engagement of local communities and the refugees themselves, adds value to the design (see *Architecture Guide* 2020: 14–15).

The argument is that poorer people spend more time in public space because their private space cannot accommodate daily household needs and activities. Therefore streets, squares, promenades, and green spaces should be seen as representing the primary forms of social infrastructure of cities. Access to public space and communal spaces is also a human right. "Properly made urban spaces that are defined, enclosed, protected, humanly-scaled, surveyed and landscaped, promote human dignity—everyone is the same within these spaces and poverty does not become a badge" (Dewa 2003: 34). It is also crucial for the users to participate in the design of urban space. For that purpose, a task team representing the community must be elected that can work closely with council officials and consultants (Dewa 2003: 24).

46.2.2 Zero Hunger

Initially, when refugees started to camp out on the sidewalk, they asked the UNHCR to provide portable toilets, water and food for the children, but the UNHCR said there was nothing they could do. Some residents and religious groups provided them with food and blankets, but without the possibility of urban farming or micro-gardening, they became reliant on informal food vendors, the alternative being to buy food at the upmarket mall nearby. Their cooking activities on open fires contravened the Municipal Bylaws, as described in the High Court ruling. Justice Ranchod made the following order on 13 November 2019: The Protesters were interdicted and prohibited from contravening the Municipal Bylaws and the laws of the country, including common law, by committing acts in, on and around the sidewalks, parks, public roads and road reserves of the Affected Area. The Local Government Ordinance 17 of 1939 forbids: "Causing a nuisance, noise, erecting shelters, causing unpleasant smells, making fires, cooking food, doing washing, causing health problems, defecating, urinating, undressing," etc. When they were removed to Lindela, poor food, overcrowding and the systematic denial of basic rights were highlighted by various humanitarian organisations.[11] Child nutrition is specifically worrying and malnutrition due to a loss of household income, the lack of available and affordable nutritious food, reduced physical activity and disruptions in essential nutrition services are listed in the *UN SDG Report*[12] as global risks.

When designing for refugees, architects must provide areas for food production and allow for urban agriculture and regenerative landscape design. Refugee shelters are usually on barren plots with poor resources and the suburban sidewalk is no exception. Furthermore, the City of Tshwane Municipal Bylaws forbids growing vegetables on a public sidewalk.[13] Food production may reduce the high demand that refugees place on the host country's resources and involving end users in the design process will ensure relevance and longevity. A good example is the micro-gardening kits containing vegetable seeds, compost, watering cans and a tutorial on how to grow vegetables in a small space, that were handed out to Rohingya refugees in Bangladesh. Neighbouring communities received the same kits to improve the balance in support of communities (see *Architecture Guide* 2020: 26–27, 34).[14]

[11] Retrieved from https://www.gov.za/sites/default/files/gcis_document/201409/lindela20.pdf.

[12] Retrieved from https://unstats.un.org/sdgs/report/2022/Goal-01/.

[13] https://www.news24.com/news24/southafrica/news/tshwane-man-fined-r1-500-for-growing-cabbage-patch-in-front-of-his-home-20210915.

[14] Retrieved from https://issuu.com/kadk/docs/aechitecture_guide_un17_vol.2_web_single_page.

The mechanisms of migration produce suffering and local labour markets exploit the poor. In settings where land is abundant, poorer households can potentially benefit by employing refugees to expand agricultural production or disengaging their own labour to focus on more profitable livelihood activities. However, poorer households that depend on casual labour may be adversely affected by the presence of refugees who reduce opportunities for work and drive down wages (Chambers 1986).

46.2.3 Good Health and Well-Being

Refugees are often deprived of human dignity and well-being, running counter to the Punta del Este Declaration on Human Dignity.[15] Investigations into the well-being of refugees in South Africa found that refugees were not better off than South African citizens (Dalton-Greyling 2008). The reason for the lower level of well-being among refugees was that the Refugees Act 130 of 1998 was not fully enforced. A second reason is xenophobia. Foreigners are more likely to be targeted by criminals and they are unwilling to report incidents to the authorities because they have a historical distrust of police.

One of the criteria that measure well-being is access to affordable housing (Dalton-Greyling 2008). The temporary shelters erected by refugees on the sidewalk of the UNHCR (Fig. 46.1) are reminiscent of refugee camps across the world and architects are challenged to propose better accommodation for refugees, an alternative to camps, although refugee camps are still very much a part of emergency shelter solutions. Traditional emergency refugee camps are designed to be temporary shelters, but their lifespans often exceed what was planned for.

The oldest refugee camp is the Palestinian camp Dheisheh (Fig. 46.3), built in 1949 for 3,400 Palestinians who fled the 1948 Arab–Israeli war. The UN built small shacks, but refugees did not want to live in those, so they built more durable structures. It now looks more like a permanent settlement than a temporary camp.[16] One of the world's largest refugee camps is Kakuma in Kenya, where the average stay is 17 years.[17] Sandi Hilal and Alessandro Petti's book *Permanent Temporariness*[18] discusses camps as paradigmatic representations of political failure. Refugees are stuck in time, waiting to be deported or relocated. "Refugee camps should not exist; they represent a crime and a political failure." "Camps are established with the intention of being demolished. They are meant to have no history and no future; they are meant to be forgotten." The reason why refugees in the world do not want to live in camps, but in urban areas, is because camps have unsanitary conditions.

The mere presence of the de facto squatter camp thus points to a bigger problem: inadequate policies to address the needs of refugees and

[15] The Punta del Este Declaration on Human Dignity for Everyone Everywhere was signed in 2018 to commemorate the seventieth anniversary of the 1948 adoption of the Universal Declaration of Human Rights. In May 2019 an endorsement and elaboration of the Punta del Este Declaration was compiled by members of the African Consortium for Law and Religion Studies (ACLARS) at its Seventh Annual Law and Religion conference in Gaborone, Botswana. The statement describes African perspectives on human dignity, a concept that seems to be easier to translate into African languages, than the Western concept of human rights. African thoughts on human dignity include societal, religious, cultural and legal ideals that implicate important relationships such as family, community, tribe and nation. The Nguni concept of *Ubuntu* is closely related to human dignity. Prinsloo (1998: 41–3) summarised the views of various African thinkers, presenting *Ubuntu* as an African worldview.

[16] https://www.unrwa.org/where-we-work/west-bank/dheisheh-camp.

[17] https://www.unhcr.org/ke/kakuma-refugee-camp.

[18] http://www.decolonizing.ps/site/wp-content/uploads/2019/05/fourteen-concepts.pdf.DAAR (Decolonizing Architecture Art Research) is an architectural collective that combines conceptual speculations and pragmatic spatial interventions, discourse and collective learning. The artistic research of Sandi Hilal and Alessandro Petti are situated between politics, architecture and pedagogy. In their practice art exhibitions are both sites of display and sites of action that spill over to other contexts: built architectural structures, the shaping of critical learning environments, interventions that challenge dominant collective narratives, the production of new political imaginations, the formation of civic spaces and the re-definition of concepts.

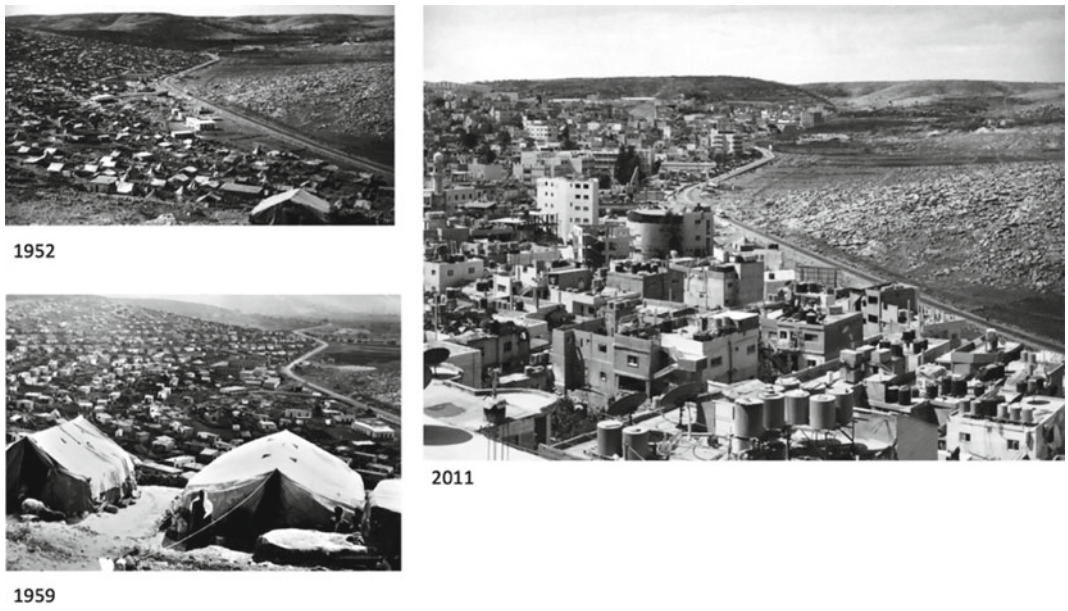

Fig. 46.3 Dheisheh camp, West Bank/*Source* UNRWA's Archive, Gaza

asylum seekers in urban areas.[19] The UNHCR does not offer recommendations on how cities and public space could serve refugees better. Architects find it strange to design something with no intended future that represents the dark side of modernisation. When designing emergency shelters in refugee camps, architects need to understand the brief through its temporariness.

Globally, most refugees, by their own choice, don't live in camps but in urban areas,[20] because camps tend to turn into prisons. By asking to be relocated to camps, the refugees at the UNHCR in Pretoria went against the global trend because the threat of xenophobic attacks in urban areas placed their lives in danger. They also did not want to be sent to the DHA's Lindela, where many died, due to inadequate health services or at the hands of badly trained, violent security guards. The facility was overcrowded, and disease spread quickly, as pointed out in a Doctors Without Borders report in 2018, endorsed by Lawyers for Human Rights[21] and the public interest law centre, Section 27.[22] Some died a few days after medical personnel diagnosed minor illnesses (incorrectly). HIV, tuberculosis and communicable diseases were treated outside of the national protocol. The DHA rejected these allegations, stating that inmates died of pre-existing medical conditions.[23] With the outbreak of the Covid-19 pandemic, all Refugee Reception Offices (RROs) were closed, so permits could not be renewed and access to basic services, such as healthcare, became problematic.[24] The *UN SDG Report*[25] lists the Covid-19 pandemic as the main concern relating to health and

[19] https://reliefweb.int/report/zimbabwe/squatter-camp-south-africa-underscores-need-urban-refugee-policy-review.

[20] The 2018 World Refugee Council report shows that 60% of all refugees and 80% of all internally displaced persons are living in urban areas. https://www.cigionline.org/activities/world-refugee-council/.

[21] https://www.lhr.org.za/lhr-units/detention-monitoring-project/.

[22] https://section27.org.za/2012/06/violent-riots-further-affirm-the-need-to-protect-the-right-to-health-at-lindela-yet-home-affairs-idles/.

[23] Retrieved from Bornman (2019). How Lindela became Bosasa's meal ticket, *Mail and Guardian,* 11 December 2019.

[24] https://help.unhcr.org/southafrica/2021/10/02/dha-announces-reopening-of-services/.

[25] Retrieved from https://unstats.un.org/sdgs/report/2022/Goal-01/.

well-being, but even before 2020, refugees were facing a health crisis.

When designing for refugees, architects need to create an environment that supports good health and well-being, with access to health systems, sanitation and hygiene. Spatial planning must allow for social distancing and healthy airflow. A well-designed house will improve a family's health (See *Architecture Guide*[26] 2020: 42–43).

46.2.4 Quality Education

The children of refugees camped out in front of the UNHCR have not gone to school since 2019.[27] It is essential that refugee children attend school and since the families fled their communities after xenophobic attacks, schools will have to be created for them. When designing for refugees, architects must bear in mind that, although emergency shelter needs innovation, access to schools is just as important, and when designing primary education facilities, the importance of an active lifestyle must be reflected in the layout. Children should have access to play. They should be climbing trees, and running around in a safe environment. Whether in a refugee camp, an informal settlement or in a rural community, access to schools and education is defining the future of our children (see *Architecture Report*: 60–1). The children of refugees are being left behind, unless they can be integrated into a local community. Religious organisations, such as the Jesuit Refugee Services, have been involved in building community centres and subsidising school fees in South Africa. The *UN Report*[28] describes how valuable online schooling is to the disrupted children of Ukrainian refugees. This, however, is not an option for the refugees on the sidewalk. Safe, inclusive, and continuous education is crucial to help learners cope with current and future crises.

46.2.5 Gender Equality

On 15 November 2019, after the High Court ordered the removal of protestors, about 700 refugees were violently evicted from the sidewalk by police in riot-gear, using water cannons and pepper spray, the protestors resisted, bashed police shields, and threw rocks, cans of food and water buckets at the officers. Others sat in a group and refused to move. But it was the women who captured the media's attention. *Al Jazeera* reported that women held on to their weeping children and pleaded with the police. 224 women, 169 children and seven men were temporarily detained at Lindela Repatriation Centre until Home Affairs could verify their immigration status and process them accordingly.[29] It did not take long before the same refugees returned to the area. By May 2022, refugees were once again camped out on the sidewalk in front of the UNHCR.

Coupled with high levels of Gender Based Violence, migrant women face a "triple oppression" of xenophobia, racism, and misogyny. The number of women migrants in South Africa quadrupled from 2000 to 2017, from 400,000 to 1.8 million—44% of the approximately 4, 1 million migrants in South Africa. Women are increasingly migrating independently of their husbands and families, and are making independent choices about where, when, and how to migrate.[30]

20% of Lindela inmates are women and there have been reports of violence against them, but the DHA has denied these allegations. Still, South Africa has an extremely high prevalence of sexual and gender-based violence and harmful practices, despite it having ratified fourteen articles of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW). 36 NGOs levelled claims against South Africa on Human Rights abuses related to domestic violence, failure to comply with its

[26] Retrieved from https://issuu.com/kadk/docs/aechitecture_guide_un17_vol.2_web_single_pages.

[27] https://www.groundup.org.za/article/refugees-limbo-outside-un-offices-pretoria/.

[28] Retrieved from https://unstats.un.org/sdgs/report/2022/Goal-01/.

[29] https://www.aljazeera.com/news/2019/11/17/south-africa-monthlong-unhcr-sit-in-ends-in-violent-eviction.

[30] https://www.thedailyvox.co.za/the-fight-against-sexism-and-gbv-must-include-migrant-refugee-women/.

obligation to protect women and grave and systematic violations of the Convention obligations. The country responded in a follow-up report submitted in June 2022. It was conducted under Article 8 of the Optional Protocol to the Convention. One issue that was raised is female refugees' access to justice (see SDG no. 16). Legal Aid SA is an organisation that works in cooperation with University Law Clinics. They have a specialist capacity to assist certain vulnerable groups such as refugees.[31]

When designing for refugees, architects should include sanitary toilet functions in private booths with a semi-private social space in which women can sit down, rest and recover, together with a place for lectures and training (*Architecture Guide* 2020: 80). Homeless women have different needs that are mostly invisible in public**.** One must identify a different strategy for outreach to support them well.

46.2.6 Clean Water and Sanitation

When planning for an emergency shelter, architects must provide basic care first. This includes water and sanitation. The *Architecture Guide* recommends that bathroom and washing facilities must be low-cost, quick to construct, and with sufficient privacy and ventilation. Toilet facilities must be designed to handle the waste that is produced. When asked to provide water and portable toilets to the refugees on the sidewalk, the UNHCR said there was nothing they could do. Council previously provided them with temporary toilets (see Fig. 46.1) but since their return in 2022, they have been forced to go to the mall to relieve themselves. They also have no direct access to clean drinking water, handwashing, or cleaning. The sidewalk occupation has caused unsanitary conditions. Local Government Ordinance 17 of 1939 forbids defecating, and urinating on the sidewalk, or any other activity that causes health problems. Rainwater is mixed with pollution from the site, which spreads to the storm water system.

46.3 Architecture is a Human Right[32]

"Architecture for Refugees" started as a Facebook page in 2015 and developed into a multimedia platform where approaches to solving problems are discussed, and architectural projects that promote integration are engendered. Co-founder Bence Komlósi from Hungary explained that he saw two- to three thousand Syrian refugees, stranded in the public space of the Keleti railway station in Budapest. This was at the height of the refugee crisis in 2015. They had nothing but sleeping bags: no supplies, no food and no drinks. He wanted to know what architects could do to improve the situation and found that the current design thinking focused only on shelter solutions and not on integration, inclusion, and organising a good coexistence. His first task was to stimulate fruitful debate based on interdisciplinary discourse, and to present several interesting projects that had been created in recent years. The aim then was to shift from theoretical discourse and knowledge multiplication to practical discussions about built architecture and adaptive reuse. Regular free workshops were organised. Guests were from various countries and represented a range of disciplines, from architecture to politics, and participants included refugees, architects, students and ordinary citizens. Architecture is a wonderful tool to achieve human rights, but it cannot solve all the problems alone. Once a vocabulary is built, one has to engage in action.

The online platform "Architecture is a Human Right" developed from there and has bigger goals. Its aim is to create awareness that housing is a human right (which should be extended to refugees), to consciously emphasise the relationship between architecture and human rights (which has been absent from architectural theory and practice), and to encourage architects to

[31] Retrieved from https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CEDAW%2FC%2FZAF%2FFIR%2F1&Lang=en.

[32] From interview with World-Architects.

become politically active. If the discipline of architecture is understood only from an aesthetic and artistic perspective, and its focus remains on a very small elite, then architects are alienated from the problems and challenges that a modern society must face, and the suffering and plight of the majority population is ignored. Architects need to ask how they can house and integrate refugees and contribute to a changing social climate to improve the lives of millions. Vulnerable groups have become a social urgency. Mass migration, climate change and increasing social inequality have necessitated changes in the profession of architecture, at a pace not seen before. (See "Architecture is a Human Right" Manifesto).

46.4 Moving Towards a Solution (Space)

46.4.1 Utopia and Heterotopia

Utopias are fundamentally unreal spaces, placeless places that present society itself in a perfected form. Heterotopias, by contrast to utopias, are counter-sites, but real sites. A utopian world would be one where humans are not stuck in a box of a nation-state, a political space defined by a specific geography, which has resulted from the carving up of nations. With globalisation, people thought they could live in a transnational state, in more than one place, but the outbreak of the Covid-19 pandemic highlighted the harsh reality: that we are actually stuck. Our society cultivates nation-states in their territories and a refugee crisis becomes a violent manifestation of these territories. Our passports reflect inequality and the right to mobility. A refugee camp is a heterotopic space, a place where people are kept because they have been violently displaced. Refugees are displaced because of conflict, climate emergency, disasters, forced evictions and gentrifications. Displacement means forced movement from one place to another, but it can also be voluntary (migrations). Displacement comes with privilege or without. It erodes the possibility of staying put, so people are always on the move. Crisis heterotopias are reserved for individuals who are in a state of crisis, in relation to society and to the human environment in which they live. When a camp becomes their natural ground and a position of stability where their movement is indefinitely slowed down, it becomes a space of emplacement. Emplacement is the opposite of displacement (Foucault 1965). The trick is to not normalise this condition in life, but to normalise emergency in the urban sphere.

Another utopian way of viewing society is to return to an imagined "original position", where a human is free from attachments, history and identity. Society would then be organised to maximise justice and opportunity for all, based on fairness and on the basis that the interest of any person might be their own. In *A Theory of Justice*, Rawls (1971) explained such a hypothetical liberal civil society and described how political liberalism would negotiate justice in the face of diversity, in a pluralist society composed of diverse individuals, people of various faiths and traditions. Although this is not an actual historical description of humans, it is a vision generated by deliverance from destructive, individual self-interest. Tradition is neglected or even seen with hostility and so are collectives and communities other than liberal societies, which in modern politics is identified with the nation-state.

46.4.2 The City

The city has always been part of movement and displacement and when coupled with migration, the essence of the urban project is placed in crisis. Architects are obsessed with space and place, but they need to challenge the existing spatial order and design urban space where the displaced can develop a sense of belonging, build connections, and have access to the job market. The solution should start at the city level with a Spatial Development Framework (SDF). Such a framework aims to set out "logical arguments for managing the emerging spatial structure of the city in a manner that achieves greater human dignity, equity, integration, sustainability and a

sense of play over time in the face of severe fiscal constraints" (Dewa 2003: 34). It could start by making pockets of vacant land (and rooms) available for shelters.

Refugee accommodation is often located in remote areas with no functioning neighbourhoods and no work opportunities, which makes it impossible to leave. What is needed is a mixture in our buildings and neighbourhoods that promote integration and contact with the local population. We need to pay increased attention to places of encounter outside the home, in public spaces. Creating high-quality urban space is a strategy central to achieving this aim.

Urban Design Frameworks and Planning Projects should have a component addressing homelessness via spatial design and policy recommendations specific to the area. Homeless women have different needs that are mostly invisible in public. One must identify a different strategy for outreach in order to support them well. Architects and urban designers have to design to accommodate transience. They need to find ways to help people survive on the street by providing mobile survival kits/backpacks and creating amenity points that can provide basic services such as ablutions, electricity and cooking facilities. This can be accommodated as part of larger commercial buildings such as malls or community facilities such as churches, parks and community centres.

Documentation and analysis of the open space system show that the homeless are more likely to congregate and sleep in deteriorated and abandoned open spaces and buildings, thus allowing the mapping of areas of concentration of homeless people in the inner city. Refugees congregate in large numbers around facilities of the Department of Home Affairs that cater to their needs. Well maintained open spaces are used by the homeless as places of refuge and to access amenities provided by social facilities. Homeless people are also more likely to congregate in areas where built fabric is incoherent and deteriorated which is often surrounded by deteriorated open spaces.

Mapping the various facilities in relation to the range of open spaces and built fabric is the first step to start mapping homelessness in the inner city, identifying amenities and facilities catering to their needs and to propose areas in need of soft social infrastructure development. Thus mapping and spatial analysis of the existing topography and soft infrastructure in the inner city can be further developed as a design and planning tool to complement and support policy initiatives to create pathways out of homelessness.

46.4.3 Dwelling

The Lindela Repatriation Centre has proved to be the worst kind of accommodation for refugees. The red brick fortification used to be a miner's hostel compound, housing synonymous with apartheid, before it was turned into a holding facility. Still, protestors on the sidewalk preferred temporary cloth shelters to the centre. In 2019 many of the protesters from the DRC lived in domed tents, but when they returned in 2022, they had to manage with make-shift shelters. The bus stop was converted by draping large plastic sheets over the openings on all sides and sheets or pieces of cloth were hung from the boundary wall and fence, which doubled as a washing line. The temporary structures have made pedestrian traffic impossible.

Homelessness is a serious problem in Pretoria, worsened by the refugee crisis. Various organisations are advising on creating pathways out of homelessness. The policies and management of city-owned shelters need to be reconsidered and safe housing that complies with building codes and regulations, with sufficient amenities and hygiene must be provided, as well as access to education and job programmes, and treatment for substance abuse. Family accommodation will be different from single accommodation.

Residing in a formal residence drastically increases the likelihood of happiness and human dignity. It was found that Somali refugees who began to arrive in the RSA after 1994 gathered near existing Indian communities that already had established mosques, halaal butcheries and other key services for Muslim residents. When

refugees stay in hostels, dormitories and boarding houses their likelihood of well-being and human dignity decreases. Housing is limited to foreigners in South Africa. They have to stay where it is more affordable. Refugees are more likely to be subject to crime.

Architects have been collaborating with UN-Habitat to develop new shelter models that are replicable in large-scale housing programmes for refugees. Japanese architect Shigeru Ban won the Pritzker Prize for emergency housing made from cardboard and supervised the construction of the pilot shelter in Kenya. Habitability, cultural appropriateness, accessibility and affordability are all factors that have to be considered when designing the most appropriate, durable and affordable solutions for refugee shelter. According to Ban, the wooden frame brick model is most suitable for transitional shelter, based on the availability of construction materials, which makes it possible to involve the host community and the refugees in construction. Also, customized toilets suitable for the housing prototypes were installed with a community-based approach to construction and maintenance.

The point is that the solution entails more than just providing shelter, more than the physical design of a little box that keeps the rain out. The solution must be seen in its wider context and start at the city level. It is true that emergency shelter needs innovation but access to schools, health care, etc. is more important. Think of it as triage. One must deal with the emergency first and provide basic care, water, and sanitation, but after that, there must be a plan to integrate. Many government buildings in the inner city of Pretoria are derelict. They need to be fixed and illegal occupations controlled, because else many refugees will move in, which exacerbates problems with drugs and prostitution.

46.5 Conclusion

The forced removal of refugees camped out on the sidewalk of the UNHCR in Pretoria, South Africa, and the detainment of asylum seekers at the Lindela Repatriation Centre, once again revealed that the plight of refugees in that country transgresses not only the basic principles of human dignity, but also the Constitution. The global consensus is that refugees should be integrated in the host country's urban society, but in South Africa, this strategy is sabotaged by locals' violent xenophobic attacks and a refusal to accept foreign nationals in their communities. This paper argues that architecture is a human right that must be extended to refugees across the world. The United Nations (UN) has identified seventeen Sustainable Development Goals (SDGs), which include the world's best plans to end poverty, reduce inequalities, and ensure good health and well-being, as well as access to quality education and clean water and sanitation, to name but a few. A sustainable world is one with room and consideration for all people, but in order to achieve the aim "to leave no one behind", architectural discourse and debate must include the accommodation of refugees in the urban landscape. In order to meet the Sustainable Development Goals (SDGs) of the UN, architects need to concern themselves with more than just designing shelter. Architectural discourse needs to encourage an interest in the architectural design of both refugee camps and the integration of refugee accommodation in the existing urban fabric. These aims are advocated on various social media platforms. Acknowledging the pluralist society for which one designs and collaborates with refugees and volunteers in the design and development of both temporary and permanent settlements, architects can promote human dignity and well-being as set out by the Punta del Este Declaration on Human Dignity, that reaffirms the 1948 Human Rights Universal Declaration and the SDG of the UN.

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Part VII
The Non-human

47 How to Speak the Language of Dolphins? Challenges and Opportunities for Interdisciplinary Knowledge Transfer to Inform a Multispecies Architecture

Luis Carlos Mestrinho

Abstract

A distinguishing feature of a multispecies architecture is the concern to meet the critical needs of the target non-human species, along with those that are demanded by man. However, asking these stakeholders about their wants and needs regarding the project is not something that can be done directly. Therefore, dialogue between professionals from different backgrounds can be fundamental to obtain a good result, as it would allow clarifying which species-specific needs should be observed in the project. However, the literature remarks difficulty in establishing this dialogue in the face of language barriers and the interpretation of concepts between different areas. This argumentative essay explores the challenges and opportunities that may rise for interdisciplinary knowledge transfer in the context of a more-than-human project. The study throws light on the fact that some commonly used concepts such as "livability" and "nature" may vary according to the interpreter's background, the human and non-human perspective and their application in a natural or urban environment. In addition, by taking two case studies as examples, the renovation works of Elliot Bay Seawall (USA) and Afsluitdijk Dyke (NL) it is illustrated how a different layer of perception not acknowledged by human beings may be integrated into the design to favour non-human species and how the design of an urban infrastructure may reinstate an essential ecological feature once lost providing an opportunity for the integration of needs coming from non-human agents in the project's solution.

Keywords

Multispecies architecture · More-than-human · Interdisciplinary knowledge transfer

47.1 Introduction

In promoting wildlife-inclusive urban areas, it has already been pointed out that ongoing collaboration between ecologists and professionals in the built environment more accustomed to urban design, such as urban planners, architects and engineers, is something that needs to be done (Apfelbeck et al. 2020).

Houston et al. (2018a, b) argue that the multifaceted environmental crises of our times require an expanded understanding of the entanglements between human and non-human worlds. A multispecies architecture, distinguished by the search to integrate non-human species in the design of the

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built environment, fits into this contemporary scenario. However, other authors (Bracke et al. 2022) point out that, despite a growing trend in discussions about the more human dimension in several disciplines, the engagement of design theory or practice with this emerging theme is still in its initial phase. We argue that for a better understanding of these entanglements in design practice, a dialogue between professionals from different backgrounds may be paramount, as it permits to clarify which specific needs of the species should be observed in the project. In this sense, Haraway (2003, p. 14) one of the leading voices on human-animal relationship, affirms that "species is about biological kind, and scientific expertise is necessary to that kind of reality". This is in line with what Latour (Latour, foreword in Despret 2016, p. VII) mentions when he says "…to understand what animals have to say, all the resources of science and of the humanities have to be put to work."

However, while recognizing that interdisciplinary cooperation is essential in the urban phenomenon, Lefevbre (1970) has already highlighted the difficulty in establishing this dialogue in the face of language barriers and the interpretation of concepts between different areas.

47.2 When Good News Is also Bad News, Language as a Powerful Tool for Knowledge Sharing but also a Management Problem in Itself

When dealing with Ecological Design, Gould and Hosey (2006) suggest that designers must accurately understand the patterns and flows of the natural world to match them to human purposes carefully. The authors argue that this understanding is unlikely to happen within the narrow scope of their discipline. In fact, the contribution of interdisciplinary research in the face of complex problems has been recognized for some time (Winowiecki et al. 2011) and, if we consider the integration of non-human species into the architectural domain, it must be recognized that this task deals with the most complex of all things, namely, life. Thus, communication is likely to be the key to success since a variety of principles, concepts and definitions, coming from different fields, must be shared and agreed upon during the different design phases.

The good news is that when it comes to communication, we, human beings are experts. It is known that species of the animal and plant kingdoms are able to communicate with others through sophisticated ways like gestures, vocalisation or chemical signals. Furthermore, often one same resource used for communication, such as dolphin clicks and whale songs, is used to apprehend information from the environment, performing echolocation for the former and seabed mapping for the latter. However, humans surpass all other forms of life in how to communicate with others since we are the only ones to develop a cultural form of language. Through language, humankind has developed a way of attributing not only information, but also meanings to words, expanding the possibilities of communication to another level.

Nonetheless, the level of specialization and refinement we achieve in language can, paradoxically, be a management problem in itself when it comes to interdisciplinarity. The reason for this is that the more one knows about a given subject, the most probability is to escalate the principles, concepts and definitions about it, all this "knowledge baggage" coming with its own terminology. As a result of the multiplicity of terms and interpretations, Morse et al. (2007) notice a disciplinary idiosyncrasy that creates a barrier to collaboration or, still, a communication difficulty that leads participants of an interdisciplinary group to feel as if they were "speaking different languages and need to work on terminology first" (Roy et al. 2013, p. 751).

47.3 Agreement on What? Finding Common Ground for Different Interpretations and Perceptions

Finding common ground for different assumptions, views and beliefs can be an unavoidable preliminary task for any collaborative interdisciplinary effort, no matter what specialized fields of knowledge are involved. One might question

what common ground would be for collaboration between ecologists and professionals in the built environment to inform a multispecies architecture. Johnson et al. (2002) recall that, traditionally, ecologists and designers have had different pieces of training to achieve different goals and suggest that improvement in dialogue may be reached when each understands how the other looks at the world. So, what different views could play a role in the search for an agreement within the framework of a more-than-human project? The need to overlap human/nonhuman's worlds (Roudavski 2020) gives a clue to issues that are key to understanding this relationship.

First, it must be recognized that a concept can have a different meaning according to a human or non-human perspective. As Alberti et al. (2003) remind us, to effectively fill a gap, teamwork participants must design solutions that address multiple perspectives simultaneously.

The concept of livability, a trending theme among architects and urban planners, illustrates how integrating perspectives might not be a straightforward task. According to Veenhoven (2014) livability is the degree to which a living environment fits into the adaptive repertoire of a species. Although the concept can serve as a starting point, it should not be forgotten that this "fitness for life" means satisfying the demands of a particular species and these can differ substantially between humans and non-humans. Research has already shown that, in the context of the built environment, the concept of livability is used in different ways (Herman and Lewis no date), and can be taken as "the sum of factors that add up to a community's quality of life" (Kozaryn and Valente 2018, p. 197), commonly gravitating towards providing infrastructure for transportation, affordable housing, safety and health, social justice and the environment (Herman and Lewis no date). Not surprisingly, all these contexts are deeply rooted in an anthropocentric view where the built environment must satisfy the multiple needs of people as if they were the only inhabitants of the city. However, if we take a non-human perspective, priorities can be different from those that come from humans. Simply put, from a non-human perspective, a liveable environment is the one that meets its critical habitat needs according to the species' life cycle (Weisser and Hauck 2017a, b). Such needs may vary between species, but, in general, they are related to the habitat requirements that must exist for a species to thrive or be able to adapt, such as the characteristics presented in and around the site, size and fragmentation, connectivity, level of disturbance, diversity and occurrence of other species (Apfelbeck et al. 2019). As we could see, the satisfaction of these requirements is different from human priorities.

A second relevant aspect to the issue of perspectives is the fact that not all species perceive the world in the same way as we do. Different layers of perception not recognized by humans might have a decisive influence on non-humans. In short, in addition to not conflicting with the requirements of the target species, the design should preferably not conflict with the Umwelt[1] of the target species, that is, their sensory perception of the world.

Light can be taken as an example of what could be a hidden layer of perception. Lam (1992) argues that, for a good lighting project, it is not exactly the amount of light that matters, but rather its quality. The author defends an understanding of visual perception and the nature of human needs for visual information, which he calls "biological needs for visual information as a design criterion" (Lam 1992). We here suggest that, by using the same reasoning for humans and non-humans, probably, it would be easier to share common goals. In addition, incorporating biological needs requires the understanding that visual perception is not only formed by visual stimuli but also by how the brain processes information. The point is that various effects in the organism depend on this relationship with light as a resource or source of information (Gaston et al. 2013) to trigger a physiological response or behaviour. This is true for everyone, humans and non-humans (our common ground), however, the response will be different according to the receiver's conditioning, which can

[1] The concept of Umwelt was coined by Jakob von Uexküll and denotes an organism's unique sensory world.

differ substantially from the others, causing unexpected responses according to the human perspective.

47.4 Such Strange Articulations: Nature That Is Not "Natural" and Buildings That Are "Alive"

Overlapping these two worlds is therefore too complex a task to be left alone to professionals in the built environment and they may have to count on ecologists to gather all the necessary information to inform the project. Nevertheless, once the living requirements are understood, architects can help to design a man-made environment to be suitable for them,[2] a built environment that, most commonly, is very different from the original state in which the species developed throughout its evolutionary history.

This can give rise to a terminology in which commonly used terms are no longer restricted to their historical meaning. The word "nature" serves as an example of an expression whose concept as a series of things devoid of human influence (Ducarme and Couvet 2020a, b) developed in the eighteenth century, nowadays may not be interpreted strictly as such. In an overlapped world one would find an articulation of the meaning, a process that accepts both the relationships and divisions that may exist in a given object (Ramadier 2004). This articulation of a man-made living environment would describe a functional built environment where the possibility of continuing life still exists through any sort of human-influenced solution, such as mimicking features found in nature.

Indeed, as Weisser and Hauck (2017a, b) argue, to comply with species' most pressing requirements, animals do not care how the solutions are implemented, in particular how they 'look', as long as they serve their intended purpose.

An example of this vision is the renovated seawall in Seattle. During the replacement of the wall, works provided the opportunity to develop habitat improvement concepts that could be incorporated into the wall design and an interdisciplinary team was established for this task (Cordell et al. 2017a, b). Members of Seattle's Department of Transportation, the organization in charge of the renovation, worked closely with academics of the University of Washington and other experts, to better understand the ecosystem of Elliott Bay (pegNielsen 2014). They need to overcome the problem of how to maintain the structural performance of the wall (its primary function) while at the same time improving the quality and function of the coastal marine ecosystem and creating an intertidal migratory corridor for a target species, the juvenile Pacific salmonids (City of Seattle 2019) whose behaviour and preferences are closely associated with shallow water and the seawall (Cordell et al. 2017a, b).

Particularly important was the fact that juvenile salmon are active visual predators, and the shadow cast by piers reduces the intensity of feeding (Munsch et al. 2014 cited in Cordell et al. 2017a, b). The habitat requirements influenced the design in such a way that not only did the complexity of the vertical face of the wall had to be improved to host more diverse biodiversity, but also the issue of shading, essential for the salmon foraging patterns, had to be addressed. This was solved with the introduction of light penetration surfaces in the urban infrastructure of the pier as well as the one located above the seawall, on the sidewalk (Fig. 47.1).

The observed change in foraging patterns of fish after the installation of LPSs supports the argument that as long as the design satisfies a functional role and fits within a species adaptation threshold, for the species, it may be less important if it is a natural or managed trait.

It is unlikely that the improvement of the wall project would occur in the same scope without interdisciplinary integration. The role of shading in the design solution would probably not be addressed without knowledge transfer. This is because, for humans, the issue would not be

[2] It is known that not all species adapt equally to a modified environment, while some are capable, others are not and, still, some adapt better to the conditions present in a novel ecosystem than to the original. The three categories are known, respectively, as urban adapters, avoiders and exploiters.

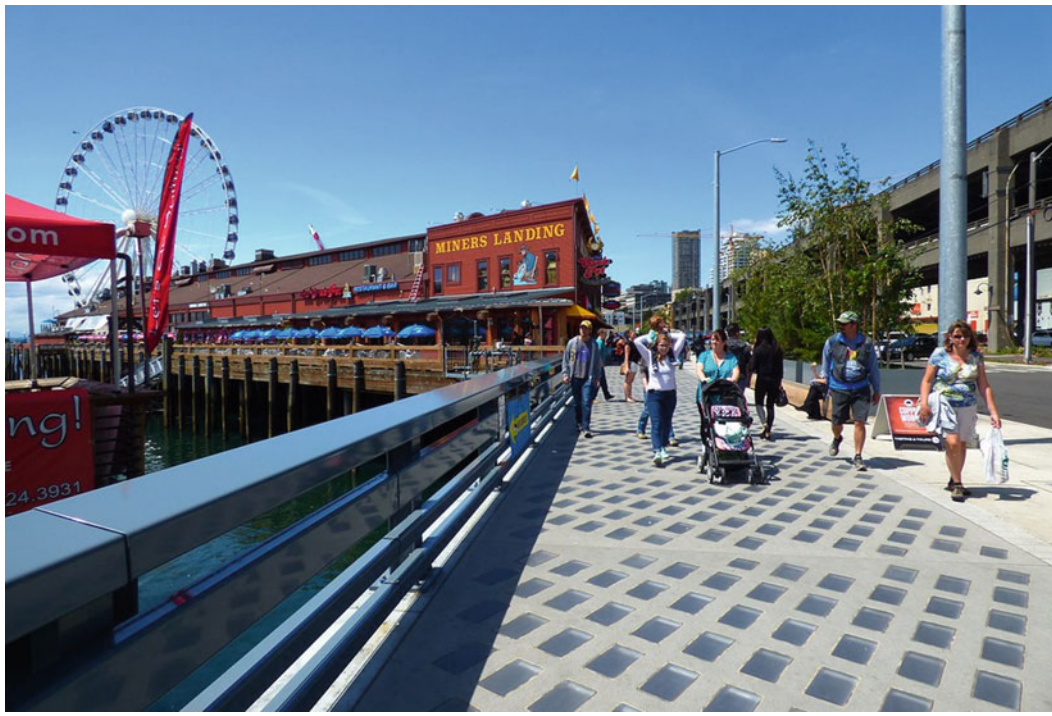

Fig. 47.1 Light penetration surfaces at the sidewalk. © Seattle Department of Transportation CC BY-NC 2.0

worth considering, as it is not related to the human experience. On the contrary, for the target species, it represents an important aspect to satisfy their specific ethological need.

What is worth noting with the case is that understanding how natural processes and ecological principles interact with the built environment can not only influence the design solution but, in addition, can shed light on how multispecies architecture expands the standard architectural concept focused on an independent physical structure somehow related to its surroundings.

In a multispecies approach, the focus is on the relationships that occur within the system where the architecture is embedded. Dinur (2008a, b) argues that, when taking a relational point of view, architecture is no longer seen as a static item, but as a dynamic, relational and interdependent system that presents interactions with its environment comparable to those of ecological systems. According to her, architecture exists in an inherently alive, dynamic and constantly changing context and should be regarded as being "alive" since it is a part of a living environment (Dinur 2008a, b). This animistic metaphor may sound strange to apply in architectural terms, but it seems to be appropriate to describe the field of multispecies architecture where both ecology and architecture are able to influence each other as components of the same context.

The Afsluitdijk Fish Migration River to be implemented during the renovation works of the Afsluitdijk Dike in the Netherlands illustrates well this relationship in which architecture becomes "alive" and re-establishes a natural process that was interrupted with the introduction of built infrastructure. A drawback of building the dike in 1932 was the separation of the Wadden Sea and the IJsselmeer lake, where the gradual transition from freshwater to saltwater was lost, preventing fish migration and leading to changes in the local fish stocks (Rijkswaterstaat 2017a, b). Restoring the natural process to its original state was not an option due to the need to protect the lowlands, so the idea came to design a winding artificial river that could mimic the transition of brackish water (Vismigratierivier.nl

Fig. 47.2 Electronic sketch of Afsluitdijk Fish Migration River. © Benthem Crouwel Architects

no date) and let the designed environment do the job. One participant of the Project team remarks: "the entire concept has been thought up from the perspective of the fish and this is what makes the project unique" (Rijkswaterstaat 2017a, b, p. 27). Once completed, the four-kilometre fish migrating river will meander through the Afsluitdijk (Fig. 47.2), performing this functional role of adaptation and serving as a habitat connector for migratory fish species that can only survive if they can commute between salt and fresh water and vice versa (Rijkswaterstaat 2017a, b).

47.5 Conclusion

The examples show that the integration of needs is something that can be achieved through an ecosystem-based approach that informs the design project and results in a solution that engages the built and living environment in a balanced arrangement regardless of their different characteristics. We argue that a multispecies architecture could make its contribution to UN development goals 11 (Sustainable Cities), 14 (Life Below Water) and 15 (Life on Land). We believe that by integrating non-human species into the design of the built environment, favourable conditions are created for non-humans to thrive in a novel ecosystem. The impact that the transversality of urban issues has on other Sustainable Development Goals has been already recognized, including Goal 15, which deals with the protection of terrestrial ecosystems and halting the loss of biodiversity (UN-DESA no dataa). The examples illustrate how the design of a urban infrastructure may incorporate solutions to positively influence also marine species, relating to Goal 14, especially its target 14.2 which deals with sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts (UN-DESA no datab). This goes aligned with the argument of other authors that urban

environments present opportunities for biodiversity and are also a necessary component of conservation (Soanes and Lentini 2019) and cities are important for the conservation of biodiversity per se (Apfelbeck et al. 2019).

It was highlighted that the fulfilment of biodiversity requirements must integrate the different phases of the project, as it can influence a design solution from the very beginning. Thus, as observed by Kirk et al. (2021), the usual approach of viewing biodiversity as an afterthought or final addition, when development is ending, is not an appropriate choice when designing a multispecies architecture. The complexity involved when dealing with living beings suggests that interdisciplinary collaboration is needed as it can be a hard task for non-specialists to deal with the multifaceted aspects that exist (Kirk et al. 2021) and difficult to someone without specialized training to understand other species' different realities.

However, as mentioned, the dialogue between specialists from different areas can be taken as a secondary problem to be equalized before attacking the main one. The communication process may not be as clear as initially expected to be useful enough to translate ecological requirements into design results. In spite of the usefulness of interdisciplinarity to address complex problems, it has been noticed that, until now, "little is known about this process in which participants learn from different disciplinary perspectives" (Gardner et al. 2014 cited in Xue et al. 2020). Therefore, there are opportunities to investigate which arrangements are best suited to promote the integration of knowledge in a field that mixes humanities and environmental sciences such as multispecies architecture and, conversely, what are the most important impediments that can prevent this from happening.

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Towards a More-Than-Human Architecture: Exploring the Notion of Inclusivity

48

Jon Dag Rasmussen

Abstract

The concept of inclusivity is prominent in architectural practices and discussions concerned with the promotion of social, societal, and spatial participation among the largest possible group of people. In this argumentative essay, I seek to ask fundamental questions regarding inclusivity in contemporary architecture and planning from the position of nonhuman lifeforms and phenomena. This endeavor aims at exploring the notion of the architectural user as this can be understood and defined in the Anthropocene, and in the wake of philosophical and research-based findings concerned with the significance of human and nonhuman entanglement in this era. Drawing on elements from both fiction, philosophy, and research, the essay reflects upon what inclusivity and inclusive architecture could mean when we engage with these notions and ideologies from a nonhuman and more-than-human point of departure. Leaning on concepts as *the nonhuman turn* and *flat ontologies*, the essay explores the need for developing a more-than-human architecture for the twenty-first century.

Keywords

More-than-human architecture · Inclusivity · The nonhuman turn · Architecture for the Anthropocene · Users of architecture · Human-nonhuman entanglement · Refuge

48.1 Introduction

> What would happen to our thinking about nature if we experienced materialities as actants, and how would the direction of public policy shift if it attended more carefully to their trajectories and powers?
> Jane Bennett in "Vibrant Matter" (2010), p. 62

In this essay, I seek to ask fundamental questions regarding the position of nonhuman lifeforms in contemporary architecture and planning. The context for such a critical venture is that we currently find ourselves in the midst of the "Sixth Mass Extinction Event" (Rose, 2011; Morton, 2016)—a process also known by words such as global climate change, acute ecological crisis and irreversible loss in biodiversity, just to name a few of the most used idioms signifying the Anthropocene. What the use of these terms reveals is the fact that we (humans) have not been sufficiently oriented towards holistic and planetary thinking, that our ethics and standards have been measured with reference to short term human interests alone, and, that we have by no means been good enough at comprehending the world from nonhuman and other-than-human perspectives. Furthermore, this situation is

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promoted by the appropriation of space that is seriously affecting all living beings on planet earth and in which architecture and planning play a major role. Working within the paradigm of inclusive architecture, thus engaging with notions as Universal Design, Design for All, and Emancipatory Design, I wish to explore both obvious and somehow provocative questions sounding: What does inclusive design and inclusivity mean when we scrutinize these concepts and ideologies from a nonhuman and more-than-human point of departure? And what does the notion of inclusivity cover if we transcend a paradigm in architectural thinking, where the human being stands as the sole recipient and referent of architectural endeavors? Furthermore, along the same line of questioning: What does exactly qualify as "inclusive", "universal" and "for all", if we measure these notions on a more-than-human scale also considering the myriad other forms of life defining the biosphere? As I argue in this essay, also following the direction expressed in the opening quote by American professor of political theory, Jane Bennett, we are at a point in history where we need to acknowledge the world in which we live as a vibrant and complex environment inhabited by actants and actors of all kinds, human as well as nonhuman. The implications of this shift in our thinking are enormous, not just in the comprehension of the so-called Nature, but because they involve a turn in our modes conceiving about the world and our position in it. Within the areas of philosophy and environmental studies, this fundamental shift goes under the heading of *the nonhuman turn* (e.g. Grusin 2015). What does this turn entail in the disciplines of architecture and planning, and what are the consequences when we start attending more carefully to nonhumans and their agencies within these lines of work? Are nonhuman creatures objects to an architectural gaze worthy of the twenty-first century, or do we rather need to understand the multiple critters and "vegetal lives and bodies" (Bennett 2017) with which we share our basic living conditions, as subjects, or as "nonhuman people" as proposed by philosopher Timothy Morton (2017)?

The essay is structured as a series of explorative arguments that are based on different sources of inspiration. With this speculative endeavor, I try to grasp what the nonhuman turn might entail for architectural enterprise and what it might mean to the directions and demands of a sustainable, responsible/response-able, just, and including built environment for the future. In the text, the compiled arguments and considerations are used as a path leading towards a preliminary and exploratory definition of what can be called *a more-than-human architecture*. Furthermore, it is proposed how this concept can lead towards new understandings of inclusivity that transcends the anthropocentric "program" on which most of our late modern societies are built. The essay concludes with a line of short reflections pointing towards the need for developing a built environment, and an architecture, able to include both human and nonhuman diversity, in its products and creations.

The arguments posed in the essay relate to several of the UN Sustainable Development Goals (SDGs), among these most clearly the goals of Reduced Inequality (No 10), Responsible Consumption and Production (No 12), and Climate Action (No 13). However, the discussions raised also extend beyond the scope of the SDGs in the ambition to challenge the humanity-centered basis on which the "Leave No One Behind" agenda is founded.

48.2 The Garden Outside, the Garden Within, the Garden In-Between

In the novel "Women Without Men" (2004 [1989]) written by the Iranian author and activist Shahrnush Parsipur,[1] "the Garden": an estate consisting of a large piece of land with trees, vegetation, flowers, a river, and foliage along with a house, becomes a sanctuary in the lives of five women all affected by crisis in their lives. The garden located in Karadj, a smaller village

[1] A big thanks to Karen Helmer-Hansen for introducing me to Parsipur's work.

outside of Teheran, affords the group with different possibilities for asylum and change. In this tale, written in the literary genre of *magical realism*, the borders between the women and the garden gradually dissolve. In each their own way, the women submerge themselves in nonhuman processes while simultaneously stimulating the parts of their human needs, which was taken from them or seriously challenged prior to their arrival. The re-vitalization, the healing, the well-being; the social and more-than-human symbiosis that literally grow out of these meetings and entanglements between different lifeforms and the materialities inherent to the garden, enable the women to identify and follow new paths. A woman has taken the somewhat radical choice of planting herself in the garden pursuing her dream to become a tree. Within the narrative of the story this event occurs as very rewarding, possible, and even realistic to the human inhabitants of the garden, even though it will disrupt the local environment, if uncovered by the broader community. Meanwhile, as a literary grip, the figure of the human tree contains a critique of the deep ontological gap installed and promoted by Enlightenment philosophy, and by which the divide between humans and nonhumans has been maintained since this era (Merchant 1980). Philosopher David Abram, who also coined the concept *more-than-human* in his book "The Spell of the Sensuous" (1996), wonders what has made possible the absence of this attentiveness towards the nonhuman in the modern West (ibid.: 27). How is it, Abram asks, that we members of Western civilization have become so deaf and blind to the vital existence of other species, and to the animate landscapes they inhabit, how have we come to be so exempt from this sensory reciprocity defining the existence of other lifeforms? (ibid.: 27–28). Even though Parsipur's primary objectives concern more political, ideological, and cultural issues at stake in Iran prior to the writing of the novel, her literary imagery can also be read as a critique of this divide separating the human from the rest of the inhabitants and entities contained by the biosphere. The slow recovery experienced by the women is directly related to the nonhuman life with which they entangle and engage. Furthermore, the human tree is the embodiment of this fundamental connectedness, this direct link between vegetation and human, or, rather, the *vegetation-as-human* and vice versa. Put another way, Parsipur challenges the hierarchy established between humans and the nonhuman world by emphasizing the direct connections. The American biologist and professor Emerita Donna Haraway works with the same realization, albeit from a philosophical and scientific perspective. In her work, Haraway points to the fact that we as humans are fundamentally woven together with the nonhuman world, and that we as living beings are products of an extensive cooperation between a multitude of lifeforms (2007; 2016). In this regard, the human body is sustained by a symphony necessary to our being alive, thus, we become human beings in the company of, and with, these tiny *messmates*: bacteria, fungi, protists, and such (2007: 3–4). Besides from serving as vital symbiont partners within our (more-than-) human bodies, these organisms also link us directly to our environment. Therefore, "[…] to be one is always to *become with* many" (ibid.: 4, original emphasis). As we know from research, e.g., therapeutic gardens (Lygum et al. 2013), a similar effect to the ones experienced by Parsipur's five women, (if we stay with the more realistic effects, leaving the magical ones for a moment) is also obtained in gardens designed for people with psychological and mental challenges such as stress, depression, and other conditions. As this research shows, human beings benefit from direct contact and exposure to nonhumans and a variety of nonhuman species including vegetation as plants, trees, and so-called wildlife. Jane Bennett has coined the concept of Onto-Sympathy, by which she explores the similarities, the kinship, and the plant-human sympathies occurring in-between these types of bodies, the human, and the nonhuman (2017). Bennett draws, among others, on the work of "nature-writer", James Henry Thoreau, and his descriptions of a deep connection arising between himself and the forest in which he decided to live as a hermit for years (expressed in his work "Walden", originally published in 1854). Thoreau experiences a

presence and a mode of communication among the nonhuman elements of the forest, and it is this experience that Bennett uses as her point of departure in qualifying the notion of Onto-Sympathy as a perspective able to acknowledge the deep significance of the nonhuman, and the ontological connections occurring between human beings and these nonhuman others, e.g., trees, lakes, shrubbery, insects, creeks, etc.

48.3 Wildness, Wilderness, and Co-Existence?

> In the Human Age, perhaps wilderness has become little more than a vestigial biome.
> Jason Mark in "Connectedness: An Incomplete Encyclopedia of the Anthropocene" (2021), p. 393.

The notions of wildness and wilderness are open-ended and very relative constructions in much the same way as the notion of Nature is (Vannini & Vannini 2020). As lifeforms of the Anthropocene all come to realize, wilderness and open space are contested and rare qualities currently disappearing at a very fast pace. It is highly tangible how architecture, planning, and the construction these activities entail are embedded in an appropriation process whereby "nature", or what we can describe as living environments for nonhuman beings, is swallowed up and reshaped to suit human interests and needs. In this appropriation of space, or the transformation of open space to a defined place (cf. Tuan 1977), a vast number of lifeforms are challenged, either on their ways of life as they know them or more directly on their livelihood, their individual existence or on their existence as a species. As Kate Rigby and Owain Jones have shown, human planning and the motorized traffic it affords constitute a seriously threatening and lethal force in the lives of many nonhuman beings (2022). They point to how the extensively occurring phenomenon of roadkill among wild kangaroos in Australia is given very little, if any, attention while the comparatively few humans killed in highway traffic in the exact same area are evidently more present (ibid.). By applying this focus, they seek to "[…] open up a set of narratives that speak of the continuing gulf in political and ethical status between animals and humans within modern industrialized society" (ibid.: 112). Drawing on the work of Deborah Bird Rose, a founding and prominent voice in the field of Environmental Humanities (cf. Doreen & Chrulew 2022), Rigby and Jones highlight how the lives and deaths of wild living animals are directly related to environments designed and built by human actors (2022). What this points to, when scrutinized in relation to "an ethics of the nonhuman", is that these beings are not counted as casualties, that their lives (and consequently their deaths) are not ascribed the same meaning, and that solutions that imply obvious hazards to these lifeforms remain the unchallenged (and perhaps unreflective?) example. Most other forms of construction, along with the immense production chains they rest upon, contribute to the same ethical complexes and complications, either directly or indirectly. This may be a rudimentary and somewhat simple observation. However, there are some very exclusionary and anthropocentric logics at play within this organization and administration of lives and so-called *natural resources*. In her work "Staying with the trouble: Makin kin in the Chthulucene", Donna Haraway writes:

> I think our job is to make the Anthropocene as short/thin as possible and to cultivate with each other in every way imaginable epochs to come that can replenish refuge (2016: 100).

Haraway's plea is that we (humans) take action to make the Anthropocene, in this regard measured as a geological layer in Earth's crust, as short in time, and as thin in geological impact, as possible. And, furthermore, that we (humans and nonhumans) cultivate epochs to come that can replenish refuge; places and environments in which to co-exist in non-violent and non-destructive ways. "The edge of extinction is not just a metaphor; system collapse is not a thriller. Ask any refugee of any species" (ibid.: 102). What is highly appealing in the work of Haraway is the radical inclusivity she exhibits by continually and consistently applying a "we" that is

essentially more-than-human. Refuge is environments allowing for processes of regeneration, revitalization, ecological growth. And in which co-existence (and the trouble this always entails) are given other conditions based on other types of hierarchies and domination. Perhaps refuge is also wildness and wilderness, the relinquish of (imagined) control, emergence of Parsipurian gardens and vibrantly alive Thoreauvian woods allowing for human and nonhuman entanglement, for the development of Onto-Sympathetic relationships (cf. Bennett 2017)? How does architectural practice embrace what is conceived of as wild? Is it within the grasp of this tradition and mode of thinking about the world to include wildness and/or wilderness or does it constitute an immanent and insoluble paradox?

48.4 Inclusivity?

Are butterflies and blackbirds considered *users* of architectural solutions, or should they be so in an inclusive architecture worthy of the twenty-first century? How about ants, roebucks, kangaroos, dingoes, and blowflies? Same question applies to the architectural status of oaks, seagrass, oyster mushrooms, Indian Cress, and other vegetal bodies? By acknowledging findings from sciences that work with the very direct connections between human and nonhuman lifeforms, and the fundamental entanglements and assemblages that manifest in this regard (e.g. Gilbert 2017; Tsing 2015; Haraway 2007; 2016) we need to ask and address these questions and respond to them on both practical and ethical levels. Can we talk about inclusivity in the age of Anthropos (i.e. the Anthropocene), without including and understanding these lifeforms as absolutely central and decisive in the architectural equation? If we consult the growing body of research in fields such as Environmental Humanities and the extensive range of other sciences and disciplines that deal with nonhuman life and the direct connection to (what we previously understood as) "the human world", the answer is no. As Deborah Bird Rose empathizes based on her description of the close connection between angiosperms, flowering plants, and one of their important symbiont partners, flying foxes, the *shimmer of life* at play in this vital cooperation is also crucial to humans (Rose 2017). This is both in terms of aesthetic experience and joy, thus the promotion of well-being, as well as in terms of the actual and very concrete contributions to worldly sustainability and coherence inherent to these practices and critical entanglements. Even closer to the language of architecture goes the wording of Andrew S. Mathews when he states that "The forms of trees, as of other beings, emerge from relations with others" (2017: 151). Instead of using human existence as point of departure in the strive to reflect on life and co-existence, as it is mandatory in most human records of experience as well as in architectural writings and practice (e.g. Rasmussen 1959), Mathews addresses *being* (as an existential category) and the forms that living bodies take in their relations with others, as an extended and far-reaching process involving multiple organisms, lifeforms, and materialities. Individual chestnut trees, and the societies that constitute the cultivated orchards studied by Mathews, are products of myriad reciprocal relations, processes, and actions, inherent to a wide range of actors; goats and sheep, peasant cultivators, soil and different plants growing on them, mycorrhizal fungi allowing the tree to absorb mineral nutrients, and the stone walls that have emerged from relations between trees, soils, and water (ibid.). The notion that beings emerge and are highly dependent and reliable on each other and on the environments in which they are formed and continually "become" (cf. Ingold 2013) is very much an architectural acknowledgment as well. The question is now whether nonhuman life is solely understood as backgrounds or materials with which to frame, create, enhance, and design human life. Or, if these other lifeforms qualify as *actual life* in their own right and therefore should be included and favored in architectural space on the same level as humans and the other selected beings we tend to regard as alive, thus recognize as either sacred or superior, equals, or semi-equals; cows, cats, dogs, tame birds, apes and so on (depending on

the socio-cultural context in question)? Based on the argument posed in this essay, it might be time to challenge and expand upon the trademark motto developed by Danish architect and architectural thinker, Jan Gehl, consisting in the concept and design parameter, *Cities for people,* also the title of his book from 2010. Either by drawing on inspiration from philosopher Timothy Morton and using his elegant work on the solidarity between human and nonhuman people needed in an age of extinction (2017), and, based on this entrustment add both *human* and *nonhuman* to Gehl's wording: *Cities for human and nonhuman people*. Or perhaps more appropriately, if we are to embrace the entire range of nonhuman life and actors: *Environments for a human and nonhuman world*?

Leaping back to the outset in ideologies of inclusive architecture, Universal Design and Design for All, the arguments posed above also call for circumspection from the position of these movements and ideologies. As Anne Britt Torkildsby and I have argued elsewhere, we need to be both specific and highly context sensitive when defining who it is we aim to include by means of design, when working with ambitions of inclusivity (Rasmussen & Torkildsby 2022). Could this inclusivity also regard the nonhuman beings vastly outnumbering the human species, but who are numb if we are not willing to develop ways of understanding their lives, their conditions, their languages, and their specific agencies? When we assure each other to "Leave No One Behind" as the ever-present SDGs encourage and underpin (United Nations Sustainable Development Group)—does this imply the myriad vital, shimmering, and ever important nonhuman beings and phenomena as well?

48.5 Concluding Remarks

The critical arguments and questions posed in this essay concern the impacts on architectural contemplation and practice (along with all other forms of thinking/action) that occur when we start thinking about nonhuman lifeforms, materialities, and "natural resources" as actants with their own rights, trajectories, and powers. The visionary response to these arguments and critiques could be an open-ended architecture allowing for the lives and presence of nonhumans. An architecture acknowledging the manifold entanglements inherent to life as these unfold on a planetary and bio-spherical level, also meeting more-than-human processes and appearances. As anthropologist Tim Ingold writes, the ambition of modernist architecture and planning has long been to "[…] bring closure to life, or to 'put it inside', by means of projects of construction that would seek to convert the world we inhabit into furnished accommodation, made ready to be occupied." (2011: 123). In continuation of the arguments and perspectives raised in this essay, architecture can be an endeavor that is highly critical of anthropocentric and human-centered, and thus exclusionary, approaches. It is not about humans being phased out or made peripheral, but rather about opening up architecture and the architectural consideration, so that space is both reserved for, and created for, human and nonhuman beings alike. What the *flat ontologies* (e.g. Bogost 2012; Haraway 2016) and *the non-human turn* (e.g. Grusin 2015) can teach us, is that we inhabit a world that is more-than-human in every way, and that we have a responsibility to let this shine through the architecture as well.

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The Architecture of (Hu)man Exceptionalism. Redrawing our Relationships to Other Species

49

Eva Perez de Vega

Abstract

Architecture and human-built structures are embedded with speciesist practices of domination over the environment, where humans are considered special and superior to other species. This (hu)man exceptionalism has driven architecture and the built environment to be conceived in opposition to 'nature', dominating natural terrains and consequently displacing or instrumentalizing the many other species that are given little to no ethical consideration. This way of intervening in the world is leading to the existential questions that must be posed given our global climate crisis. A reframing of human intervention as 'built environment' placed in opposition to the 'natural environment' of supposedly passive nature, is urgently needed. The motivation for this paper is rooted in a deep concern for the role of humans in the climate crisis and a realization that architecture as a discipline is complicit in elevating the human category above all other beings in nature. There are biases embedded in the practices and teaching of architecture that need to be interrogated and reflected upon, starting with the role models and ideals that we unwittingly operate within. To contextualize the idea of human exceptionalism in architecture, we will explore deep-seeded ideals in architecture linked to the concept of *Rectitude* as a form of 'rightness' -or correct- mode of intervening in the world, conceptualized by Western men as a human-centric practice distinct from nature-made. Supported by Ecofeminist thought, the aim is to open alternative models for world-building and housing humans on earth living in its sixth extinction.

Keywords

Human exceptionalism · Ecofeminism · Nature · Feminist materialism · More-than-human · Nonhuman · Posthuman · Animal ethics

49.1 Speciesism and the Human Category

While most of us claim to know what it is to be a human and see it as a self-evident biological category, this term is far from uncontroversial. Most unjust-inhuman-actions by humans have taken place under the umbrella of the human as dominant species over other animals. There is a deep-seeded assumption that humans are cognitively and morally superior to other animals, which has been fundamental to the legitimization

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of atrocities inflicted not only to nonhuman animals but also to members of our own humankind. Thinkers like Rosi Braidotti have long argued that the category of 'the human' is never a neutral one, but rather one always linked to power and privilege. The opening to her publication *The Posthuman* points to the problematic nature of the category of human:

> Not all of us can say, with any degree of certainty, that we have always been human, or that we are only that. Some of us are not even considered fully human now, let alone at previous moments of Western social, political and scientific history. Not if by 'human' we mean that creature familiar to us from the Enlightenment and its legacy: The Cartesian subject of the cogito, the Kantian "community of reasonable beings". (Braidotti 2013, 1)

These words reveal how Western societies have historically conceived of the human as a rational being with mind, culture and political will, in contrast to those who are not considered to be "fully human". In her work, Braidotti elaborates on how women, people of color and people of low income, have been historically associated, not with the 'human' category, but with the 'nature' category, which has been historically used as a tool for injustice. The philosopher Immanuel Kant, whom Braidotti references, famously wrote about how humans are ends in themselves but that nonhumans are means to an end and can be treated and disposed of by humans at will: "altogether different in rank and dignity from things, such as irrational animals, with which one may deal and dispose at one's discretion." Implicitly, one has moral obligations towards humans but not towards nonhumans, or humans categorized as "irrational animals" which are part of the 'nature' category. In this view, making a distinction between what is human and what isn't has serious moral implications.

Thinking in terms of one large group 'Man' versus the nonhuman world of 'animals' or 'nature' entrenches the divide between us and them, as well as giving a false sense of power that legitimizes instrumentalizing the nonhuman world. It also negates how different humans are vulnerable in different ways to climate change. Yet it is important to hold on to the term 'nature' rather than aim to find ways in which ecology can exist without it.[1] As the work of Ecofeminists such as Vandana Shiva has shown (Shiva 2014), wishing away the category of 'nature' will not erase the injustices that are done in her name.

Braidotti uses the notion of the posthuman as a mode of reconceptualization -what she calls a navigational tool—that aims to move us away from the Eurocentric and anthropocentric conception of the human, inviting us to move "beyond the sexualized and racialized others that were excluded from humanity". In a similar line of inquiry, Stacy Alaimo's concept of transcorporeality reframes the notion of opposition between the humans and nature by illustrating how our bodies are already enmeshed with the environment[2] and Chiara Bottici's development of the concept of transindividuality sees the human body existing as a consequence of its relations with other individual things. These contemporary feminist thinkers are part of a growing movement of feminist thought that aims to reconceptualize materiality, the body and environment, which has been the domain of Materialist theories put forth mostly by Western men, without giving up on 'nature'. These outlooks, on which the work presented here rests and grows from, depart from a (hu)man-centric, account of matter by understanding our bodily enmeshment with the physical material world. This way of thinking about interconnectedness of humans and environment is, of course not new, indigenous cultures have operated this way from the start, but in the West, we have lost this knowledge: it has been supplanted and these voices have been suppressed and subjugated. As dominant and dominating species, humans have the mandate to question the effects of our exceptionalism.

49.2 (Hu)Man Rectitude in Architecture

49.2.1 Human Ideals in the Vitruvian Man [The Body Ideal]

> At the start of it all there is He: the classical ideal of 'Man', formulated first by Protagoras as 'the measure of all things'. Later renewed in the Italian Renaissance as a universal model and represented in Leonardo da Vinci's Vitruvian Man. (Braidotti 2013 [13])

At the start of architectural thought in the West, there is Vitruvius' influential treatise on architecture, *De Architectura*. A first in its attempt to systematize the practice of building for humans, *The Ten Books on Architecture* penned by the first century BC Roman architect was largely a forgotten text until rediscovered by Renaissance architects such as Leon Battista Alberti, Sebastiano Serlio, and Andrea Palladio, who all had a go at authoring their own versions of the cannon. Interestingly, the new treatises also entailed the emergence of new images intended to illustrate Vitruvius' words while actually embodying agendas specific to the time of their own production.

Vitruvius' text covered a wide range of topics related to the built environment, emphasizing the 'optimal proportions' of architectural elements and the design of temples, most of which are based on a perceived ideal of the (hu)man body. At the epicenter of Western thought, Architecture was emerging as a unified body, ordered through an appreciation of the human body as its regulating system. The presence of the body reaches its emblematic moment in the first chapter of Book Three, when Vitruvius articulates the geometric links between architecture and the body: the role of the circle and the square geometry as organizers of architectural proportions made analogous to those of a perfectly proportioned male body. Vitruvius' description is directed at providing a template that can be instrumental to the architect who is designing temples, and who must do so according to strict rules of symmetry and proportion governed by the (hu)man body.[3] That we know of, the original text was not accompanied by an illustration[4] and yet it is most known through its imaginal translation drawn by Leonardo da Vinci over a millennium afterwards: the *Vitruvian Man*. As masterful and emblematic as this image is and has become—with its many different variations-it is worth paying close attention to Vitruvius' words in describing this diagram, as the man is "placed flat on his back" (Vitruvius, 1914, 73) illustrating the geometric proportions described in a more passive disposition: he is a man with no thickness, a two-dimensional geometric figure used to illustrate proportion and symmetry.

Da Vinci's Vitruvian Man drawing (Fig. 49.1) and the subsequent versions which have been reproduced so exhaustingly, invariably show a *standing* naked man actively illustrating the ideal proportions between the (hu)man body and geometrical figures of a circle and a square. The change which provoked illustrating the Vitruvian man as standing instead of lying down is an indication of a conceptual shift, that emphasizes the *homo erectus* or 'upright man'. What might obscure the intent of Vitruvius is in fact illuminating the Renaissance humanistic concepts of *Rectitude*:

> The "upright man" of which the tradition speaks, more than an abused metaphor, is literally a subject who conforms to a vertical axis, which in turn functions as a principle and norm for its ethical posture. (Cavarero 2016, 6)

The uprightness of the human body is also a marker of difference between humans and non-human animals. While humans were given their official separate Homo species status until the eighteenth century,[5] this separation was already active in the Renaissance. The category of homo erectus marked the official death of the animal in the human; now an upright being distinguishing (him)self from the rest of the animal kingdom.

This upright postural figuration epitomizes the moral *righteousness* of depictions of the (hu)man as an upright figure, providing ideals for all of humanity to follow, as eloquently analyzed by Italian Feminist philosopher Adriana Cavarero in *Inclinations. A Critique of Rectitude*. Indeed, the

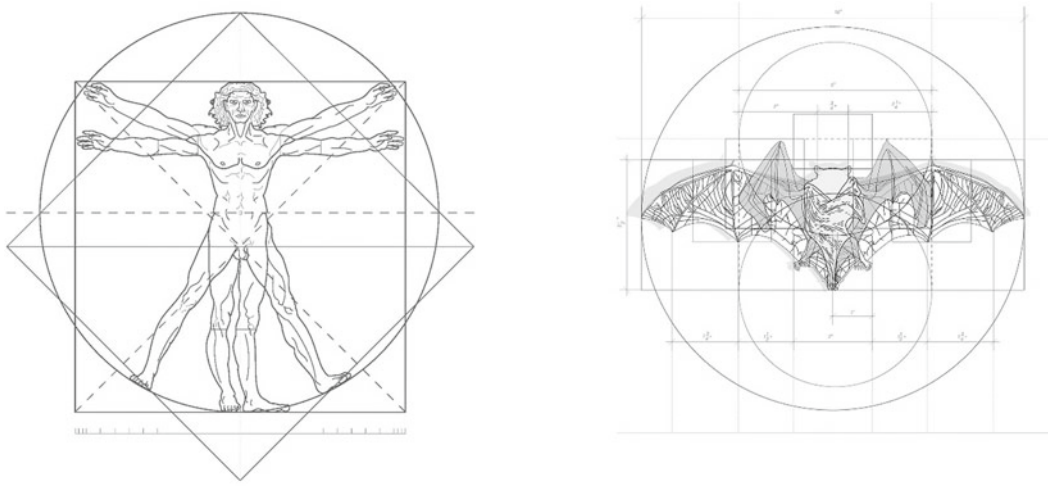

Fig. 49.1 Drawing based on the Vitruvian Man by Leonardo Da Vinci, redrawn by author, joined by a Vitruvian Bat

uprightness of the Vitruvian man can be placed in dialogue with Da Vinci's other depictions such as 'The Virgin and Child with Saint Anne' insightfully analyzed by Cavarero in a chapter called "Leonardo and Maternal Inclination". Her book is an eloquent critique of the concept of Rectitude as a model of the 'rightness' or 'correctness' of Man depicted in the upright disposition. Cavarero provides a feminist critique of the long-standing set of assumptions in moral philosophy by contesting this classical figure of the homo erectus and providing an alternative model that relies on the concept of *inclination*. An open and altruistic model, inclination is what has characterized the depiction of women, as a subject that inclines, altruistically, towards others.[6]

The Vitruvian Man ideal as evocative of the uprightness of *humanitas* emerges again in Western canon in full force with the work of Le Corbusier. Despite his proclamations of cutting ties with the past, the image which glorifies the male body as a measure of all things is enthusiastically re-adopted and repackaged in the *Modulor*—his own version of the Vitruvian Man. Here, we see a 'modern man' who nonetheless follows the footsteps of the humanistic Vitruvian Man by proposing ideal proportions of architecture based on idealized proportions of a man created with his own proportions. Notably the term "modulor" also refers to the goals of it being an example to follow, a "model" to be repeated (as a "module"). This *Modulor* provided a modernized methodology of regulating lines that would dictate certain proportions of built spaces: it intensified the humanistic idea of the primacy of Man and further entrenched the idea of [hu]man exceptionalism in architecture.

One might ask, why do we question these dated images that no contemporary architect follows anyways? Drawings are the tools with which as architects we communicate our ideas: they are our language and as such have -and have had- a transformative role in our conception of architecture itself.[7] The bodies we draw to represent what is "right" have not only a historical significance but a role in upholding inequalities and ways of being in the world that is at odds with its flourishing. What happens to our imagination if we were to draw a radically different ideal: a Vitruvian Man that is no longer a male body but rather a…woman or a bat?[8] (Fig. 49.2) Just as our language holds biases that need to be interrogated in order to debunk the bias, so too as architects we need to question the bodies that dominate our representations. Redrawing our ideals matters!

Fig. 49.2 Speculative scenario for a project by e + i studio: it imagines an alternative life, where the now near-extinct Eastern Cougar and short-eared owl would return to what was their region, in a city no longer dominated by human presence

49.2.2 The Rightness of Right Angles [The Building Ideal]

In *Architecture, Animal, Human: The Asymmetrical Condition*, architecture critic and theorist Catherine Ingraham writes about the asymmetries between human histories in architecture and nonhuman histories or animal life. Ingraham connects the project of Modernism to the Renaissance by its continued centering and "rightness" of the human:

> Le Corbusier's claim that the existence of right angles and straight lines are the primary evidence for the "rightness" of the human mind, particularly the "uprightness," i.e. propriety of the architectural mind." (Ingraham 2005, 13)

Modernism in architecture continues the Renaissance project of glorifying Man, explicitly emphasizing 'his' production and what distinguishes it from 'nature'. The humanistic ideas of 'rightness' extend to the aesthetic of the right angle, separating humans from nonhuman nature. It may seem paradoxical to elevate the ideal body of a Modulor Man, to also deny the body as "nature", but this is in favor of the abstraction of the body, steps removed from its "animal-ness" in order to emphasize the move towards an abstracted *machine aesthetic*.

Villa Savoye by Le Corbusier is a building which embodies these ideals: it is conceived as an object, lifted above ground on its piloti barely touches the natural terrain. Nature is not excluded entirely, but it is treated as a painting to be hung in the architecture: it is framed by the architecture forming a precise rectangle of green with a stripe of blue of the sky. Nature is thus something *out there* distinct from humans and distinct from architecture. The materiality of the

walls also fades away in favor of abstract white stucco, or colored surfaces that do not resonate with materials "in nature". They are a form of abstraction – of removal from the human- that makes domination more acceptable, in fact, enticing: "Man undermines and hacks at Nature. He opposes himself to her, he fights with her, he digs himself in." (Le Corbusier 1987, 5).

Like painting, architecture too was moving towards abstraction, and separating itself from the material resources that make it possible. Textures and textiles which are perceived as the more 'feminine' or 'natural/ bodily' aspects of the domestic space are emphatically criticized and devalued. The work of Eileen Gray, for example, did not follow the dogmas of Le Corbusier's modernism, so it was cast aside and subsumed under the figure of Le Corbusier. A self-taught architect, Gray designed the famous house E1027 that was often attributed to Le Corbusier, possibly because he became so obsessed by it and infamously painted murals in its interior. Only recently has Eileen Gray been recognized as a Modernist architect in her own right, with the restoration of E1027, possibly saved from ruin due to Le Corbusier's "gift" which was deemed worth preserving. Her work did follow these precepts so was cast aside and seen as threatening to Le Corbusier and his ideals.[9]

Abstraction achieved through the use of right angles and straight lines is a tool to further separate architecture from nature—to claim that they are distinct in kind. It is also more generally used as the defining factor for architecture to qualify as 'modern'. Architects such as Alvar and Aina Aalto, for instance, while contemporary in chronology to Le Corbusier, do not fit into the modern movement because they defied the rule-base precepts dictated by Modernism that hailed abstraction and a separation from nature as a defining feature. The work is not bound by an excessive use of the right angle, or by an abstraction of materials used to make it up, it is in continuity with nature- an extension of it.

Epitomized by the right angle and orthogonal geometry, Modernism strives to separate the human from nature, to dominate it and change it from 'chaotic and unhygienic' into 'ordered and pure.' These precepts have extended into the way architecture is taught and practiced in the West today: architecture still identifies itself with a clear separation between *human* and everything other as *nonhuman*, proclaiming superiority of the human category over other species. To be human for modern architects means to have finally separated oneself from animals. With its abstracted lines and orthogonal geometry, Modern Architecture becomes the fuel for the disappearing animal inside the human -it is an instrument of its erasure.

49.2.3 Donkey Urbanism and the Colonizing Grid [The City Ideal]

In *The City of Tomorrow and Its Planning,* Le Corbusier opposes old city urbanism with his conception of a hygienic *Radiant City* which would be planned with straight lines and right angles. There was a keen and deliberate attempt by Le Corbusier to advocate for a holistic aesthetic vision, from the scale of city planning to that of the domestic space that relied on orthogonal geometries used with the moralizing purposes characteristic of modernism. Indeed, his book on urban planning opens with a chapter called: *The Pack-Donkey's Way and Man's Way*, where he makes his ethical position about human exceptionalism quite clear:

> Man walks in a straight line because he has a goal and knows where he is going; he has made up his mind to reach some particular place and he goes straight to it. The pack-donkey meanders along, meditates a little in his scatter-brained and distracted fashion, he zigzags in order to avoid the larger stones, or to ease the climb, or to gain a little shade… The Pack-Donkey's Way is responsible for the plan of every continental city. (Le Corbusier 1987, 5)

Le Corbusier juxtaposes the "scatter-brained" movement of nonhuman animals with the 'straightness' -or *rectitude*- of lines and paths with which humans make their mark on the world. Ancient cities according to Le Corbusier

are problematic because of their connection to nonhuman animals with their meandering paths that become the loci of disease and moral depravity. The notion of *rectitude* in city planning with straight orthogonal lines is juxtaposed to the meandering paths made by other nonhuman animals, such as a donkey, in order to affirm human superiority and moral status. The 'rightness' of the grid-city is based on Western standards of moral and morphological correctness, versus the chaotic unplanned ancient city.

Catherine Ingraham writes about the asymmetries she sees between human histories in architecture and nonhuman histories /animal life. Of particular interest is her emphasizing the obsession Le Corbusier had with the image of a donkey and the meandering paths, with the term she coined "donkey urbanism". This expression describes what Le Corbusier finds problematic about European cities of the past that have developed without planning, as a result of "animal paths". Ingraham writes about how the modern movement espoused the superiority of human endeavors over anything generated by nonhuman animals:

> Why, or how, a trivial, typically comical animal such as a donkey came to oppose the right angle, held as one of the most significant abstract productions of the human mind, the deep mathematical heart of Western architecture itself, is one aspect of a set of complex issues. (Ingraham 2005, 14)

The use of straight lines and right angles as a way to claim superiority and organize the occupation of land is not new to the modern movement. The Romans used it very deliberately as a strategy to colonize territory with what is called in Latin the Cardo and Decumanus: a north–south and east–west axis that is traced on occupied territory as a way to start new city planning. But in the modern movement, straight lines and right angles have an added importance because of the aesthetic agenda tied to a moralizing dimension of hygiene; of them (animals) versus us (humans). They materialize control, precision, and the man–machine-made, further entrenching the dualities between (hu)man and nature.

The moralizing dimension of the use of right angles in modernism is used to advocate for a holistic aesthetic vision, from the scale of the body in domestic spaces to the scale of city planning. Indeed, it extends into dictums of how one should live: "We are to be pitied for living in unworthy houses, since they ruin our health and our morale." (Le Corbusier, *Towards a New Architecture*, 14) This goes hand in hand with the adopted aesthetic of the machine that sees the house as "a machine for living". The concept of the machine is also invigorated by the invention of the automobile that gains primacy in the design of cities as well as allowing humans to use man-made transport instead of animal-based transport. Indeed, machines in general and automobiles in particular were seen as a symbol of progress and power.

With modernism came a fundamental questioning of what it is to be human. What is at stake is our fundamental understanding of our role on earth, and architecture is seen as an avenue to further entrench human superiority over other species, who -as exemplified by Le Corbusier's donkey—are seen as unhygienic, lacking culture, or agency. The fascination with machine aesthetics was instrumental to further wedge the human-nonhuman divide, as a way to continue to assert our superiority and separation from nature and other species. Even more explicitly, the colonizing power of the grid fueled the dualism between the grid-city of Western urban planning-let's call it "enlightened urbanism", and the more emergent morphology of unplanned ancient cities still connected to animal life "donkey urbanism".

The grid is used in the practice and teaching of architecture as a default organizational tool, often oblivious to the roots of its colonizing goals. The prevailing ideology enforced the use of the grid as a 'corrective' tool for the chaotic lack of planning of indigenous peoples. Importantly, however, it is not the intent to assume that anything non-western and non-male is by default better or more righteous. Rather, to provide the context from which one can question the practices we have inherited and consider counterpoints to the *human-all-too-human* western

typologies we continue to rehash, teach, and proliferate on this side of the hemisphere. As Cavarero puts it:

> The geometry intrinsic to Homo erectus adapts itself to all the realms of meaning in which the human manifests its condition, it is in fact philosophically even more urgent to ask what consequences this geometry produces for our discourses on subjects, human relations, and community (Cavarero 2016, 128).

Geometry holds meaning and memory. Architecture expresses itself through, among other things, geometry. Yet the geometries used by architects to house humans are embedded with unacknowledged biases. Cavarero asks us to put attention to the effects that "the geometry intrinsic to Homo erectus" has on the discourse of subjectivity and community. Similarly, one should pay attention to the geometries that pervade our built environment, used as innocent defaults that nevertheless embody centuries of exclusion and domination.

This text asks how architecture and the built environment can adopt a multi-species approach, that acknowledges the histories and biases embedded in building typologies, which have privileged a very narrow conception of 'the (hu)man'. Given the climate crisis, we have a mandate to question our exceptionalism, and realize that true ecological thinking must disturb the human-animal divide. This work, and the illustrations herein are part of that disturbance (Fig. 49.2): to question the assumption that architecture is only for humans, and to re-introduce bodies that have been excluded from their own habitats.

This work is part of a (self)reflection on the practice and teaching of architecture in the West that aims to understand how we got to the status quo in architectural practices. Exploring the inherited biases of thought can allow us to reframe speciesist attitudes which see architecture as a practice of domination over the environment and its other species.

The catastrophic predicament we are in as humans demand action but also thought. We are all complicit in internalizing and replicating human exceptionalist practices of domination over the environment. It is through a self-reflection of one's own practices that we can open a dialogue on how to engage with a different kind of world-building. The act of re-drawing our spaces and acknowledging the presence of non-human life, is part of this effort. (Fig. 49.3) to recognize the interconnectedness between humans and nonhumans, so that we can be critical of our role as in a changing world that demands radically different ways of intervening in it.

Notes

1. Some thinkers, such as Timothy Morton, have rejecting the use of the term "nature" altogether, claiming that the chief stumbling block to environmental thinking is the idea of nature itself and that paradoxically, in order to have a proper ecological view, one must relinquish the 'idea' of nature. (Morton 2007).
2. As this text is a critique of human exceptionalism in the West, it will work within that framework, while also aiming not to fall into what Intuit scholar Zoe Todd reminds us: that indigenous knowledge is all too often unreferenced. (Todd 2016).
3. As with the title, the brackets in (hu)man are being used to make explicit how human category is by default male in all the visual and textual representations being referenced.
4. Kagis McEwan details how Vitruvius favored words over drawing claiming that he was "writing the body of architecture" (Kagis McEwan 2003, 17).
5. Given by Swedish botanist Carl Linnaeus in 1730's, despite his not wanting to claim a separation between human and animal, this is the effect (and deliberately intended by certain theologies) of the taxonomic classification we use today.
6. In the Forward Paul Kottman synthesizes one of the main goals of the book: "Cavarero is interested, rather, in tallying the costs of depicting the human being as upright when it comes to our view of

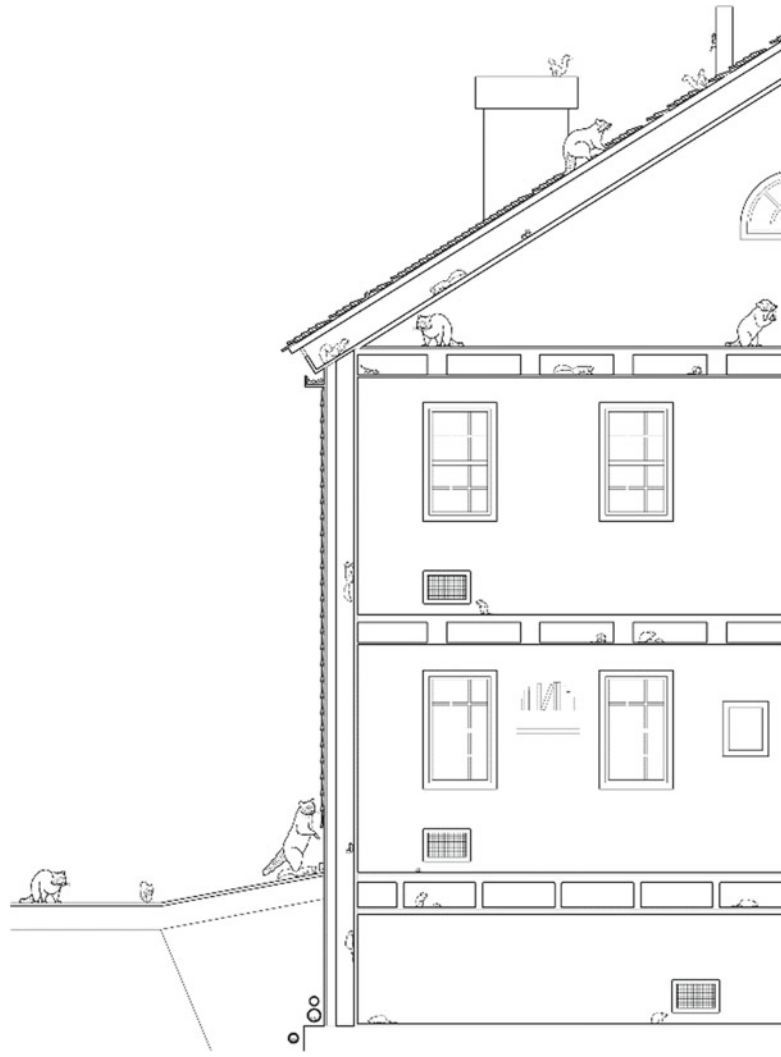

Fig. 49.3 Section drawing of a suburban home, exploring animal life in and around human habitation. By author with Daniella Tero

women, our overall understanding and collective self-conception.".

7. For example, the life-long work of Piranesi, which exists in drawings only.
8. This is an exercise we do with thesis students at the start of a semester to have them question the human exceptionalist ideals that are taken for granted in architectural education.
9. This house was given the status of "subversive aesthetic" and threatening to Le Corbusier, to that point that he developed a life-long obsession with it. For more on this see *Occupying E.1027*, an illuminating piece by Jasmine Rault.

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Inclusion Through Exclusion

50

Jonna Krarup

Abstract

This paper takes its point of departure in resources in philosophy to understand human-nonhuman as a relation in landscape architecture. Two seemingly contractionary terms *distance* and *(re-)connection* is used to discuss and reflect on some of the theoretical implications and openings that arise for landscape architecture amid the biodiversity and climate crisis; crises that may be seen as a result of an anthropocentric dominance over and a lack of care for the non-human. Talking about inclusion of the non-human in human society and the built environment, the idea of *(re-)connecting*, seems to be key. Theorists, artists, architects, and activists propose different strategies on how we might (re-)connect with the non-human. Some of these seems to be depending on a physical, body-to-body, encountering, others on how to mentally (re-)connect. Common for the different approaches and ideas is that *distance* seems to be problematic. But overcoming the distance must thus also mean making the non-human accessible, mentally, and physically, for humans. *Distance* is traditionally emphasized as a *precondition* for landscape as an aesthetic object in landscape architecture. If distance is a problem which is to be overcome as suggested with the current focus on (re)connecting in philosophy, sociology and in (landscape-)architecture, what might the implication be on landscape architectural theory and practice? It is argued that distance may be part of how to include the nonhuman, and that distance may be a prerequisite in including the nonhuman and practicing an ecology of practices, and an act of care.

Keywords

Landscape architecture · Human-nonhuman · Philosophy · Distance · (re-)connection · Care

50.1 Introduction

A couple of years ago the rabbit Magda Morgenfrue von Silberstein, moved into our back garden. Instead of buying one of these prefabricated one square meter rabbit houses that many rabbits lives in, a moveable enclosure was constructed.

The enclosure is without a bottom, which means that Magda can dig rabbit holes, which she is keen at.

She soon re-organized what used to be part of the lawn and transformed it into a mini-hilly-like

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landscape with holes and small heaps of the material she excavated from holes. She likes to sit on the small heaps looking at her landscape or whatever she is looking at.

Most of the grass is eaten, some weeds or herbs that doesn't go along with her taste buds are sticking up in the rabbit landscape. When it gets too bare, the enclosure is moved to a new spot and Magda restarts digging and reorganizing the new site. She organizes her space systematically; it is always the same corner she uses as her bathroom. Her morning treat is always eaten at the same spot, and she always choose the calmest (meaning out of our reach) place to rest.

When Magda moved in, we moved out; to include Magda on our plot meant excluding us (at least partly) from it. A distance between Magda and us was created and the distance facilitated unexpected forms of contact and connectivity between Magda and us, and a new garden design(!). She got the opportunity to unfold her rabbit nature and we got the opportunity to observe, learn, and enjoy her ways of inhabiting and organizing her space without us taking other means of control than locating the enclosure.

Normally living with the non-human, it must tolerate and adapt to the conditions humans think best. Humans in general, tend to control the non-human and shape it so it fulfills human needs and ideas of how it should look, where in space the non-human is allowed to be (Cunha 2019) and how. Enacting spatial control has historically become key in (landscape) architecture and human society.

But if landscape architects are to follow the call from Bruno Latour (2018) on finding new ways to inhabit the Earth and to relate to the non-human, prevailing notions of nature and landscape and methods in landscape architecture must be reconsidered and developed. The current biodiversity and climate crisis may be seen as results of a human-nonhuman relationship in which the human perspective has dominated and sought to control the nonhuman through the application of different techniques; one of these is the aestheticization of nature as landscape, another the Cartesian division of the relation human-nonhuman into the dichotomy, subject-object, rendering the nonhuman as an objectified passive material for humans. The latter propelled the Enlightenment process version 1.0.

Currently, there is a rich philosophical discourse on the relation human-nonhuman representing a variety of positions. In the following two positions are brought into the following discussion.

There is one stressing inter-connectivity and co-existence between human and nonhuman; Isabelle Stengers calls for an ecology of practices (2005), and Donna Haraway for *sympoiesis, making with* instead of autopoiesis (2016), by which new forms of the relations may be investigated and new forms of co-habitation between human and nonhuman critters may be established.

The second coming from the group of Speculative Realists, argues a more radical post-human position, a flat ontology, in which the subject is abolished, and humans objectified as objects among nonhuman objects. Common for both positions, is that the relationship human-nonhuman is revised, and the nonhuman sought rehabilitated philosophically.

But how to interpret and translate a revised philosophical human-nonhuman relationship in landscape architecture, and which strategies and techniques to apply?

In several of the reflections the idea *(re-) connecting*, seems to be the key, but the idea of (re-)connecting is often interpret and expressed in ways depending on a physical, body-to-body, encountering between the human and the non-human, for example by individuals emerging themselves in snow, soil, or water as we see in many contemporary art projects or by dressing up in feathers and masques representing the nonhuman protests urban development. Others seek ways to mentally (re-)connect through religious practices and in indigenous cultures. Common for many of the different manifestations and expressions is that *distance* seems to be problematic. But overcoming the distance must thus also mean making the non-human accessible, mentally, and physically, for humans. Is distance only a problem?

This discussion relates to the UN SDG 11, 13, 14 and 15.

50.1.1 The Role of Distance in Landscape Architecture

In landscape architecture distance has historically played a defining role in landscape as an aesthetic object.

Riehl (1850) described landscape as an aesthetic object as the *'work-relieved' and alienated landscape'*, that emerged in tandem with modern society and modern man and his ambition to emancipate himself from the constraints of nature and obtain freedom by exercising control over nature and the natural processes.

Ritter(1963) unravels this transition and its impact on culture and art in his scholarly essay, in which he refers to the writings of Petrarch and his mountain climb in 1326. Petrarch was later described by Jakob Burckhardt (Ritter 1963; Wojciehowski 2005) as one of the first among the moderns.

When Petrarch climbed Mount Ventoux and got a glimpse of a new way of looking at the landscape beneath the mountain, Petrarch literary initiated modern man's walk out of nature as a taskscape (Ingold 2021) and into landscape as an aesthetic object. Petrarch's account is one of the first documentations of the, at that time, emerging new visual dominated modes of seeing—gazing at—and relating to the world as landscape.

Petrarch's experience transcended everything he was taught, namely that such admiration of nature and landscape is beyond the teaching of the church and thus non-acceptable as the focus on God is distracted.

This is according to which nature is created by God and given to man for his disposal. As such nature should on the one hand be admired, but on the other hand nature is reduced to a passive resource for humans, as it is non-spiritual and therefore positioned below man in a hierarchically order, in which God resides at the top, man in the middle aspiring to God and eternal life, and nature, the nonhuman at the very temporal and earthly bottom.

Such ordering creates a distance between humans and the nonhumans, and it is part of the underlying idea of the Cartesian subject—object dichotomy propelling the Enlightenment process. The subject-object dichotomy gave authority to humans to order and control the nonhuman in space according to our needs as exemplified in cartography, argued among others by Latour (2018), Olwig (2019), Ingold (2021), Cosgove (1985). Landscape as an aesthetic object may thus be regarded *the image* of the Enlightenment process, beginning with the transition from the Middle Ages to the Renaissance, i.e., the image of our own ideas of nature projected, organized, and executed as landscape.

In addition, the emergence of landscape as an aesthetic category occurred at the same time as the understanding of the Self emerged, the emblem of modern individualized man, propelling the idea of landscape as a screen for projections of the interior lives of human beings. '*Landscape and the Self are dialectically interdependent, with each relating to the other as both precondition and result*.' (Gleiter 2016).

But can we imagine a landscape reflecting something more than just the human self?

If we are to include and connect with the nonhuman in that image, i.e., in landscape architectural projects and thinking, we must acknowledge that there is no turning back to a primordial, pre-historical nature and natural condition, and question whether emerging ourselves in weeds as an artistic statement is a feasible way and answer for a profession.

Faced with the challenges of climate change, biodiversity loss and an epistemological crisis (Babou 2017) as well, these questions are essential to develop a landscape architectural thinking and adequate methodologies to navigate and act in this new reality.

Are there other ways to include the nonhuman than overcoming distance?

Could distance be positive, a landscape architectural technique to include, to create space for the nonhuman, to liberate the nonhuman from human control and constraints and thus allow for

a revised human-nonhuman relation to form? Distance as a form of care?

50.2 Method

This paper is a critical discussion of some theories of inclusion of nonhumans in landscape architecture theory and practice. To positioning the landscape architectural questions and thematic in a wider societal context and thinking, the discussion is sought related to ideas and thoughts on the relation human-nonhuman within contemporary philosophical discourse.

To this end I refer to and discuss two philosophical lines; the one focused on developing the relation human-nonhuman by including the nonhuman, by B. Latour, H. Rosa, I. Stengers, and D. Haraway. The other arguing, G. Harman and T. Morton, a flat ontology and transforming the relation into an object-object relation.

Positions from the two lines are hereafter discussed in relation to landscape architectural theory and practices discussed and theorized by, G. Clement, E. Krasny and H. Frichot.

50.3 Findings

The discussion of the philosophical resources revealed two contrasting suggestions on how to rethink the human-nonhuman relation. The one argues an actively and caring engagement with the nonhuman through practice and acceptance, formulated as an ecology of practices (Stengers 2005) and a sympoeisis (Haraway 2016), that enfolds in a common habitat characterized by acceptance of humans technocultural doings and its offsprings. Here it is not distance, but control that is the problem in obtaining resonance with the non-human (Rosa 2018).

The other argues a flat ontology (Harman 2011), a return to the things in themselves by returning to a pre-critical thinking and thus reach the 'great out-doors', where things exited regardless of human thinking. Through the subjective impression, an attunement to a thing's reality (Morton 2013), it is argued that humans might relate to the non-human. But the subjective impressions seems similar to the criticized and distance creating aestheticization technique in landscape architecture, i.e., to reflect the human understanding upon the non-human and thus define it.

Leaving the nonhuman passive and an object for human disposals.

Turning towards landscape architectural theory Clement argues that we must plan for the in-between leftover landscapes and urban environments, offsprings of human's technocultural doings, which we normally tend to overlook. The totality of these leftovers is termed, The Planetary Garden, (Clement 2004) and himself a gardener. Being leftovers humans tend to overlook them and avoid them, which is the point: human's distances themselves from these places and they become refuges for the nonhuman, and a way to include the nonhuman in human society. Not seeing and not coming there means that humans do not care, but that is also an act of care according to Clement, as the nonhuman then is free from human control.

Contrary to what we normally understand by gardening, the human gardener of the Planetary Garden is excluded from the garden. Caring for The Planetary Garden thus presupposes the distance between us and the garden and giving over the role of the gardener to the nonhuman. The nonhuman is thus granted agency and the distance becomes a technique to (re-)connect and include the nonhuman in human society.

It is argued that distance may be part of how to include the nonhuman, and that distance may be a prerequisite in including the nonhuman and practicing an ecology of practices, and an act of care.

50.4 Discussion

50.4.1 Distance as Part of the Solution

As outlined in the introduction the distance between humans and the nonhumans and the distanced aesthetic gaze on nature as landscape

emerged in tandem with the Enlightenment process, illustrated by Petrarch ascent on Mount Ventoux, is a one-way track—there is no U-turn.

We have to accept, as Donna Haraway (2022) argues, our technocultural doings and its offspring, and we have to learn to love and take care of our new family as it is not only part of ourselves, but it also reflects ourselves. Or, in the words of Karen Barad (2007), '*Ethics is therefore not about right response to a radically exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part*.'

As agued above landscape as an aesthetic object presupposes the distance and reflects ourselves, defining nature in the words of Barad as, *'a radically exterior/ized other.'* Further, seen through the lens of Haraway, landscape as an aesthetic object can be characterized as a technocultural doing, in which distance is key.

The notion of nature we thus can relate to is in Genevieve Lloyd's words (1994), '*a nature-cultural continuum mediated by technology*.' Lloyd refers to contemporary Spinozism stating that all entities are variations on a common matter, to which R. Braidotti (2021) adds, '*to be alive means to enjoy the freedom to go on becoming, within a differential materially embedded process ontology, aware that we differ from each other all the more as we co-define ourselves within the same living matter*.' Braidotti can thus be understood as, the more we try to co-define, and (re-)connect with nature, the more the distance between us and nature increases.

Identifying distance, as we also see in the current theoretical discourse and artistic experimental practice, as *the* problem is then perhaps taking Bruno Latour's pledge and book title, Down to Earth (2018), too literally, and examining distance too little.

Latour's call (2018) to invent new ways of inhabiting the earth is a call for reconsideration and reflection on the relation human-nonhuman, as we, according to Latour, seems to be living on another planet; thus a call to reorientate ourselves towards the earth as our habitat, and to realize what the impacts of human's technocultural doings on earth, the nonhuman, are and causes the nonhuman, and change accordingly.

50.4.2 Inhabiting a Habitat

The focus on the habitat as the locus for both humans and nonhumans is also key in Stengers idea on an ecology of practices (2005). Stengers has, so to speak, landed on earth and in her habitat, '*Ecology, for Stengers, is quite simply a question of habitat, the context in which you undertake your labour, and the habits that circumscribe your methodologies. In operating within your "habitat" your practice must feel out its borders, recognize its limits, and also push against them, re-establish them again and again*', and further, '*While habit enables practice in relation to habitat, habit must also be resisted where it begins to stultify thinking. The relevant tools for thinking, Stengers explains, are the ones that actualize and address the power of a situation*', (Frichot 2017). By introducing the concept of ecology, it is pointed out that humans are always part of something outside the human and part of a process of exchange between humans and nonhuman, but also that this process of exchange is a power-relation we must observe carefully and continuously to prevent it becomes habitual. Humans' embeddedness in a process of exchange with the nonhuman is underlined in her idea of an ecology of practices; human practices are part of a process of exchange with nonhuman practices.

50.4.3 Achieving Resonance with the Nonhuman

The human-nonhuman power relation is also addressed by Rosa (2018) in his analysis of modern society. Rosa argues that the human tendency to encounter the nonhuman as a series of objects that we must conquer, master or exploit, instead of resulting in the experience of feeling alive and truly encountering the world, elude us. Rosa argues that to encounter the world

and achieve *resonance* with it requires us to be open to that which extends beyond our control. When we try to control, master and plan everything, the world becomes meaningless, and it withdraws. The desire for control creates distance to the controlled.

Rosa suggests letting go of (some of) the control we exercise over the nonhuman world to achieve resonance with it and instead (re-)connect with the world through uncontrollability, meaning that humans set free the nonhuman from human control. Or said otherwise, by granting the nonhuman freedom from human constraints, humans may obtain resonance and (re-)connect with the now uncontrolled nonhuman world.

Both Latour, Stengers and Rosa argues that the human-nonhuman relation is possible; it has failed in several ways until now why the prevailing definition and practice must be reconsidered and reformulated both philosophically and practically to include the nonhuman in human society.

50.4.4 Breaking Out—Seeking the Great Out-Doors

Another more radical line in contemporary philosophical discourse on the human-nonhuman relation is found among the Speculative Realists, a loosely coupled group of thinkers. Common for the group is their ambition to break away from dominant constructivism's focus on language and culture toward a renewed focus on the materiality of the world. From having been about how human views reality, the focus shifts towards humans' ability to understand reality, the nonhuman, regardless of how we think about it. The ambition is therefore to break out of, what they describe as, the correlationist circle and '*(…) reach the great outdoors, the absolute outside of pre-critical thinkers: that outside which was not relative to us, (…) existing in itself regardless of whether we are thinking of it or not*' (Zahavi 2017). They claim that Kant left the *Dinge an sich* as trash on the road side, and hence legitimized a perception of nature as a resource and passive 'dead' materiality, subdue to and for man's disposal (Laugensen et al. 2018). Instead, they suggest equality among objects in a flat ontology, formulated by Harman (2011) as Object Oriented Ontology (OOO), in which the subject-object relation is replaced by a post-humanist object-object relation. The group's thinking has gained interest among architects as, '*(…)it seems to draw on common sense, asking us to respond innocently: well of course there are objects out there in the world independent of me (the human observer)*' Frichot (2017). How to define the object-object relation, is a bit unclear; according to Harman (2011) we can only know the appearance of a thing and never its true being; the things-in-themselves forever remain inaccessible to other objects. Such an understanding may seem both liberating and a turn towards the things-in-themselves without having to think them in relation to other things. In the same way establishing a flat ontology can be understood to include the nonhuman in the human world. On the other hand, it can also be argued that such an understanding consolidated the distance between humans and nonhumans as an insurmountable condition, and forever excludes humans from the nonhuman.

We find another view on the object-object relation at Morton (2013) where it is described as a subjective impression, an inter-objectivity between objects, a form of aesthetic experience, that *(…)is far more than a merely whimsical or self-centered interpretation of a thing, but an attunement to a thing's reality*' (Morton 2013). The attunement is described as a technique by which humans are able *to connect* to the world of objects through tactile speculative experiments on what it might mean to be another object, exemplified by Morton with a reference to the performance *Timeless Alex*, by Eduardo Navarro at the New Museum Triennial (2015), in which Navarro examined what it is like to be a turtle. Afterwards Navarro declared that during the performance he felt a turtle was trying to become human. The attunement technique illustrated by E. Navarro's performance seems to be depending on a physical behavior imitating examination, in which the distance between the objects is sought to be eliminated by the human-

object's desire to (re-)connect with the non-human object by trying to be that object, the turtle. In this way, the attunement technique might also be understood as a continuation, or another form, of exercising control over the non-human under the disguise of the ambition to (re-)connect. The attunement may be characterized as intruding and transgressive as the artist thinks himself in a position to define how it feels to be a turtle by imitating its appearance by wearing a mask and its behavior by crawling around on the floor. The idea of the subjective impression can thus be seen as another form of aestheticization of the nonhuman as objects that may be arranged, and here enacted, according to human likings, ideas, and understandings like what has happened historically in landscape architecture—aestheticization as a technique to reflect the human understanding upon the nonhuman and thus define it. One might also ask to which degree we are able to understand and relate to the nonhuman, regardless of how and what we think, and have already thought, about it; is establishing a tabula-rasa, a point zero, possible?

But what the implications for the whole architectural field of seeing the things-in-themselves, without having to think them in relation to other things, might be is perhaps an even bigger question than an isolated artistic performance.

50.4.5 Experience of Belonging

A less transgressive mode of examining the human-nonhuman relation as a relation is investigated in the image series, "Eyes as Big as Plates by the Finnish- Norwegian artist duo Riitta Ikonen and Karoline Hjorth (karolinehjort.com). They explore human's experience of belonging to landscape sites among specific marginalized demographic groups. To that end the two artists collaborate with local elderly people. Together they develop the idea of the images, '*a solitary figure in a landscape, dressed in elements from the surroundings that indicate neither time nor place. The landscape acts as both content and context: the characters literally inhabit the landscape wearing sculptures they create in collaboration with the artists*' (karolinehjort.com).

The wearable sculptures act like tools with which the human models try to illustrate their experience of belonging to specific landscape locations by physically and symbolically merging themselves into the landscape. The purpose is thus to illuminate the human experience of belonging physically and symbolically to a site in the world, but not to be that site, as Riitta Ikonen (riittaikonen.com/) states, '*nature is something impermanent and 'getting back' is impossible*', but humans may nevertheless experience a belonging to the nonhuman, a relation to and with the nonhuman.

A somewhat similar reflection on the impossible U-turn to a primordial state is expressed by Haraway (2022), when she argues, that we must learn to love and take care of our new family, our techno-cultural doings and its offspring, as it is not only part of ourselves, but it also reflects ourselves—both humans and nonhumans and anything between the two are all critters inhabiting the same habitat. A point we also encounter by Barad (2007), '*Ethics is therefore not about right response to a radically exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part*.'

So where to does these diverse ideas on the human-nonhuman relation lead? Do they have anything to offer to or relation to landscape architectural theory and practice – this techno-cultural doing and its offspring, landscape as an aesthetic object?

50.4.6 The Third Landscape—Distance and Connectedness Through Caring

In 2004 Gilles Clement published his, *'Manifesto of the Third Landscape.'* The third landscapes are not gardens or other protected areas, nor the cultural landscapes, but the in-between leftovers in the landscapes and urban environments we tend to overlook and therefore do not care for.

These are, as Clement suggests, the refuges for nature to regenerate. The idea of the third landscape draws on an idea on The Third Estate by Abbé Sieyès conceived during the French Revolution defining those neither nobility nor the clergy, re-defined by Clement (2004; 2015) in relation to landscape as, '*the totality of all those places abandoned by man*.' Clément calls the totality of these places, *The Planetary Garden*. Clement argues that we need to plan for such places and acknowledge their importance for nature and for us, to counteract the biodiversity crisis. Not paying attention to these third spaces also means that we do not come there, they are left to nature, the non-human, and the natural processes and that is the point, suggesting that distance between the human and the nonhuman may also be a quality and a productive technique to include the nonhuman in human society.

Clement applied his third landscape thinking onto the design of le Parc Matisse à Lille, also known as, l'île Derborence, in which a seven-meter high and inaccessible 'forest island' was constructed. The idea was that this island should be left alone as a refuge for the nonhuman, on which plants, and animals could take refuge out of human reach, and as such a technocultural produced space from which they could regenerate and spread out into the environment.

He also names himself a gardener, emphasizing that the practice of gardening holds the ambition of caring for the nonhuman, and through gardening, mediated by technology, we may (re-)connect with nature and natural processes.

In Clément's third landscape thinking three aspects stand out, the first is that he scales-up the concept of the garden, from often being the 600–800 square meter plot most are familiar with. Clément's Garden concept encompasses the planetary scale which in turn is downscaled from planetary to local through the garden concept. The second aspect is that distance is part of the solution as distance is a prerequisite for the nonhuman to be included in the human society as shown in Parc Matisse. The third is by excluding humans, we include and care for, the nonhuman, which in turn will take care of the garden—the planet—for us, which we so far have proved to be rather bad at.

In other words, contrary to what we normally understand by gardening, the human gardener of the Planetary Garden is excluded from the garden. Caring for The Planetary Garden presupposes distance between us and the garden and giving over the role of the gardener to the nonhuman.

Further, Clément reinvigorates a basic notion of the garden as the enclosed space, Hortus Conclusus, and reminds us of the root of the term, Culture, is the activity of cultivating, i.e., taking care of the soil—the planet. The activity of gardening and cultivation suggests agency and exchange between the human and the nonhuman, and thus a relation and a connection. Here distance and connectedness become interconnected.

We also encounter the concept of care in Krasny (2019) discussion on feminist architectural theory. Krasny refers to a definition of care by Berenice Fisher and Joan Tronto (1990), *'On the most general level we suggest that caring be viewed as a species activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live as well as possible. That world includes our bodies, ourselves, and our environment, all of which we seek to interweave in a complex, life-sustaining web.'*

In this definition there is exchange and interdependency, and thus a sort of connectivity between and inclusion of more or less of the parts as the different bodies and species have different needs in sustaining their lives. Here the idea of care becomes bodily and life-sustaining for all critters within the habitat.

Here we come closer to translating and making operational Stenger's idea of an ecology of practices and Haraway's idea on the sympoiesis —*making-with*, as a practice.

50.4.7 Rewilding or Wilderness as a Cultural Asset

In contrast to Clement's emphasis on the process of active exchange between the human and the nonhuman in a technocultural gardening process,

the concept of, Rewilding (Fløjgaard et al. 2021) rests on a biological understanding of self-managing ecosystems as the optimal management model for biodiversity. In rewilding a major change attributable to humans is the impoverishment of the natural mammal fauna and the replacement of wild animals by domesticated animals, why the question of a natural baseline for the grazing function becomes essential for how rewilding is practiced. A palaeoecological perspective is sought installed as an 'authentic' non-human impacted, but human defined, baseline by which the success/failure of the rewilding initiative is measured. The baseline may thus be understood as a going back to a distant prehistoric ecosystem, without humans, which then becomes the scale with which today's and tomorrow's biodiversity is measured. Areas designated to rewilding are enclosed and human access restricted. Distance in and to time and evolution both become an argument and a measure, and a means to by-pass any social, societal, historical, and philosophical aspects and questions in relation to the method and the thinking behind.

Whereas Vettese and Pendergrass (2022) argues for human directed rewilding by natural scientific means, Mark (2021) appeals to our ethical consideration by pointing towards the importance and meaning of the wild,'*wilderness, then, is to preserve people's opportunity to, at the very least, glimpse something beyond the human. Wilderness is our final connection to the eons from which we arose.*' Mark argues that there is no *away* anymore, but the wilderness is *afar*, an area at a distance and therefore out of reach of routine human control or intervention. The importance of wilderness is that it is the very last refuge of the real and as such an invaluable cultural asset, and man's last link to the Holocene. Mark points towards the experience of the wilderness's pure disinterest and indifference in humans as an aesthetic, sensible, experience and a way for humans to rescale ourselves to our right-size, at once caught between the infinite and the intimate in the wild, and hence a way for humans to discover and formulate an enduring ethics for human-nonhuman relations. According to Mark humans, simply, seem to need the nonhuman as something different from, and distant to, humans to understand the human self.

50.5 In Concluding

The discussion is initiated by Latour's call for finding new ways for humans to inhabit the earth as we seem to have distanced ourselves from earth, the nonhuman. It is questioned whether distance is only problematic and to be overcome or could be part of the solution to include the nonhuman in landscape architectural theory and practice.

Two philosophical positions on the human-nonhuman relation are discussed; the one focused on developing the relation by including the nonhuman in human society through a process of exchange and accept and care. From Stengers the idea of habitat characterized by an ecology of humans as well as nonhumans practices is introduced. Embedded in Stengers idea is an acceptance, which is also a pivoting point in Haraway's thinking, of our technocultural doings and its offspring, and that we must learn to take care of our new family as it is not only part of ourselves, but it also reflects ourselves. Both Stengers and Haraway's argues an actively inclusive and caring engagement through practice, acceptance, and care in each other as a way to (re-)connect, termed: an ecology of practices (Stengers 2005) and a sympoeisis (Haraway 2016). Distance is overcome by humans actively engaging with the nonhuman in practice.

Rosa (2018) argues a relation through uncontrollability, i.e., that humans let go of the control we exercise over the nonhuman world to achieve resonance with it, for humans to feel alive and really encounter the nonhuman.

In contrast hereto the Speculative Realists Harman (2011) and Morton (2013) are aiming at re-establishing a pre-Enlightenment human—nonhuman relation by arguing a flat ontology (Harman 2011), in which the subject-object—human-nonhuman—dichotomy is abolished. The aim is to break free of what they term, the correlationist circle, and reach the great outdoors,

the world as it is, beyond human thoughts and language.

The subject-object relation is replaced by a post-humanist object-object relation, in which the things-in-themselves forever remain inaccessible to other objects. Morton (2013) argues a possible object-object relation, described as a subjective impression, an attunement to a thing's reality. The example given by Morton (2015) refers to an art performance in which an artist dressed up like a turtle imitates turtle behavior and afterwards claims that he felt a turtle being present.

It is discussed whether the subjective impression is a form of aestheticization of the nonhuman as objects that may be arranged, and here enacted, according to human likings, ideas, and understandings, like the aestheticization technique in landscape architecture, i.e., to reflect the human understanding upon the nonhuman and thus define it. It is questioned whether humans can understand what the nonhuman is, regardless of how and what we think, and have already thought, about it; is establishing a point zero, possible?

Even though the flat ontology may seem an interesting way to include the nonhuman, the possible object-object relation, suggested by Morton (2015) as a subjective impression seems a one-way relation, leaving the nonhuman passive and distant, and an object for human disposals.

Even though similar in some ways to Navarro's performance**,** the artist duo, Ikonen and Hjorth, exploration of humans belonging to a specific landscape site also differs from it, as they recognize that there is no going back to nature and a primordial human—nonhuman relation; secondly that they do not try to be the nonhuman, but to illuminate the human experience of belonging to a site. It is thus the human experience belonging, being part of or connected, to the nonhuman that is examined.

The question of both partaking agency and distance is unfolded by Clement in his, Manifesto of the Third Landscape (2004), on the in-between technocultural leftovers in the landscapes and urban environments we tend to overlook and therefore do not care for. The totality of these leftovers is termed as The Planetary Garden, by Clement, and himself a gardener. Clements argues that we need to plan for such places to include the nonhuman in human society. As they normally are regarded leftovers, humans tend to overlook them and avoid them, which is the point: humans distance themselves from these places and they become refuges for the nonhuman, and thus a way to include the nonhuman in human society. Being leftovers, humans do not care for these places, but that is also an act of care according to Clement, as the nonhuman then is free from human control. By allocating space to the nonhuman and by letting go of human control over these spaces, the nonhuman can unfold their practices of inhabiting. Further, contrary to what we normally understand by gardening, the human gardener of the Planetary Garden is excluded from the garden. Caring for The Planetary Garden thus presupposes the distance between us and the garden and giving over the role of the gardener to the nonhuman. The nonhuman is thus granted agency and distance becomes a technique to (re-) connect and include the nonhuman in human society.

The idea of care in architecture is unfolded by Krasny (2019) underlining care as a bodily and life-sustaining agency for all critters within a habitat. The presence and importance for humans of spaces, landscape, that are different, uncontrolled, 'wilderness', is stressed by Mark (2021) as the very last refuge of the real and as such an invaluable cultural asset, and man's last link to the Holocene. Wilderness is both afar, distant, but becomes intimate through the aesthetic experience of it and thus we might rescale ourselves to our right-size.

The summarizing point of the discussion suggests that distance may in fact be a productive tool and strategy to (re-)connect and thus to find new ways for humans and nonhumans to inhabit the world together but also apart. To (re-)land on Earth and thus to (re-)connect may thus methodologically mean both to scale-up and scale down by distancing ourselves to (re-)connect as suggested by Clement. Or to say it otherwise, to exclude in order to include, and rescale humans in the nonhuman world.

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Towards a Relational Theory of Architectural Modeling

51

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Abstract

This paper addresses inclusivity and how architectural modeling theory can be developed to enable thinking about the human and nonhuman in terms of a relation. The claim of the paper is that the bias of the singular modeler and the human centered thinking that dominates practice theory is a barrier to the transformation of practice. The concept modeling reflects a pragmatist way of understanding this process as in the making. The proposition discussed in the paper is that a focus on socio-ecological relations requires a plural imagination of the combined human and nonhuman interests. The claim of the paper is that this can be facilitated by an understanding of architectural modeling as a process where several agents superimpose projective intra-representations on the situation where a solution emerges from the observation of their shared referents. The theorizing is situated in two practice cases: a sustainable urban design for a housing district and an architectural innovation project for apartment buildings with sharing. They have been investigated through analysis of documents and interviews with key actors. The latter case also included participatory ethnographic observation. The theorizing in the practice demonstrates how architectural representations enact user and resource relations in specific ways that exclude some possibilities in the situation. It points at the possibility that a critical theorizing situated in practice can help practitioners to better understand the implications of a combined concern for human and nonhuman interests and how they become entangled in the specific case.

Keywords

Practice epistemology · Plural imagination · Relational theory · Intra-Representation · Architectural modeling · Urban design · Sustainability · Inclusivity

51.1 Introduction

The question posed by this paper is how the practice of architecture can be theorized to support the expansion of practice from a human centered approach to also include the nonhuman interests of the ecological system. The approach of the study is a theorizing in the making (Ockman 2000). It is based on a pragmatist understanding of architectural design as a process of modeling.[1]

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[1] This understanding is grounded on the philosophical discourse on models as in the making by among others Willard McCarty (2004).

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The paper is an argument for that a relational theory of architectural modeling can enable a better understanding of how the relations between the combined social and ecological consequences of the architectural intervention can be represented already during the stage of imagination of the architectural project. The architecture researcher Simon Guy argues that if the practice of architecture shall be opened to the concerns for sustainability this requires a critical theoretical engagement with the understanding of sustainability that guide judgment in practice (Guy 2012).[2] Previous studies of architectural modeling practice point to that it often embodies a differentiation between culture and nature which disables attention to the socio-ecological relations (Erixon Aalto 2017). But what could a more relational theory of architectural modeling be like?

It is assumed in studies on inter- and transdisciplinary knowledge production in architectural projects that the participation of several disciplines and stakeholders will improve the inclusive capacity of the architectural project (Bina et al. 2021). This can be referred to as a plural imagination where several experts are included in the act of imagination to assist in the identification of socio-ecological relations in the project. This also requires a pluralist imagination in the practice to accept that a concern for external affects from the architectural project can be considered in the imagination (Guy and Moore 2007).

The proposition discussed in the paper is that a plural imagination can be improved if architectural modeling is understood as a process where several disciplines with different ways of understanding superimpose projective intra-representations of the specific project situation. I have investigated how a tentative the theoretical understanding of the modeling as the seeking out of shared referents in a superimposition of different intra-representations can be used to improve the understanding of how combined goals for social and ecological sustainability can be better implemented.

[2] Crysler et al. 2012 propose that architecture discourse in the epistemological sense can be classified as a 'practice theory discourse'.

I will argue that this requires a recognition of that the possible relations inherent to a specific project talk are found in the intersections between these projections and the identification of the specific shared material, discursive and/or experiential referents. This way of understanding modeling has been introduced in a case study of the planning for the Commerzbank highrise in Frankfurt which was planned during the 1980's and 90's (Moore 2007). Other studies demonstrate that this identification of shared referents requires a recognition of how those claims iteratively become entangled through intermodal translations intermediated by the juxtaposed intra-representations (Da Costa e Silva 2018, Medway and Clark 2003). Some studies also indicate that it requires a recognition of the performativity of the materiality of the architectural model as an autonomous agent in the project discourse (Yaneva 2009, Sahlin Andersson 1989).

The science philosopher Karen Barad has proposed that knowledge emerges in the making as an intra-action between discourse and matter through intermediation by an apparatus of observation (Barad 2007). She argues that the focus of research should be on the relation between discourse and matter enacted by the apparatus rather than the separate entities constituted by discourse and by direct perception of matter as a personal embodied experience. In architectural modeling, this can be compared to the system of representation of a project. Barad grounds her critique on a consideration of the responsibility and experience of the individual as a third embodied part of the act of knowledge production. She observes that when we speak of the universe as an object we are as observers at the same time implied in that object through our bodies. The mental fiction of a disinterested relation between the observing subject and the observed object at a distance enables us to develop an idealized knowledge about the universe and to reflect on our position in the universe as if we were outside the system. But Barad emphasizes that it also enacts a disconnection from the entanglement that constitutes reality which disables integrated ways of thinking about a situation. The entangled relation

instead implies that we are responsible for the consequences of the observation (Barad 2007, 176).

I propose that this epistemology can be employed to open architectural theory to a relational way of thinking about architectural modeling. In architectural reserach it has been recognized for a long time that the modeler is accountable for the consequences of the solution (Rittel and Webber 1973), but not that the model intermediate and embodies this relation.[3]

51.2 Materials and Methods

The relational theory is grounded on a critical discussion of how five previous theories of architectural modeling enable or prevent a thinking about modeling as a collaborative act of imagination when applied to a case of sustainable urban design: (1) as a cognitive act of logical inferencing from information guided by a first principle (Cross 2006); (2) as a Projective Cast of a will to transform a situation through a representation of an imagination in the mind of the modeler (Evans 1995); (3) as a materialization of a project specific discourse (Moore 2007); (4) as a performative materiality (Yaneva 2009; Johansson 2003; Tostrup 1999; Sahlin-Andersson 1989); and (5) as an intermediation of different practices (Erixon-Aalto 2017). Those theories are not understood as fixed entities but as representing heterogeneous discourses that can be defined by the ontologies they embody. This method is in line with critical studies of discourse as an investigation of the changes in the different elements of the discourse proposed by Michel Foucault (1969). In this case mainly what Foucault refers to as the rules of enunciation, i.e. how the knowledge is expressed. To this is added Habermas' practice epistemology of the lifeworld ontology (Habermas 1981, 31).

The critical investigation is situated in a plan for a new sustainable housing district at Lomma harbour. The plan is an implementation of the combined objectives for sustainable development and architectural quality adopted by the Swedish parliament in 1998.[4] The plan received the Planning Award of Architects Sweden in 2004 and can be considered as a typical representative of sustainable urban planning in Sweden during the 1990's on the scale of around 1500 apartments (Ramberg 2012).[5]

Even though this means that the planning methods are historical it is a typical time-span for the realization of a planning scheme in Sweden. This motivates a critical discussion of this plan now. In this case, the main innovation was the introduction of compensatory thinking in environmental planning which later developed into the concept of ecological system services as a framing of the green interest in urban design (Naturvårdsverket 2015).

The plan is constituted by planning documents that correspond to a decision process on four tiers: the policy and objectives for land use of the Comprehensive plan [ÖP], the strategy for implementation of the Amendment for the Town center of Lomma [FÖP] and a few adjuncted investigations on Children in Lomma and a Location analysis, the tactical Planning program with mainly to adjuncted programs for the Quality of public spaces and Environment and the detailed development plans [DP] that synthesize those programs in specific planning regulations that include both visual, technical,

[3] This system of enquiry is developed in depth in my coming doctoral dissertation which is planned to be defended at KTH in Stockholm in 2023.

[4] At the time the project aligned with the 16 National Environmental Quality Goals, and as many as seven are directly addressed by the plan: 1. Good built environment (referring manly to reuse of resources and energy efficiency), 2. Fresh air, 4. Non-hazardous chemicals in the environment, 8. Living seas and streams, 10. Oceans in balance and a living coast, 15. Limited climate impact and 16. A rich biodiversity. The architectural policy added the goals of aesthetic attraction and taking care of the local cultural heritage as a ground for the development. This set of national goals address SDG 3 Health, 11 Sustainable cities, 12 Sustainable consumption and production, 13 Fighting climate change, 14 Ocean resources and 15 Biodiversity.

[5] The program for the plan is similar to the famous cases of Hammarby sjöstad in Stockholm and Western harbour in Malmö, but without the ambition to be at the frontier of innovation.

functional and ecological aspects and are connected to a specific action plan for the environment submitted by the developer and an exploitation agreement. The relational theory of intermediation of intra-representations by the aggregate of superimposed intra-representations resulting from this investigation is tested as a frame for the organization of an innovation project for Elastic Homes with sharing.

The case study of the innovation project is grounded on a participatory approach to architectural research where the researcher is embedded in the practice as a partner but maintains integrity in relation to the practice by framing the observations in the context of formalized theory (Habermas 1981, 161). This is a participatory ethnographic method where the researcher is actively engaged in the practice based on the purpose of truthful knowledge and without a requirement to harmonize her or his observations with the plans of the practice (ibid. 106). In this case, this means that the theoretical understanding of the conditions for a collaborative practice emerged through a strategy to involve the experts in the modeling proactively with their own conjectural ideas, and not only through reactions on the architectural concept.

The practical aim of the innovation practice was to investigate the possibility to create a sustainable everyday practice through sharing in a conventional highrise apartment building.[6] The project was based on an application for step 2 funding from the Swedish Agency for Innovation Vinnova by a partnership of 21 companies of which I as a researcher signed for one and 7 affiliated organizations. Totally close to 100 persons were involved in the project during the three years, but the architect was the project leader. The study is grounded on a combination of participatory observation of the specific communicative interaction between the expert group of the architects, the sociologists (including social activists for collective housing), and the digital application engineers and the study of their multimodal reporting on the project.

[6] The SDG 10.2 concerning promotion of social, economic and political inclusion is a fundamental principle of the project, but it also engages with SDG 11 Sustainable cities, 12 Sustainable consumption and production, 3 Health and 5 Equality.

51.3 Results

The results of the theoretical investigations can be briefly summarized in terms of an argument for a transfer of the ontology of the discourse on the theory of architectural modeling. In that sense the investigation enacts a transfer from the separation of the modeling subject from the modeled object assumed in the rationalist discourse to an understanding of the ontology of architectural modeling as a relation between an individual experience of the modeler, the sharing of information in the project discourse and the matter of the situation of the project which is mediated by an aggregate of sufficiently superimposed intra-representations of the project situation by a group of agents that project their will to change a situation.

In the case of logical inferencing, the theory embodies a bias to assume an individual mind that conceives the model as a bounded object grounded on objective knowledge. In the case of Lomma, this way of understanding foregrounds the architect as the author of the planning concept of the small town. The architectural principles for the conceptualization of the urban design for Lomma Harbour are grounded on a Local identity analysis [Ortsanalys (OA)] adjuncted to the Amendment to the comprehensive plan for the town center [FÖP]. They are derived from a combination of framings in what is referred to as the 'physical structure', 'social conventions', and 'perceived character' that constitute what is referred to as 'possibilities' in the document. The analyst expresses an awareness that the recommendations are constituted by several different types of what she refers to as 'knowledge grounds' [kunskapsgrunder] (OA, 3).

This heterogeneous ontology of the site analysis is described by the author as 'a systematization of knowledge to understand the history, present situation and future possibilities of a location' (ibid. 3). From the epistemological

point of view this system of analysis reflects the general heterogeneity of lifeworld knowledge as observed by Habermas (1981). This also reflects the combined social and ecological objectives of the ÖP to protect the agricultural land and create attractive housing for the region through the reuse of the polluted and abandoned industrial harbour. The chosen proposal from a parallel commission is developed into guidelines for architectural quality in a *Quality program*. It emphasizes the significance of variation and experiential sensorial qualities that are combined with a concern for biodiversity and renewable energy. It prefigures the form of a lowrise dense pattern of integrated development of traffic and buildings with a blockgrid pattern interspersed with blue-green pathways (Fig. 51.1).

The analysis of the plan with the theory of representation of an imagination foregrounds that this discourse on modeling embodies a critical understanding of the contingency on the bias of the modeler and that the grounds of judgment also include emotional aspects and values that constitute the disposition of the modeler (Habermas 1981, 31). In this case, the analysis focuses on how the visual representations in the *Quality program* enact the project by exclusions of some aspects and inclusion of other. For example, the perspective drawings by the architect foreground the public spaces and their relation to the water and present the ecology of the site such as trees and water as a static objects for aesthetic contemplation and social utility. Not as a living thing that will change over time.

In contrast, the representation of the project in the *Environmental program* gives more attention to the conditions for the dynamic changes in nature and also recognizes the interests of the animal and herbal life on the coast, the biodiversity.

The analysis in terms of the theory of materialization of discourse transfers the agency to a historically contingent intersubjective agreement which acts as an institutional apparatus or regime that orders the understanding of the project (Foucault 1975). But it also implies the significance of the communicative interaction between the actors to constitute the solution (Habermas 1981). An analysis of the speech acts shared between the planners, architects, environmental experts and the developer, as represented by the written statements on the planning regulation in the planning documents, indicates that the actors have different communicative dispositions in terms of the openness of the statements and their embodied ontological ways of understanding the project. The communicative openness is the greatest in the planning documents on the intermediate level of the Amendment and the Planning program and is more closed on the tactical and operative level of the detailed planning regulations as could be expected. Statements on the aesthetic and spatial requirements are mainly made by the architects and planners whereas the environmental experts and the developer are focused on functional and technical requirements. The planners and architects also include combinations of ontological grounds of validity such as aesthetic, technical and social (functional) to a much higher degree than the other actors (Fig. 51.2).

This way of analyzing the planning process foregrounds the communicative interaction and the condition of the ontological and communicative disposition, concerns and attachments among the participants, for the determination of the spacetimematter at the site. It backgrounds the contingency of the discourse on the materiality of the site and preserves the bias of the subject, even though expanded to an intersubjective agreement.

The discourse on the materiality of the representation of an architectural project as a performative speech act instead foregrounds the agency of the materialized representation of the imagined architectural model to determine the perception of the situation among the multiple actor-subjects that constitute the project (Butler 1993). The framing of the case with this theory foregrounds the rhetoric significance of the visual representations of the architectural model to transcend the incommensurable representations of the project among the actors found in the critical discourse analysis. This agency can be referred to as the concrete visual embodiment of the concept of the metaphor of the small town and the townhouse that act as a paradigm for the

Fig. 51.1 The legally adopted Plan Map of Lomma Harbour District enclosed to every detailed development plan. Image credit Brunnberg and Forshed Architects 2003. Public domain granted by Lomma municipal government

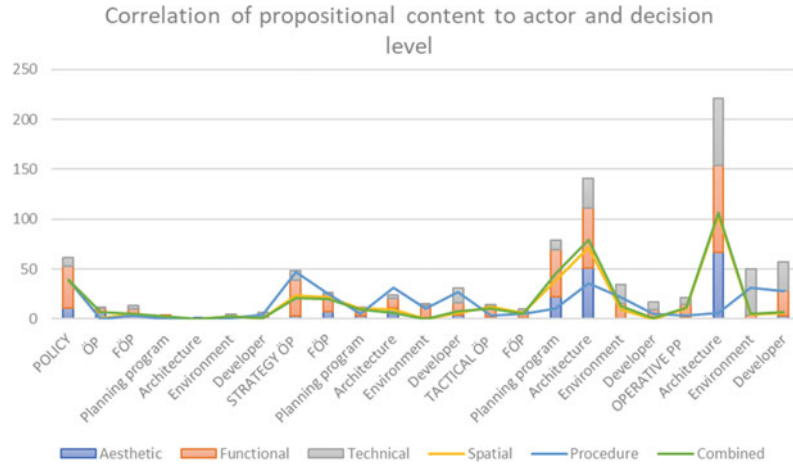

Fig. 51.2 Distribution of propositional content among documents and levels of decision according to the ontological grounds of the validity of the claim on the project. Diagram ©PM Sällström 2022

development which is open to appropriation by all the actors (Johansson 2003; Sahlin-Andersson 1989). It can also be referred to the embodiment of the concept in the *Plan Map* that acts as a spatial syntagma and orders the discourse on the project as a non-contested unmarked condition which is the privilege of the planners and architects to control (Tostrup 1999). This demonstrates how this theory represents a step towards the liberation of modeling theory from its dependence on human subjectivity to an understanding that the material objects that mediate the discourse also have an autonomy as agents that influence the discourse independently of the subject actors (Yaneva 2009).

Finally the discourse on architectural modeling as intermediation of practices foregrounds the role of the material representation to mediate the relations between the different practices and specific individual experiences that constitute the project-specific discourse as a system for distributed cognition (Nersessian 2006). It also attends to the materiality of the site of intervention and how this influence the decisions (Yaneva 2009). In the planning for Lomma, the stated purpose of the *Plan Map* and the *Quality program* is to enable a shared understanding of the project. The discourse analysis also indicates how the *Plan Map* orders the discourse through the spatial order it enacts as a figure for thinking about the project. This can be exemplified with the conflicting claims on the plan by the traffic planners and the architects. The former wants to separate cars from walking people, the latter to integrate them. The conflict is in this case intermediated by sections of every type of street in the district where the relation of the different kinds of traffic are concretized but that are also accompanied by rhetorical writing with arguments that bridges the objective of transforming roads into streets on the condition of the pedestrians.

51.4 Discussion

Grounded on this critical investigation of the discourse on architectural modeling I propose a provisional relational theory of architectural modeling that I refer to as an intra-representational practice. This hypothesis can be visualized with a diagrammatic representation of the relations of the elements of a project-specific discourse identified in the theoretical investigation of the planning for Lomma Harbour: (1) the entangled matter, discourse and experience in the situation of a planned intervention; (2) the different discourses, experiences and general understanding of matter that constitute the project as an object of attention by the participants as members of different disciplinary practices (represented by only two instances A and B to imply a multitude) and (3) the intermediations of these discourses with projective

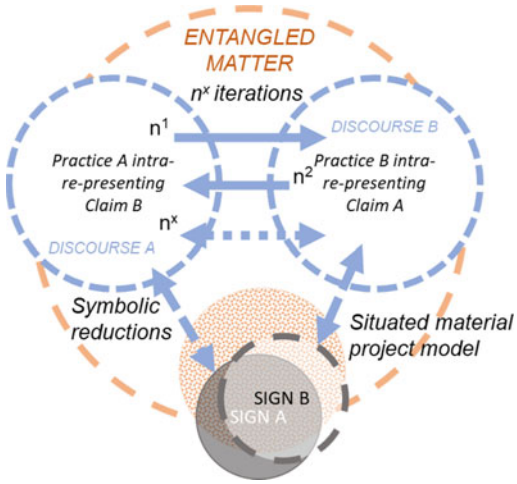

Fig. 51.3 Diagram of the elements in architectural modeling. Diagram ©PM Sällström 2022

intra-representations (sign A and sign B) of the specific project situation grounded on combinations of personal embodied experiences and different practice systems of representation that are superimposed on the project situation together with the specific expression of the situation by the architectural model (Fig. 51.3).

I propose that this provisional theory of architectural modeling can be used to foreground the relations between the social and ecological, human and nonhuman, interests in a project and enable a more inclusive practice. I will demonstrate this in a discussion of how the provisional theory can be used to understand the relations between the different concerns of the project in the case of Lomma Harbour and the Elastic Home.

51.4.1 The Lomma Harbour Planning Project

In the case of Lomma Harbour, this can be demonstrated with the superimposed claims on the green in the district by the architects and the environmental experts. The principles of socio-ecological interaction stated in the Comprehensive plan are interpreted in the *Quality program* [QP] by the specific solution concept to give each area in the district its own aesthetic theme constituted by 'its unique set of plants' and that 'the buildings of the district wreath the central green, which is a part of the town-web of intensively cared for green areas' (QP, 6). For the territorial objectives of the different thematic areas in the district, it is specified that: "A conscious design of planted surfaces is completely determinative for the character of the urban space, both as regards location and selection of species. Different tree species have completely different properties that they contribute to the character of the urban space—different lightness, density, color and suitability considering growth conditions etc." (QP, 17) The QP expresses a clearly biased point of view on the ecological elements in the plan: "The green is not only grass and leaves in general. Neither is green an element which is only "nature". The right kind of green belongs to the urban culture." (QP, 17) The *Children in Lomma* report also grounds its recommendations on a perceptual experiential understanding that 'the courtyards should include materials that stimulate all senses: smell, taste, touch, sight and hearing' (Children, 80). This document expands the understanding to a broader field of sensorial bodily experiences.

I propose that this aesthetic-ethic way of thinking guides the architectural conception. It can be generalized as an ontology that combines individual experience and discourse. This framing of the plan in a human interest is constituted by the stated purpose of the *Quality program* to define the aesthetic architectural form for the public spaces in the district. The only objective in the *Quality program* which to some extent is grounded on a concern for a nonhuman interest is the designation of the Sandskogen new forest to the north in the plan figure both as a passage for walking and as a corridor for spreading plants and animals to promote local biodiversity.

The argument for the green in the *Environmental Program* [EP] is instead mainly grounded on quantitatively measurable effects such as that the green areas will contribute to better air quality and health (EP, 13). An important contribution of the EP to the development of the district is the specification of the nonhuman

interest of biological diversity as a major concern. The EP states that 'great biological diversity makes the district more interesting not the least for animals and the life of nature' (EP, 13). This concern is framed as a matter of 'minimizing interventions in nature and demonstrating care for existing vegetation' (EP, 13). This motivates the partial re-construction of the ecosystem of the harbour area. The social and aesthetic concerns for the green in the EP are mainly grounded on the utilitarian and economic arguments that 'by the creation of a spirit of homeliness by means of comfort, security and proximity, the wear on the district is diminished' and that this 'decreases cost for maintenance' (EP, 24). Not that it contributes to the social and psychic wellbeing of the people who live there, which is foregrounded by the QP. The authors of the EP avoid any other specification of the social objective stating that 'it is hard to define and quantify a good social environment' (ibid. 24). They recognize the significance of the social dimension of the plan but refer to the QP for a specification of those aspects. The field of concern for a 'living town district' in the EP, which corresponds to the objectives of the small town in the QP, includes very few specific goals. This indicates a technoscientific bias that plans should be grounded on objectively validated and verifiable information. Not on intersubjective agreements or self-expressions of personal experiences as assumed in the QP.

This case demonstrates how what can be referred to as a technoscientific understanding that focuses on nature as a material resource for biodiversity is juxtaposed with a psychosocial way of understanding the values of nature in the project situation. This results in a double determination of the green in the plan both as the cause of better air quality and as the source of experiential character. I propose that those two epistemologically and ontologically incommensurable representations of the architectural project for Lomma Harbour can be understood as two different intra-representations of the socio-ecological concerns of the plan. They are sufficiently superimposed as projections of the model to enable the identification of shared material referents such as trees and green corridors and constitute a sufficiently integrated model of the district to enable a coordinated action without a complete domination of either perspective. But I propose that the psychosocial understanding dominated the conception.

51.4.2 The Elastic Home Innovation Project

In the case of the innovation of a typology for housing with sharing, I tested to mandate several expert groups to project ideas on the project based on a shared brief. Not all the groups demonstrated a projective disposition, but the groups of architects, sociologists and digital designers made sufficiently articulated proposals to enable a qualified discussion about the ontological differences embedded in their intra-representations and how they became connected as superimpositions during the modeling. This can be exemplified with the communication of the shared concern for codes of conduct, the rights and duties of the residents, that enables a micro-common of sharing in a small community of about 30 people. In the intra-representation of the project by the architects they demonstrate a preference to foreground the significance of the spatiomaterial configuration and its capacity to enable sharing as a materially determined order which can be articulated by the textures and detailing of the spatial distinctions.

I propose that the intra-representation by the architects of the plan embodies an understanding of sharing as a spatiomaterial object of bodily experience, aesthetic and practical similar to the thinking habits of the architects in the Lomma project. The sociologists instead intra-represent the project with a linguistically mediated ontology that foregrounds the intersubjective agreements on sharing and stress the significance of initiating a story about the complex spatial distinctions that define the rules for sharing. The sociologists argue that the story that explains the distinctions of the complex spatial order, which was indicated in the brief and the plan figure, will be the most efficient way of maintaining the

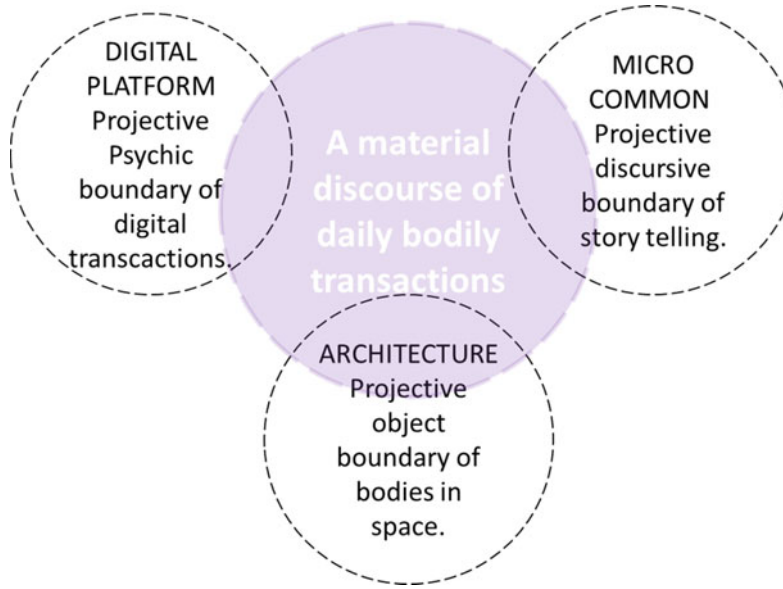

Fig. 51.4 Diagram of the juxtaposition of discourses of the architects, sociologists and digital designers in the innovation project. Diagram ©PM Sällström 2021

system of sharing. The intra-representation of the concept of sharing by the digital designers instead embodies an understanding of sharing as transactions between individuals that are contingent on their psychic motivation, rather than social agreements, storytelling or bodily presence. The digital designers demonstrate a more individualistic approach where sharing is only understood as a transaction between individuals as if it were without a need for codes of conduct in a local community.

A visualization of the juxtaposition of these three discourses on the project can enable thinking in terms of potential points of intersection, such as the shared referent of the communication of rules for sharing in the digital interface between the virtual and the real model of the house (Fig. 51.4).

However, the main initiative remained with the architects who controlled the conception through the architectural model that intermediated the different discourses with the projected spacetimematter of the imaginary project. In this case the condition of the pandemic also prevented spontaneous or unauthorized communicative interaction and exchange of information at meetings and general conferences. This presumably diminished the number of iterative exchanges of intra-representations between the practices that could have enabled the identification of more shared referents and a more integrated project model.

The parallel development of an idea for the communication of local circuits of other resources like energy, water and waste, as a 'sustainable everyday practice', by the architects can be used to speculate on how the project could have developed with some more iterations. This intra-representation was first proposed by a group of designers that participated in the programming stage before the brief. The design group worked with critical design fictions that developed the understanding of the meaning of a future situation of scarcity and local self-management through design of objects as if they had been brought back from this future. This intra-representation of the project was appropriated by the architects in a second iteration after the brief and, but it was not presented to the sociologists and digital designers. The architects embodied the sustainable everyday practice with sectional cuts to represent the resource circuits of the house. These were illustrated with different scenarios of how the residents could interact with this system at specific points in the house (Fig. 51.5).

Fig. 51.5 Perspective representation of the window for growing vegetables in the kitchen with recycled water. Image credit KOD Architects 2020 with permission

In this case, I conjecture that the sociologist could have argued that those resources also belong to the micro-common and must be regulated with codes of conduct and a story that explains to the residents how they can share those resources. In the case of the digital designers I conjecture that they could have identified methods to communicate the rate of reuse in the house to motivate local interaction between the residents and the local resource flows to incentivize reuse. The possibility to identify such shared referents could have motivated a special meeting between the sociologists and the digital designers. As it were all communication was mediated by the architects. In an interview, the architects argued that they preferred a consecutive procedure where they had time to compare the intra-representations by each expert, one at a time. Could a less hierarchic organization in this case perhaps have improved the rate of innovation?

51.5 Conclusion

I have demonstrated how an agential realist ontology can enable attention to the relation between the social and ecological concerns in architectural projects. The two case studies only motivate a classification of the theory as a tentative and provisional approach to represent collaborative architectural modeling. The speculative discussion gives a first idea of how the theory could assist a project management team to better identify the need for communicative interaction in the early stage.

To become operative the theory requires further studies on how participants in a project group can develop skills to identify the shared referents at an earlier stage. I hope this investigation will inspire further studies on how the theorizing of architectural modeling can support the expansion of practice into the field of sustainable cohabitation of our planet.

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I.N.S.E.C.T—Summercamp: Developing Multispecies Design Perspectives, Practices, and Discourse Through Co-creating (in) Community

52

Svenja Keune, Asya Ilgun, and Colleen Ludwig

Abstract

We present the two-part I.N.S.E.C.T Summercamp 2022, which aimed to connect designers and researchers who are invested in multispecies perspectives for design. Co-creation was used as a strategy for organizational purposes and co-creation methods played a major role to promote innovative outcomes and strengthen the ownership of solutions and trust among participants. The two parts of the summercamp followed different strategies for co-creating the facilitation and organization of the camp experiences and led, to different degrees, to co-creation that continues beyond the duration of the camp. We apply Bentzen's conceptual framework, "a continuity perspective on co-creation" as a means to map, describe, and reflect upon the levels, phases, and the roles of involvement of organizers, and human and non-human participants (2022). Part 1 (Case 1) was organized with the focus on *designing-for*, whereas Part 2 (Case 2) centered around ways of *being-with* other living beings, i.e., insects. Through this case study, we present and discuss a program and two formats that are based on human co-creation and that allow us to engage with our own and other species more deeply. Thereby we strengthen the field of multispecies design and respond to one of the biggest challenges designers face today: integrating post-anthropocentric perspectives into their work.

Keywords

Multispecies design · Co-creation · Community building · Digital fabrication · Biodesign · Embodiment

52.1 Introduction

52.1.1 The I.N.S.E.C.T. Summercamp

Asya Ilgün, Dilan Özkan, Laurin Kilbert, and Svenja Keune facilitated the two-part I.N.S.E.C.T Summercamp in 2022. The camp aimed to connect designers and researchers and to provide

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platforms for engaging (Ramaswamy and Ozcan 2014) in discussions and explorations around ethics and multispecies relationships. The acronym I.N.S.E.C.T. grew from the title of our design project: An INterSpecies Exploration through biodigital Craft and manufacturing Technologies. We, the authors and the members of the I.N.S.E.C.T. community, a loose collaborative formed out of the I.N.S.E.C.T. Summercamp, use it as a term to embrace small organisms that do not commonly attract human attention. In addition to insects, these include fungi, bacteria, and other organisms with more non-hierarchical communities. The Summercamp encompassed two strategies: *designing-for* and *being-with* other living beings, i.e., insects. Whereas the use of living organisms, e.g., to produce materials is common practice within biodesign, exploring ways of *being-with* them (De la Bellacasa 2017; Keune 2019) has recently been expanding the field. *Being-with* includes what Donna Haraway describes as "staying with the trouble," (Haraway 2016) which means to conscientiously endure discomfort that arises when we engage with living organisms that we are averse to, such as the mere presence of a hornet. The I.N.S.E.C.T. Summercamp was organized around three primary objectives:

1. To contribute to biodesign and multispecies design by developing engagement programs and their formats that are based on human co-creation.
2. To expand the range bio- and multispecies design methods including embodied practices, which form the basis for the development of tacit knowledge, gained through observation and experience. The goal of embodied practices is to anchor our experience in a specific, local context in both the design work and in everyday living.
3. To form a vibrant research community that exceeds the duration of the camp, where intimate connections between and exchanges among disciplines and knowledge traditions can thrive.

52.1.2 Design as a Process

One of the biggest challenges we, as designers, face today is to integrate post-anthropocentric perspectives into our design decisions and everyday lives. The importance of the connection between our practices and our beings is emphasized by the Inner Development Goals and the Metadesign Manifesto "a(A)dapting to change must include re-inventing our practices AND ourselves" (Inner Development Goals 2002; Metadesigners Network 2022). Like Puig de la Bellacasa argues, "Thinking-with nonhumans should always be a living-with, aware of troubling relations and seeking otherness that transforms those involved in the relation and the worlds we live in" (2017). Based on Guattari's concept of "ecosophy," Gatto and McCardle argue that sustainability is a process rather than an outcome and should be understood as a behavioral attitude that is implemented through design (2019).

52.1.2.1 Co-creation

Co-creation refers to a process in which several collaborators are engaged in a dialogue that is based on respect, the willingness to work together, curiosity/openness to the perspectives of everyone involved, and a sharing of power (Newton and Geissel 2011). It entails identifying problems, generating ideas from various viewpoints to find solutions, and putting them into action (Nabatchi et al. 2017; Torfing et al. 2016). We used it as a strategy for organizational purposes, to promote innovative outcomes within multispecies design, and form community because co-creation strengthens ownership of solutions and trust among participants (Torfing et al. 2016; Fledderus 2016). Sanders and Stappers predicted that the co-creation paradigm would lead to an enormous shift in the role of design researchers towards facilitation. This facilitation takes place in service of collective creativity through qualities/acts such as guiding, leading, offering, and providing nurturing conditions for the individual's levels of creativity (Sanders and Stappers 2008).

52.1.2.2 Biodesign and Multispecies Design

Common and well-accepted design interventions exclude many organisms but instead employ technologies to repel or exterminate so-called pests while protecting species based on their usefulness to us as humans. To develop alternative programs/formats for engaging in multispecies design, we must ask how we as designers and artists engage with living beings, and what kinds of knowledge we need to do so. How can we approach the complexity that comes with entangled ecologies when our design programs generally aim to simplify design problems? How can we design beneficial structures for other living beings? How will we ever know when we have succeeded? These questions cannot be answered in isolation. We need interdisciplinary discussions with ecologists, biologists, entomologists, other designers, artists, practitioners, and researchers. Most designers in the field are without a supportive infrastructure, such as access to scientific discourse, lab work, and analysis. This slows down our development of multispecies perspectives and sustains the gaps between different disciplinary knowledge.

Ecofeminist scholars inspire new approaches in design research and practice in which a sensitization towards living beings becomes fundamental (Tsing 2015; Haraway 2016; Westerlaken and Gualeni 2016) and is an important step to advance the general production of scientific knowledge. Cajete argues "When we remove artificial subject–object distinctions in science and take relationality more seriously, we come to see animals as participants in the co-creation of knowledge" (Cajete 2000). We used two approaches/strategies to co-create and integrate factual and tacit forms of knowledge: *designing-for* and *being-with*, which we both related to with their distinct set of methods.

Designing-for, the leitmotif/approach for Part 1 is a perspective in which the designer conceptualizes and creates an environment for a specific organism by researching and integrating their needs into the proposal. The designer's intention and the needs of the organisms are negotiated in an interplay of nurturing and controlling. Collet (2017) defines this balancing of needs and intentions and the shape-forming activities that the organisms are engaging in as they adjust to changing environments, as a form of "co-working." However, in this case, we refer to *designing-for* as the creation of an architectural framework with the best intention to benefit one or more organisms, which creates a suitable environment and opportunities to collaborate or even co-create with other organisms.

Being-with, the leitmotif/approach for Part 2, is inspired by Design's reading of feminist discourses and can be best described by referring to Bubers phrasing "(…) but look, these beings live around you, and no matter which one you approach you always reach Being" (Buber 1996 in Webb et al. 2023). In its pure form, *being-with* is a state of attention where the "self" is left behind and through which we can let go of our projections and allow the species expressions to unfold (read further Webb et al. 2023 and Wels 2013). We remind ourselves that we co-exist with other beings in our public spaces, homes, and bodies. This way we can create scenarios where more organisms have space to follow their course and organize themselves more organically. However, these practices and level of awareness easily get lost in busy and indoor-based lifestyles.

Traditional research methods have historically parsed species and examined animal behavior in isolation. As today's practitioners, we the I.N.S.E.C.T. community, aspire to meld human and non-human design methods by developing engagement programs/formats that allow us to engage with other species more deeply (Throop 2023). Following this perspective, we "consider empathy as a process that begins with a general orientation that tunes the observer to recognize the embodied mind of another" (Webb et al. 2023).

52.2 Case Study: I.N.S.E.C.T. Summercamp Part 1 and 2

The two parts of the I.N.S.E.C.T. Summercamp followed different strategies for facilitating and organizing activities. Part 1 (Case 1) focused on *designing-for* other insect beings, whereas Part 2 (Case 2) centered around *being-with* other insect beings. *Designing-for* is deliberately creating something for other organisms by drawing from scientific insights into their developmental stages, physiology, habitats, behaviors and ways of life (e.g., Ilgun and Schmickl 2022; Parker et al. 2022; NEXT Architects 2015). *Being-with* relates to ecofeminist philosophies and practices (Lloro-Bidart 2018) and draws from embodied methods that create personal experiences, bodily sensations, and movement. The two parts of the Summercamp are briefly compared in Fig. 52.1.

We use the two parts of the summercamp (P1 and P2) as our two cases (C1 and C2). We apply Bentzens conceptual framework on a perspective

Fig. 52.1 Comparison of C1 and C2 organization and implementation parameters

	Case 1 (P1)	Case 2 (P2)
	I.N.S.E.C.T. @ OME/HBBE (UK)	I.N.S.E.C.T. @ Hvalsø (DK)
Methodology:	designing for	being with
Engagement Platform:	provided design proposal scaffold with…	fully co-created program with provided habitat
Title:	INterSpecies Exploration through biodigital Craft and manufacturing Technologies	Towards Multispecies Worldings as an Everyday Design Practice
Dates:	1.-10. August 2022	12.-19. August 2022
Participants:	9 selected participants	ca. 35 co-creators
Setting:	urban - inside workspaces such as labs, workshops, seminar rooms	rural - outside explorations such as barn, forest, meadow, terrace, outdoor kitchen
Common Goals:	designing and fabricating wall prototype for insects	exploring ways of being with humans and more-than-human beings
Technologies / Activities:	Parametric design and digital clay fabrication with crocheting and other craft	Primarily craft and nature based tools, embodiment practices such as meditating, moving, dancing, feeling, sensing, walking, discussion, with
		some digital social media technologies
Time Parameters:	specific working hours and spaces	living and working together around the clock
Outside Regulation:	rules, risk assessments, defined responsibilities	freedom of expression and co-creation, shared responsibilities
Hierarchy:	pre-defined hierarchical framework	semi-hierarchical emerging open framework

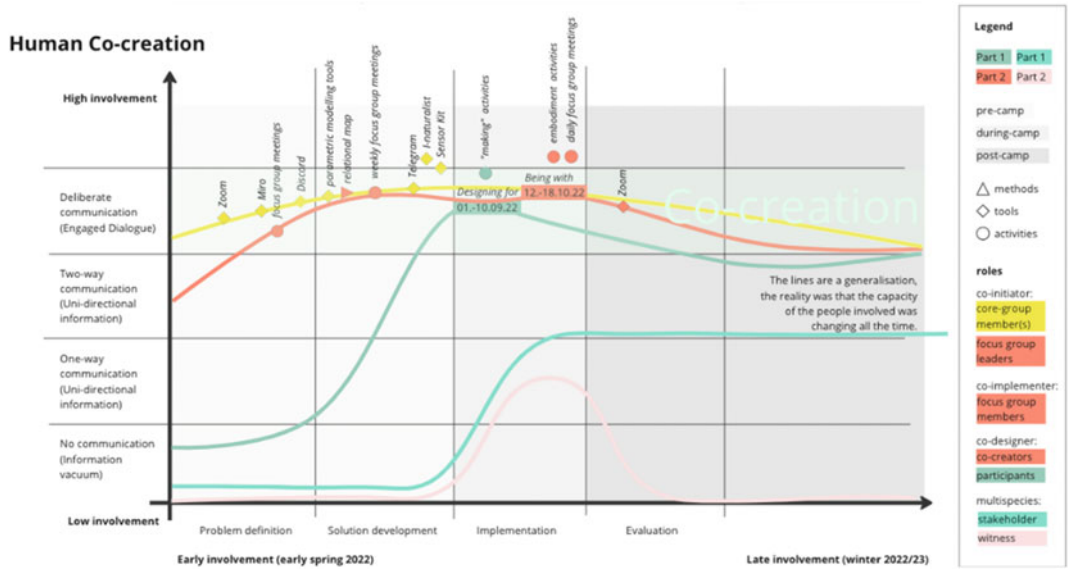

Fig. 52.2 An integrated map of the co-creation spectrum across Part 1 and Part 2

of continuity in co-creation (2022) as a means to map, describe, and reflect upon people's levels-of-involvement, ranging from no involvement to high involvement. Additionally, levels-of-involvement are divided into phases, including preparatory phases of problem definition and solution development pre-camp; implementation during each camp; and evaluation of the camp that continues at the time of writing, post-camp; to gain insight into the success of co-creation methods used at the camp. In this paper, we refer to the organizers of the workshop as core-group, the participants of P1 as participants, and the participants of P2 as co-creators.

52.2.1 INSECT Summercamp Part 1: Designing-for

Case 1 was a workshop to design for insects. We were inspired by an observation made by Asya Ilgün, in which a violet carpenter bee (X. *Violacea*) excavated galleries for laying her eggs into a pre-grown mycelium composite (Reishi or Lingzhi, G. *Lucidum*, a white-rot fungus not a local native species). Thus, we considered wild bees as our main stakeholders for whom we designed and installed a prototype, a façade installation outside the OME experimental building at the Hub for Biotechnology in the Built Environment (HBBE) at Newcastle University in the UK.

Pre-camp. Problem definition, Solution development

In the months prior to the camp, the core-group combined their expertise in parametric design, clay-3D-printing, freeform crocheting and living mycelium networks to explore a combination of material qualities (problem definition). This process was interwoven with the co-creation of a general design strategy and workshop agenda (solution development) (Fig. 52.2)

Careful consideration was given to providing workshop participants with a framework that ensured direct access to information, materials, and other resources and respond to individual's levels of creativity (Sanders and Stappers 2008), while leaving enough room for individuals and the group to influence processes, design decisions, and outcomes. Three weeks before gathering, the references, software, and plans were introduced and discussed with participants at an online meeting. The core group gathered and

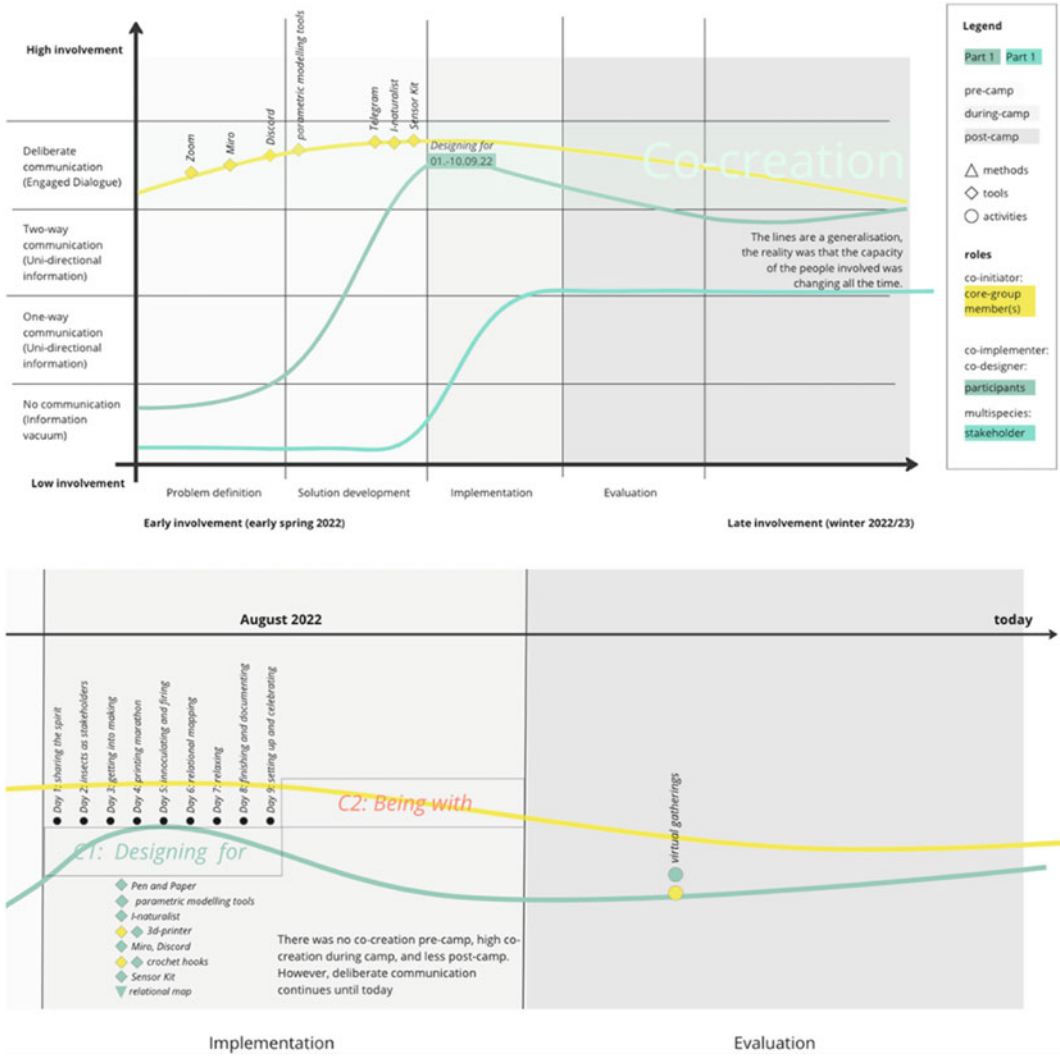

Fig. 52.3 Mapping of the co-creation spectrum across Part 1

prepared species profiles about local insect species via iNaturalist, a citizen science platform and database. A virtual field trip with entomologist Gernot Kunz (https://www.gernot.kunzweb.net/) provided insights into the compilation/assembly of a professional "insect-hotel".

During Camp. Implementation

During the first day, the core group introduced the workshop strategies and agenda, along with principles of engagement. The goal was to create an authentic group culture through twice daily check-ins, and actively self-accountability, trust, proactive engagement, and authentic communication. These methods and principles helped trigger the shift in thinking that co-creation requires; in which value is co-created and based on the experiences of everyone involved (Ramaswamy and Ozcan 2014). The core group learned to balance between "providing scaffolds" and offering a "clean slate" to nurture participants in their varying levels of creative expression: creating from inspiration, skillful making, personalizing, and productively producing (Sanders and Stappers 2008). This strengthened the group dynamic, tended to the well-being of each

individual and kept everyone informed about the status of the workflow. Each of us introduced our work, so that we could relate to each other more easily. We formed small groups to focus on multiple design, production, and assembly-related chores.

The workflow demanded parallel design and fabrication processes to manage complex timing parameters. Team tasks included clay preparation and 3D printing, module design, design of the overall structure, textile strategies, mycelium care, and sensor monitoring. Since the workshop was developed by the core group, the co-creation of the workshop participants started during its implementation (Fig. 52.3). Miro, a virtual whiteboard tool (https://miro.com), served as the main tool for collecting, sharing, spreading of design ideas, encouraging decision-making as well as harnessing insights.

The core group gathered several times a day to adjust the schedule in relation to the overall atmosphere and milestones. They maintained their role as facilitators, provided scaffolds, and guided individual and collective processes. The core group used a method called a "relational map" (Fig. 52.4) that mapped each participant's strengths into a complex overall workshop ecosystem and gave each one a special challenge to contribute something from their skillset. This completed the camp with a strengthened vision that could outlive our camp experience.

Besides involving their design, insects were rather passive stakeholders. The mycelium in contrast played a more active role. We had to enhance the saturation/penetration of the substrate before and after inoculating the textiles and clay modules to provide optimal growing conditions for them.

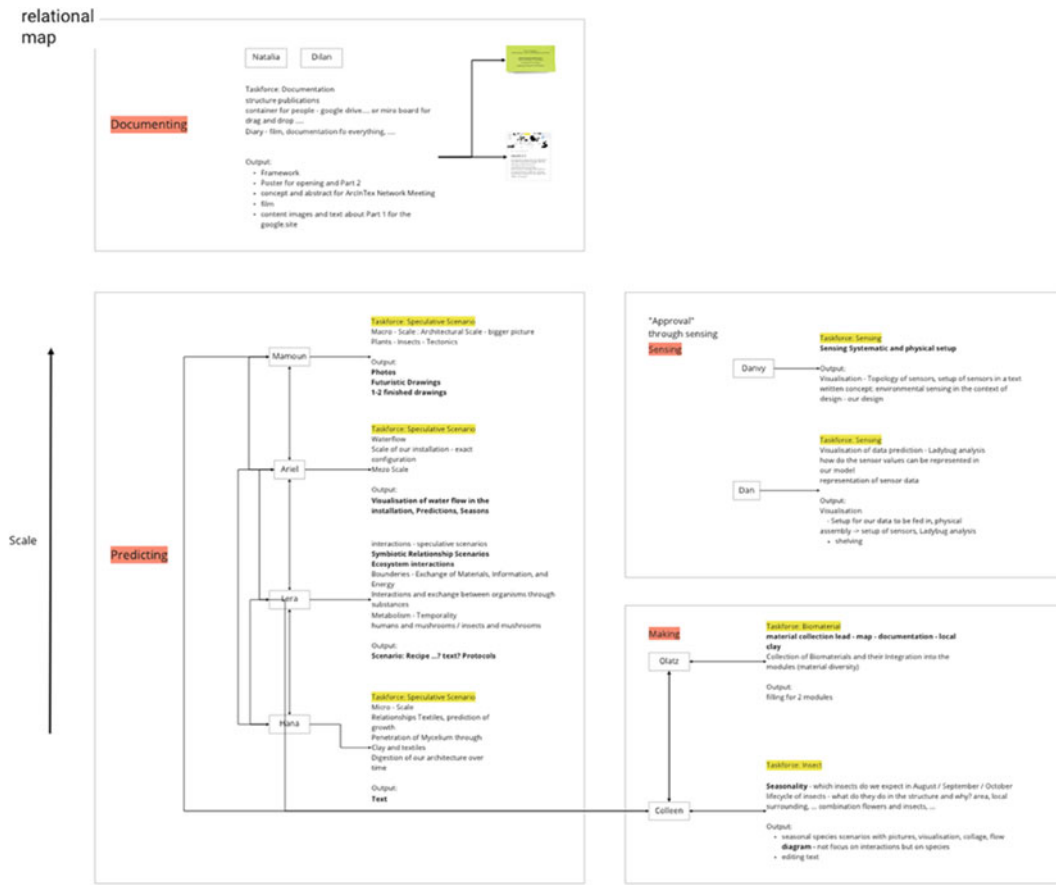

Fig. 52.4 Relational map of the participants and their potential relationships

Post Camp. Evaluation

In the past 6 months, the majority of participants have stayed in regular exchange and we have a few people who are reporting observations of the prototype. Since it was installed very late in the season, few observations of insect interactions have been made and we are hoping for more contact/exchange in spring 2023. The microbiome study is on its way. In a brief visit, one of the core group members spotted a significant change in the expressions of the textile parts that connect to the soil, as well as signs of degradation in the unfired clay prints. Since expressions include haptic and smell, personal observation is crucial to obtain information (Fig. 52.5).

Projects around the dissemination of the artifact led to extended co-creation that exceeds the duration of the camp. Both the P1 and P2 co-creators are now connected through social media and share information, events, projects, visits, feedback, support, and other resources with one another.

Post camp, insects have evolved from indirect to direct stakeholders. Through the prototype, there is a physical meeting point, an intervention that fosters relationships with insects and their local ecosystem. Jönsson considers such an intervention as a design event, a process in which entities (human and nonhuman actors) come together, and become something else, a hybrid formation that emerges (Fraser 2006; Jönsson

Fig. 52.5 Relationships between humans, clay, textiles, mycelium, and insects

2015). She also argues for a shift in the role of designers as facilitators of design processes that stakeholders, in our case insects, engage in.

Since environmental monitoring presents more scientific ways to evaluate designs, we equipped parts of the structure with temperature and moisture sensors and collected microbial samples for a microbiome study to be continued in Graz, Austria.

Unfortunately, the sensors could not handle the climatic conditions and malfunctioned. Thus, we created a contingency plan to reimplement microclimate scenarios to which several participants have agreed to. This provides more opportunities for the I.N.S.E.C.T. community to co-create.

52.2.2 I.N.S.E.C.T. Summercamp Part 2: *Being-With*

C2 concerns the production of a summercamp to address the need to broaden human perception so that we become more sensitive to and aware of the presence of insects and other small organisms that are difficult to comprehend. A group of 35 practitioners and researchers gathered on a small farm in the countryside of Denmark to explore co-creation as the main approach to *being-with* one another and with other beings, and to make space to allow relationships and activities to emerge in the moment.

Not everyone was a co-creator at all times, in fact, there were different levels of involvement present which changed across the four stages according to the individuals' capacity and preferred mode of engagement/creativity. However, since everyone was a co-creator, just at different times, we use the term to refer to all who were involved in the P2 (Fig. 52.6).

Pre-camp. Problem definition, Solution development

As described in Bentzen, the quality of co-creation processes is interrelated with high levels of involvement (2022). To create a sense of community that seems attractive to the co-creators, one of the core group members facilitated video calls with moderation and guided team-building activities like check-ins, personal shares, relational games and maps (Fig. 52.7). The authentic sharing of personal feelings and opinions, and to be met with acceptance and compassion, created a sense of trust in one another which is "an important lubricant in social processes" (Ibid). Co-creators organized themselves into focus groups, to attend to the challenge of living together in a scout camp. Topic groups investigated the areas of perceiving, thinking, moving, making, and documenting, other topic groups tended to organizational matters. Once set up, the groups met independently to plan food orders, set up activities, schedules, or create the camp map, for example.

During Camp. Implementation

A key aspect was hosting the camp in a quiet environment, where there was space to feel and respond to more subtle sensations in our bodies. Embodiment in general played a major role. Methods such as Embodied Ideation (Wilde et al. 2017) served as methods to feel, express, and imagine ourselves as another by, e.g., making insect-inspired costumes and exploring them during a "perception walk." Primal Play, an embodied relational practice in which humans meet through movement, breath and sound, brought us in closer connection to our primordial impulses and communication beyond words. A blindfolded exploration in the forest brought us closer to non-visual experiences, fermented leftovers from the garden to our sense of taste, and observations with magnifying tools into the scale of insects (Fig. 52.8). We felt it was important to make the camp a cohabitation experience, where people were living and working together around the clock. We spent time opening our senses and imaginations, while exploring the neighborhood's flora and fauna, preparing food, bathing in the lake, walking through the forest, discussing around the campfire, documenting our experiences, and disseminating them through sharing a poem or staging a skit. We spent time in states of attention, which Nimmo describes as allowing someone's or

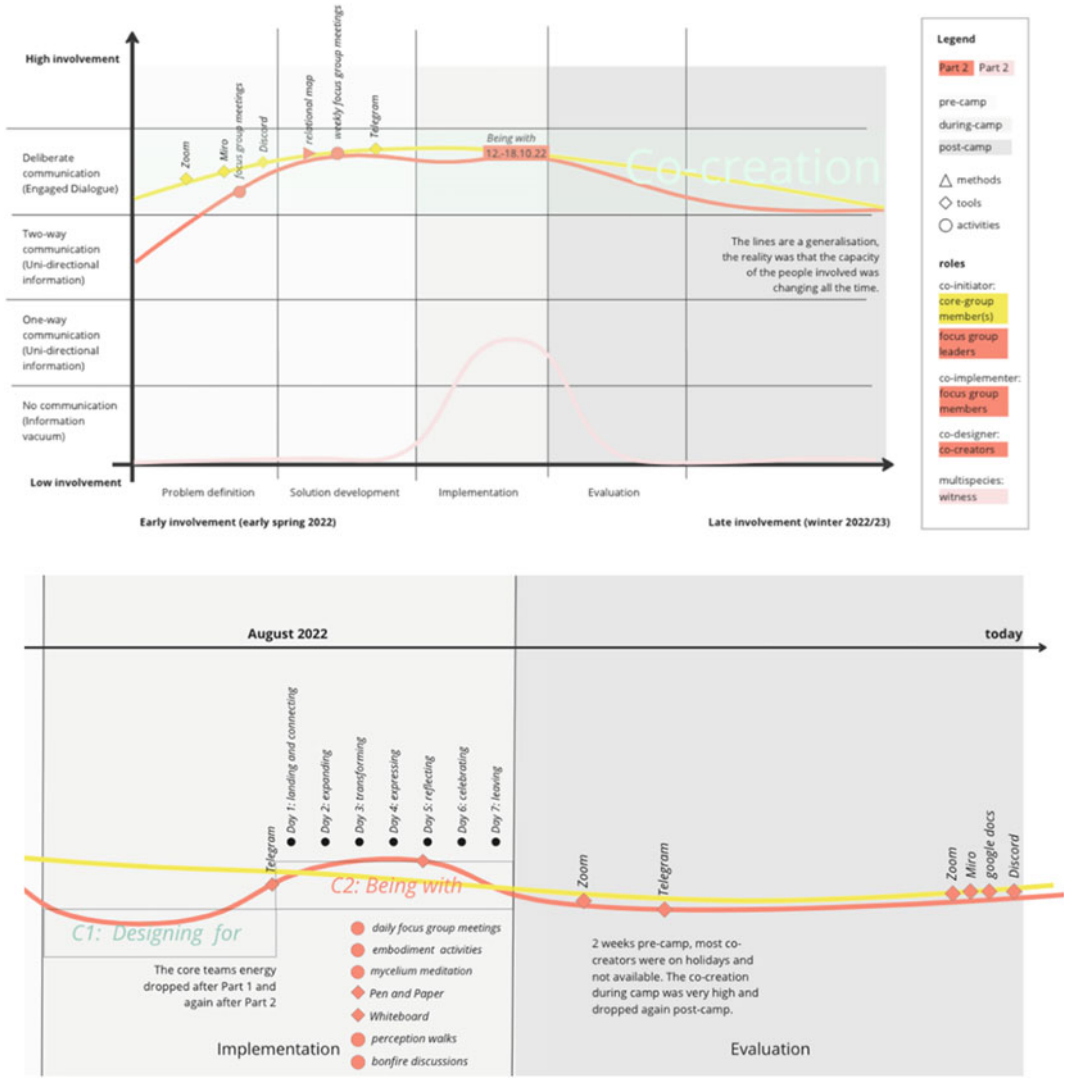

Fig. 52.6 Mapping of the co-creation spectrum across Part 2

something's intricate way of being to come to surface. This results in perception beyond projections and allows for "liminal intimacy, or intimacy at a distance, for which closeness lies not in possessing or bringing near, nor in knowing as such, but instead in a relational being-with-otherness that is comfortable with degrees of unknowing" (Nimmo 2016, p. 26).

During the camp, the focus groups met every morning to deepen discussions and co-create activities. These regular meetings with consistent members provided a certain stability, additional bonding opportunities, and a more comfortable space for people who are overwhelmed by large groups of people. Breakfast and dinner marked the times where the entire group gathered and where important updates could be shared with everyone. Since co-creation in such extent was rather new to most of us (even to the core-group), it sparked some doubt, concern, and anxiety. It took some days for everyone to find their rhythm and place and we had some disagreements regarding visual and acoustic pollution through human enjoyment.

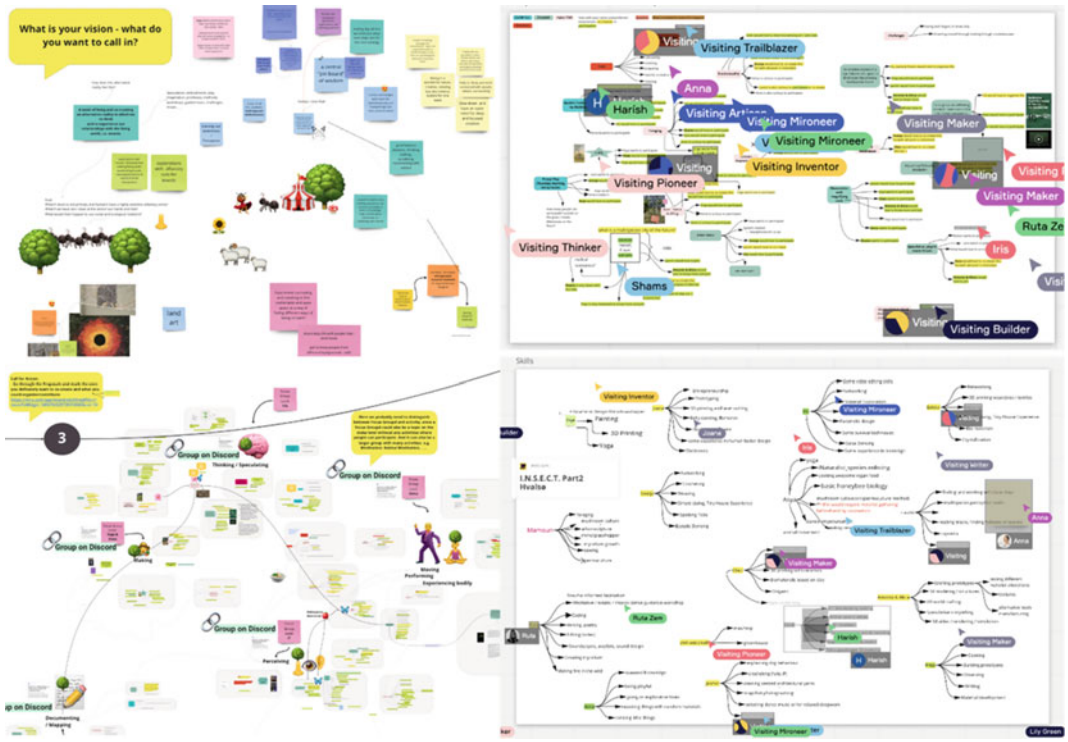

Fig. 52.7 Interactive mapping of the visions, skills, and interests pre-camp

Post Camp. Evaluation

Soon after the summercamp ended, we began organizing online meetings with the entire I.N.S.E.C.T. 2022 community to co-create publications, presentations, and other creative exchanges. We started planning a catalog to capture our experiences and have since moved into several additional projects. As a group, we are transitioning from a one-time-event to a community where members can initiate and co-create activities they feel called to do.

We approached insects through focusing on our human experiences and capacities to sense and perceive, so they didn't necessarily play an active part. Instead, we made use of our capabilities to imagine and speculate, play, stage, and improvise. We, therefore, approached insects from a perspective of "liminal intimacy" (Nimmo 2016). In other words, as a starting point and necessary step towards drawing methods for multispecies co-creation, we chose to relate to insects, recognize and respect their mindedness and autonomy by letting them be (De Jaegher 2021; Nimmo 2016).

52.3 Reflections

The I.N.S.E.C.T. Summercamp 2022 was organized around creating a program to discuss and disseminate our works, expanding the range of methods in bio- and multispecies design towards embodied methods and practices, and forming a vibrant research community that exceeds the duration of the camp. It was successful in accomplishing those objectives.

The atmosphere that the core group manifested through the co-creation activities with all the participants was a major influence on our experiences and memories of making the artifact. One participant mentioned, "…communal laughter, ambition, and a true sense of equal

Fig. 52.8 Moments of embodied and multisensory explorations that resulted from the activity schedule

influence," as primary takeaways from the camp. The networking and community aspect of the camp was also mentioned, "I know now that there is an active and helpful community that I can always reach out to when working with multi-species projects, and I feel more confident about engaging in such research." The responses illustrate that we met our goals regarding connection and community. One participant reflects on the theoretical input and how this influenced their work, "It definitely made me reflect on my next steps and future goals. The camp has also expanded my knowledge and ways of observing in massive ways compared to the short time we were present."

Bentzen argues that the continuity of involvement especially in earlier and later stages of co-creation determines the outcomes of co-creation (Bentzen 2022). With the end of our first year, several challenges are coming our way. The major one is how to sustain high-level co-creation when the capacities of the ones involved constantly and at times significantly change. Contrary to common belief, co-creation demands extensive amounts of commitment and energy for facilitation, coordination, and participation (Agranoff 2016 in Bentzen 2022), which can lead to conflicts if the personal limits and expectations are crossed or have not been clearly communicated.

One of the co-creators who joined both parts repeatedly reflected upon their personal growth, the expansion of their comfort zones and the ongoing digestion of their experiences. They commented that it, "*was just an amazing and life-changing experience.*" Longer term and potentially life-changing effects were described by several co-creators, "*after cooking vegetarian at the camp, I actually became vegetarian after that*," and, "*receiving positive personal feedback was really transformative to me and encouraged me to lead a 2-hour workshop in Berlin, where we delved deeper into empathizing with the living world.*" Embodied practices were especially powerful memories. Since they often cost some willpower and effort, they became the most

significant experiences. "*The primal play workshop was memorable as it provided the most resistance and really pushed my boundaries—as a result, its outcome was the most transformative. I'm contemplating how I could incorporate this way of acting/being in the rest of my life.*" There also seemed to be a certain level of comfort, curiosity and willingness to venture into challenges and let to creating meaningful experiences. One participant reported that "*the importance of safe and experimental places to test novel ideas*," was key for them.

We found that, during the camp, co-creation enabled us to have a more emergent and mutualistic social structure that formed through collecting, sharing, and spreading ideas and learning from one another's interactions and experiences (Ramaswamy and Ozcan 2014). People took responsibility for themselves and cared empathically for others. People's capacities naturally fluctuated, but the "organism" as a whole could function by having someone who could be ready and willing to step in to manage the flow when others needed to step out to recharge. This happened organically, instead of through a preplanned program. However, the initiations that the core group members provided were important to keep everything in flow, such as trying to make sure at least a couple of people are in good shape, and no one was solo. In both parts, the spirit of the core group was of fundamental importance to the commitment of the group in general, which created a dependence on those most at risk for energy depletion.

P1 gathered carefully selected participants whereas P2 was open for everybody who wanted to join and therefore followed the principle of "everybody who can contribute to solving the problem at hand should be encouraged to participate" (Bentzen, 2022, p. 36). We found that both approaches had pros and cons. Whereas P1 was an exclusive camp, it also provided specific in-depth discussions. P2 provided a higher level of inclusivity, variety, spontaneity, and space to offer own or co-created activities.

By exploring the contrasts between modes of thinking, feeling, and working that accompany *designing-for* and *being-with*, we could experience the value for both approaches. This paper argues that methods of *being-with* other living beings must go together with methods of *designing-for*, to integrate factual and tacit forms of knowledge and thereby fully engage with the complexity of the ecosystems to serve.

When dealing with complex ecosystems and accounting for multiple species, there is always a danger of creating contamination or unwanted effects. Additionally, relationships between organisms can get lost or can be hard to reestablish when replacing or adding human-made physical structures into the ecosystem. We see a need to develop and apply methods for the long-term assessment of the structures that we build, so that we can carefully evaluate and predict their effects on the living world. Hence, we will further develop the personal and automated monitoring strategies and setups for the next iterations of the artifact.

To integrate multispecies perspectives into biodesign, we, the I.N.S.E.C.T. community co-creators, seek to transform our design practices in several ways, since "Knowledge of the other can arise only in relation to the other (Fogel et al. 2002, p. 624 in Webb et al. 2023). We are broadening our perceptions to become more sensitive to and aware of the presence of small, unnoticed organisms. To be able to recognize and identify their environments, behaviors, life cycles, and interactions, we are integrating more factual and tacit knowledge about other living beings into our practices. Programs/formats that foster multispecies perspectives need to

- shift towards design as process to reinvent our practices and ourselves, to develop new hybrid lifestyles and ways of being for ourselves that inspire others,
- challenge our anthropocentric value system regarding the categorization of species,
- facilitate multispecies relationships,
- integrate awareness of people's different levels of creativity,
- foster co-creative and playful diversity in relational approaches and pedagogical tools,
- establish relationships to other disciplines that become relevant.

We hope that the results of this study may inspire critical dialogue among practitioners about co-creative programs and formats that allow us to engage with our own and other species more deeply.

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Part VIII
Intersectionality

Making the Special the General: Design Parameters for Supporting Inclusivity in Schools

53

Thea Christine Høeg and Dorte Alber

Abstract

Over the last decades the educational system has changed significantly, and more than ever schools face the necessary task of supporting diversity through a greater focus on student resources, preferences, and support of individual needs. In order to succeed with this task, we need to fully acknowledge that the physical environment plays an important role. It is widely agreed that working with differentiated learning environments is necessary in order to accommodate different ways of *learning*, but we need to expand this understanding to also include a wider diversity of *perception* and *participation*. A varied environment provides *all* students with the opportunity and agency to participate at their individual level. By making the *special* the *general,* we acknowledge that we all have different abilities and needs and can thereby create more inclusive spaces for everyone. Architects play a key role in translating different needs into a supportive physical framework. This text introduces a design tool with a set of design parameters to facilitate the development of spaces for diversity and inclusivity in schools, that support both the individual and common needs. The design tool is a further development of 'The Spatial Compass', first developed by NERD architects in 2015, based on many years of experience with educational design, with the ambition of creating spaces for students with different dis/abilities in mainstream education. The text argues that we need to shift our approach to *how* we design and *who* we design for, and that through a strategic use of space, users gain ownership and the ability to utilise the physical environment to its full potential in supporting participation, concentration, and navigation—and thereby inclusivity.

Keywords

Inclusive design · Inclusive school design · Differentiated learning environments · Educational architecture

53.1 Introduction

Today, an increasing number of children and young people in Denmark find themselves in need of special educational support for shorter or longer periods during their education (The Danish Ministry of Children and Education 2022a). From 2009–2019, the number of children and young people with ADHD, autism, anxiety and other diagnoses have increased by over 50 percent, measured in relation to all 0–17 year-olds

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in Denmark (The benchmarking unit of the Ministry of the Interior and Housing 2018).

It is therefore imperative that we in educational design consider different needs and abilities, in order to create spaces that support well-being and participation for everyone.

Inclusive design holds the potential to strengthen inclusivity in our communities and in society, since buildings embody both political, societal, and educational visions in physical form and can set an example for the society we want to live in.

The Salamanca Agreement of 1994 states that those with special educational needs must have access to regular schools, which should accommodate them within a child-centred pedagogy capable of meeting these needs (UNESCO 1994). Despite this, the proportion of pupils in segregated special schools increased in Denmark during the 1990s and 2000s. To change this the Danish Parliament introduced a law in 2012 (The Danish Parliament 2012) to increase inclusion in the Danish public school system. This change meant that more students with special needs had to be included in primary schools and, at the same time, academic results had to be improved and a high level of well-being had to be ensured.

During the 90s and up until today there has been a gradual change from the idea of difficulties as inherent in the child to a relational understanding of children's difficulties as a relationship between the child and the environment. Because of this, we are increasingly experiencing a paradigm shift within the educational field—and in society, where students are "allowed" to be different and where the focus instead is on individual resources and how to support different needs. It is simultaneously becoming clear that one size does not fit all, as *all* children have different needs at different stages of their development. Even children with the same diagnosis have different needs and experiences based on several factors, including social background, gender, etc. Understanding this complexity is essential to creating more inclusive education, and ultimately a more inclusive society.

This shift has in recent years led to several trials, where different pedagogical approaches supporting a higher degree of inclusion are applied. Findings from some of these have recently been published, including *The Nest program in Denmark*[1] (Clasen and Thomsen 2018), *Broader Children's Communities* (Danish: Brede Børnefællesskaber) (Analyse af bredere børnefællesskaber på almenområdet, specialtilbud og PPR 2022) and *In-between forms* (Danish: Mellemformer) (Vive 2022).

These trials mention the physical environment as a key factor in creating inclusive learning environments. However, guidelines and recommendations concerning *how* to create more inclusive physical learning environments are still few and far between. Most existing guidelines are developed for individuals with specific disabilities, such as physical or visual disabilities, autism or ADHD, which is useful when designing for one specific group. However, there is a need for a more universally inclusive design that takes on an intersectional approach to accommodate inclusive education practices. One that does not try to categorise individuals but recognises that everyone has different experiences and multiple diverse needs.

53.2 Exploring the Interaction Between Space and Behaviour

Most people recognise the feeling of stepping into a space and instantly feeling at peace or intuitively knowing how to act in the space. We react instinctively to the sensory qualities and the possibilities or limitations the space gives us. A dynamic interaction occurs at the intersection between external stimuli, our perception, the affordance of the space,[2] and our (re)actions.

This intuitive perception of space varies from person to person depending on background,

[1] Nest is an educational practice, originally developed in the USA, where children with and without autism are part of the same class. Class sizes are reduced to 16, and teaching is organized according to special pedagogical principles.

[2] *Affordance*, referring to James Gibson's affordance theory i.e., what actions are possible, practical and conceivable to the user(s) within the environment.

abilities, and emotional or neurological state (Roessler 2003). Any attempt to universalise spatial perception is therefore limited.

Jos Boys writes in *Cripping Spaces? On Dis/abling Phenomenology In Architecture,* how architectural phenomenology, attempting to essentialise human experience as a basis for architectural design, can lead to marginalisation by essentialising certain bodies or experiences and making others invisible (Boys 2018).

Instead, we should explore *how* design can support particular activities or behaviours, not by essentialising, but by exploring the multiple ways of being human, and how our differences can be incorporated and supported.

Through analysis, mapping, and user involvement, spaces can be developed as a guide, allowing users to decode spatial inputs and invitations and adapt the space or their behaviour in relation to it more easily.

> Good design becomes a matter of displaying cues and constraints to bias what users will see as their possibilities for action, the action affordances of a space. The challenge of design is to figure out how to guide and direct users by structuring the affordance landscape. (Kirsh 2004, p. 3)

Just as there is a need for clear structures in pedagogy, there is a need for clear structures in the physical environment to make it easy to decode. In the process, it becomes crucial to bring forth the complexity and variety in experiences to support both the individual and the community:

> The physical framework becomes an educational factor in achieving sustainable spaces for being when it is clear to the students what they have to do and why, when the space is safely balanced so that it both supports the individual and the community, and when there is a feeling of knowing what is going to happen. (Clasen and Hostrup 2021, p. 35)

53.3 Designing for Disability

The United Nations' 17 Sustainable Development Goals (SDG) mention inclusivity as part of both the 4th goal, Quality Education, and the 11th goal, Sustainable Cities and Communities (United Nations 2015). Designing for disabilities and special educational needs by adopting a wider accessibility perspective is an essential part of complying with the SDGs.

Within the architectural profession, when considering design for disability, we often talk about Universal Design. In the past, focus has primarily been on accessibility for people with physical disabilities. But as a concept, Universal Design covers a much wider understanding of diversity and includes sensory and cognitive accessibility, though these parameters are still rarely taken into consideration.

Recently, more studies have been done regarding how the physical environment and different sensory inputs affect individuals with neurological disabilities, including autism (Mostafa 2008; Gaines et al. 2016), ADHD and Asperger's syndrome (Tufvesson and Tufvesson 2009). These studies show how the physical environment and sensory inputs can impact children's behaviour through for example their ability to concentrate, which is a key factor when it comes to learning for children with concentration difficulties. Similarly, experiences from the Nest program (Clasen and Thomsen 2018), show that environmental modifications are an important factor in ensuring students' participation.

When talking about designing for special disability *in general* or universal design, we will inevitably encounter that all spaces have their limitations, and needs can be conflicting. However, by designing for variety and adaptability we can, to the greatest extent possible, accommodate different preferences, abilities and needs.

53.4 Differentiated Learning Spaces

Differentiation as a teaching method has been widely accepted and implemented in Denmark since it found its way into the Danish Public School Act of 1993. The law introduces a new approach to teaching based on a student's individual abilities, to ensure that the students develop their competences to the fullest, with a

focus on the individual student's versatile personal development (The Danish Ministry of Children and Education 2022a).

This approach has since merged with a focus on twenty-first century skills (OECD 2015) aimed at developing skills needed to navigate and thrive in a modern world, with an increased focus on problem solving, creativity, innovation, and critical thinking.

These changes have challenged the physical space—in particular the traditional classroom, as well as opening up new possibilities in the organisation of spaces, layout and design. We are transitioning from traditional monofunctional learning spaces to differentiated learning spaces that allow for various activities, and the possibility of individual adaptation. This holds the potential to accommodate a wider range of needs, multiple ways of learning and can thereby enable more diversity in public schools.

53.5 Making the Special the General

Making the special the general, builds on one of the foundational ideas from the Nest program; that what is good for the individual is often good for the majority (Clasen and Thomsen 2018). At the same time, it shifts the focus from our differences to the many ways we are all similar.

Space and design should not tell children about their limitations but about their possibilities. Creating a variety of options that are accessible and used by everyone shifts the focus from the individual to the group, making it less obvious who has special needs. It holds the potential to minimise exclusion and the feeling of being different and ultimately help enable children with special needs to continue their education alongside their peers.

Studies suggest that inclusive education is beneficial both for children with disabilities and children without. Children with disabilities educated in inclusive settings perform better socially and academically, improving their likelihood of employment and financial independence compared with those educated in segregated settings (Symeonidou 2018). Equally, children without disabilities develop improved social skills, including empathy and communication, as well as a strengthened sense of self, greater self-esteem, and increased ability to connect with someone different from themselves (Zavaleta 2020).

53.6 A Spatial Compass for Inclusive Design

The 'Spatial Compass' (Danish: Rumkompasset) is an analysis and design tool originally developed to provide a design framework for differentiated learning environments, and to involve and engage students and educators in the design development. It is based on a *form follow function* approach to architecture, where activities form the basis of the design, and are translated into spaces and spatial qualities.

The increasing need for inclusive education and the importance of a more inclusive design approach has led to the further development of the Spatial Compass to include a wider range of parameters with an increased focus on inclusivity through participation and perception.

The design tool aims to combine knowledge on environmental factors in schools that appear to influence performance and well-being (Barrett et al. 2015) with the theory of how we experience and navigate space (Lynch 1960) as well as an understanding of how to design for children with disabilities and/or special educational needs (Mostafa 2008; Gaines et al. 2016; Tufvesson and Tufvesson 2009).

There are many possible and relevant considerations when designing inclusive learning environments. Based on our research and experience the design framework operates with three main categories, each consisting of several parameters:

- Activities
- Participation
- Perception

The categories are understood as interrelated criteria that each focus on different aspects that

Fig. 53.1 The Spatial Compass for inclusive learning spaces with three main categories containing 12 design parameters based on learning and being

need to be considered in the design in order to support different learning preferences, forms of participation and being, as well as perception (Fig. 53.1).

Activities are based on the typical activities taking place in an educational setting, regardless of the subject. Through years of experience with designing schools for differentiated learning environments we have defined 6 core activities:

Presentation	Includes classic teacher-centred communication, student presentations, group presentation, evaluation, and performance.
Immersion	Includes reading, writing, tinkering, and similar activities conducted mostly individually or in small groups.
Conversation	Is an activity for pairs or groups to develop and share knowledge through discussion, conversation, and debate.
Fabrication	Will often take place in a workshop but covers all activities involving experimentation and hands-on production resulting in a product.
Socialisation	Is about supporting the development of social and emotional skills, social groups, and the community.
Movement	Is the possibility to learn through the experience or use of the body. This is both a great way to learn and of great importance for children's well-being and health.

Working with these core activities for learning enables us to ensure that the content and the objective of the teaching informs the organisation and design of the space—and that the space is supporting different learning preferences. Each activity is accompanied by several spatial "scenographies" that translate the activity into spatial abstractions.

Participation aims to incorporate the expression of individual preferences as well as space for community as part of the design. The category describes three parameters that together help ensure that the space allows for different degrees of participation, gradual development as well as personal adaptation. They are based on conclusions and findings from trials aimed at creating inclusive educational practices (Clasen and Thomsen 2018; Analyse af bredere børnefællesskaber på almenområdet, specialtilbud og PPR 2022; Vive 2022) and are often also described as key elements in designing for autism—especially *retreat* as the need for a place where the child can retreat, relax, and recalibrate.

Retreat	Is the possibility to take a break, self-regulate, sense oneself, and/or recalibrate one's senses.
Community	Supports the sense of belonging, making room for different communities and supporting the development of social and emotional skills, for example through different degrees of participation.
Expression	Is the possibility for personal adaptation, personalisation, as well as the possibility for displaying students' creations and products.

Participation as a learning concept is described by Lave and Wenger as, in order to master the knowledge and skills needed in a given practice, we must be able to see ourselves as full participants in the community of practice—not only in relation to the practice, but in relation to all activities in the community, including the social ones. Furthermore, our identity must be or have the possibility of becoming part of the community (Lave and Wenger 2003).

The Nest program finds that giving the children the opportunities for making their own choices (here related to learning) "increases engagement and decreases noncompliance" (Koenig 2009, p. 9). Koening et al. writes that "choice gives students a feeling that the classroom is their(s) […] and thus a place where they belong and want to be" (Koenig 2009, p. 9). We find that the same is true for the physical environment.

Perception is what we experience through our senses—see, hear, smell, feel etc., but it is also how these inputs are interpreted.

We all have a limited amount of attention and energy. By limiting distractions in the physical environment and making the space easy to read, individuals may be able to spend their energy and attention on learning.

Legibility	Is concerned with making it easier to read and navigate space due to visual cues, structure, and predictability, based on elements for legibility (Lynch 1960).
Transitions	Considers both physical and mental transitions. It is important to be aware of when transitions should be discreet to avoid disruption, disorientation, and distraction and when transitions should be clear to underline the shift. Gradual transitions can be useful to allow individuals to adjust to change, and clear transitions can be useful to communicate the change.
Sensory support	Is covering an array of different ways to design for sensory support, including variation in acoustics and light, choosing muted or natural colours and materials, supporting visual learning, ensuring recognisability, and aligning sensory input to activities.

53.7 Spatial Translation

The intention of the Spatial Compass is to create a framework for design development and assessment. It invites us to see space as a learning landscape (Fig. 53.2) where different pieces can be brought into play, with a vision of bringing an array of sensory qualities into the built

Fig. 53.2 The process starts with an understanding of the learning environment as a landscape, which is translated into spatial abstractions through scenographies

environment, which can support both learning and being. The framework provides both a method and design guidelines for architects to develop more inclusive learning spaces and contributes to establishing a common language and supporting a dialogue between pedagogy and space.

Architects play a key role both in spatial translation and in helping users envision how activities can take place and spaces can be adapted. As part of the Spatial Compass, spatial scenographies are used to facilitate the spatial translation. These take the form of isometric illustrations that translate activities and affordances into spatial representations (Fig. 53.3), but at the same time allow for interpretation. In this way, we can discuss the differences in spatial organisation and design much more concretely with teachers, pedagogues and students—and help them explore how they can use space strategically, even after the collaboration with the architects is over.

In this process, it is important to pay attention to the holistic and multifaceted nature of learning (Illeris 2001). We must relate to learning and being as a complex whole and at the same time be able to separate the different facets and components. Here, the metaphor of a landscape becomes useful to maintain complexity. Throughout the design process, the learning spaces are understood as a complex landscape composed of several facets of learning and being (as shown in the Spatial Compass)—where the individual activities and design components can be understood as justified segments of the whole. The complete learning environment—e.g., for a year group or a department—should therefore optimally include all facets and components for learning and being, as shown in Figs. 53.2 and 53.4.

By bridging between disciplines and establishing a common language, it becomes easier to make the right decisions throughout the process and ensure that the space can be used optimally by the users. In addition to being a designer, the role of the architect is to become a *facilitator* that can help schools translate educational aims and user needs into physical spaces (Fig. 53.5).

53.8 Strategic Use of Space

Understanding how the physical environment affects children's ability to participate, concentrate and navigate, is one key element in ensuring a high degree of inclusivity. Another important element is learning how to use the space strategically. As concluded in the evaluation of the RULL program in Aarhus Municipality (The Alexandra Institute 2017), ownership by management and employees is crucial. The Spatial Compass helps educators and students gain ownership by establishing an understanding of and competence for how to use the space to its full potential in supporting learning and being.

Similarly, findings from several projects concerned with creating more inclusive learning environments (Clasen and Thomsen 2018; Clasen and Hostrup 2021) show that making a lasting change in schools requires in-depth work with the organisation, consensus around goals and values, the feeling of ownership and thorough planning. The Spatial Compass supports this process by minimising the loss of knowledge in the transition from development to the implementation of the physical learning environment.

53.9 Conclusion

More and more children with special needs are excluded from mainstream education. There are many reasons for this—the physical environment being one of them. It is therefore essential in solving the task of developing more inclusive schools. Does this mean we must design individual spaces for all children? We argue that it does not. Does it mean we need to create flexible spaces that can be continuously transformed? We argue that it does not. But it does mean a paradigm shift in how we design and a greater understanding of individual needs. We argue for designing differentiated environments that support various learning styles and preferences based on an understanding of the differences in our perception of the world. At the same time, we

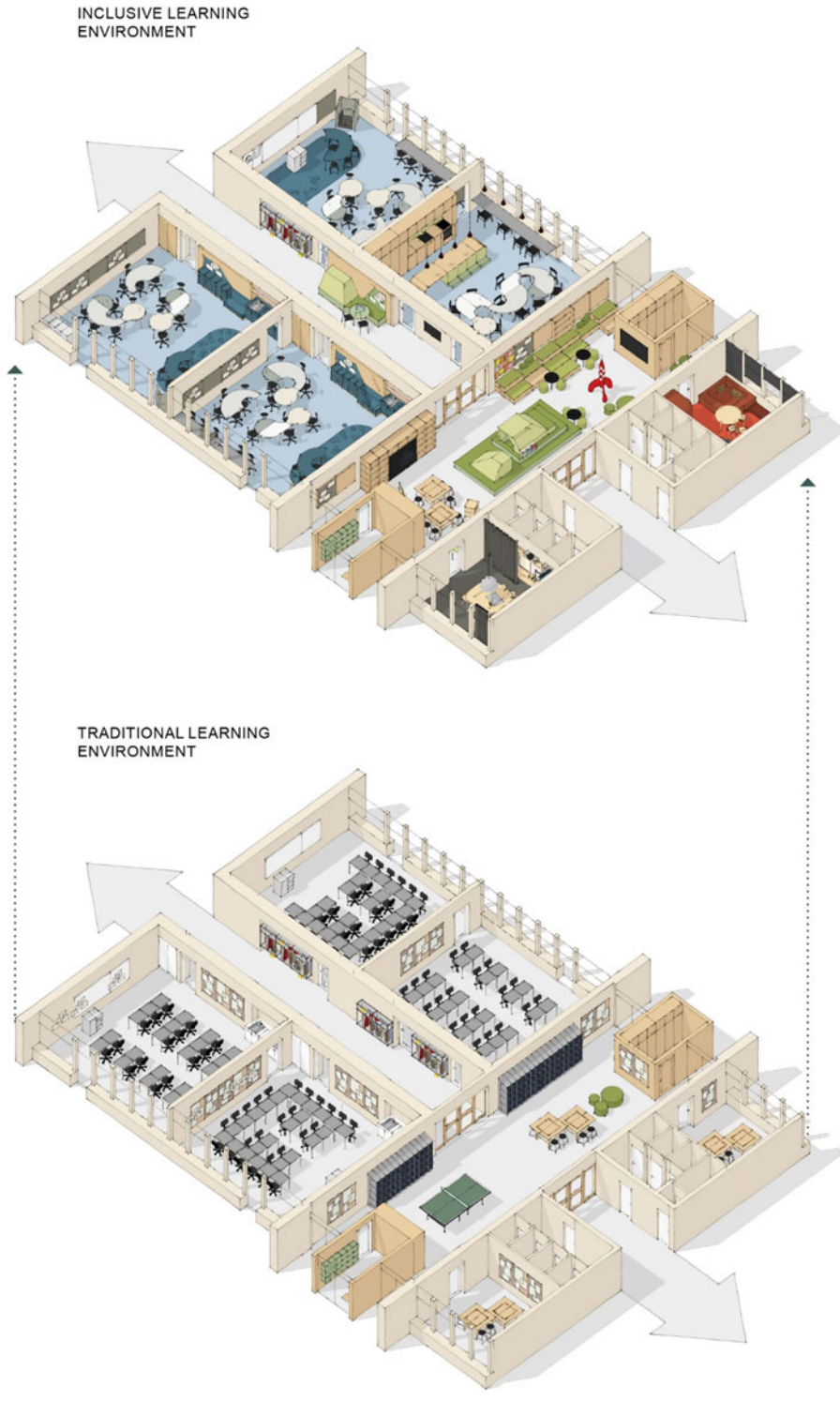

Fig. 53.3 Redesign of an existing, traditional school in Denmark into a differentiated, inclusive learning environment using the Spatial Compass

Fig. 53.4 Example of how categories from the Spatial Compass are used and translated into a differentiated learning space

find that elements such as structure and recognisability are of very high importance. To achieve this, we should dare to make a choice and challenge the idea of flexibility as the solution. This task requires us to collaborate closely between users and architects, to learn from users, understand their specific needs and receive feedback on design solutions. By developing a common understanding of how the physical environment can be used to support children's learning and development, the space becomes a strategic factor in achieving inclusivity. The design tool presented in this essay provides a framework and method that can help facilitate the development of such spaces in public schools and other educational institutions. Although more comprehensive research is necessary to gain a deeper understanding of the effects of various design solutions on children's learning, we find that creating designs that support participation and perception in schools makes a big difference for both the individual and the community. Inclusive learning spaces have the potential to accommodate a wider range of needs, enable more diversity in public schools, and reduce exclusion. The benefits of inclusive design go beyond individuals with special needs, fostering a more socially sustainable future.

Fig. 53.5 Visualisation of one of the spaces designed using the Spatial Compass. The space supports different degrees of participation, space for conversation, collaboration, immersion, retreat, and multiple sensory stimulations through materials, light and colour

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Multi-Sensory Wayfinding: Lessons from the Margins Towards the Design of Equitable and Healthy Spaces

54

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Abstract

Accessibility for marginalized and vulnerable populations has emerged as an urgent public health challenge. MIXdesign investigates how the built environment may enable spatial orientation, agency, and a sense of security in public spaces through the study of individuals with three different ways of being—those requiring assisted mobility, who are deaf, and who are autistic. Each one has developed novel coping mechanisms and ways of negotiating space that content experts and advocates have codified into formal design recommendations. Importantly and previously unrecognized, many commonalities exist among the strategies from each of these populations that we believe can be applied to the design of public domains for enhanced acclimation and safety for the majority of users within today's spatial paradigm placing health and equity at its center. As pioneers in inclusive architecture, our investigative process and methodology may also serve as a template for the development of design strategies allowing communities to be increasingly open for educational, employment, recreational, and cultural exploration and participation.

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54.1 Principles

The pandemic brought to the fore awareness, limitations, and opportunities for the influence of the built environment on public health and accessibility. At once, we all became vulnerable because of our surroundings and the need to negotiate spaces and places with others. Hospitals, libraries, and schools were no longer safe havens; stepping away from home required calculated efforts, planning, and caution. New appreciation for marginalized individuals who have only known such a complex relationship with accessibility became a shared experience for all of us. This insight is not a complete understanding of or comparable experience to those dependent on wheelchairs, individuals with sensory disabilities or who are overwhelmed by social and sensory sensitivities. It does, however, amplify for architects and designers, engineers and urban planners the imperative to consider how people mix within a space, depend on elements of the built environment to scaffold and support movement through a space for many people at one time, and operationalize post-pandemic safety measures.

The burden of isolation is profound and far from a long-term solution to protecting the public's health. MIXdesign, our inclusive design consultancy, has taken on the challenge of imagining equitable post-pandemic public spaces as a natural extension of our mission to create

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safe and accessible buildings that promote equity, health, and well-being. Rather than narrowly frame the pandemic as a public health issue shaped by seemingly objective functional parameters alone, we advocate a perspective that looks at the impact of health and social equity concerns within a larger cultural and historical context by considering the needs of vulnerable and minority populations as central to informed design for the majority. In effect, our design solutions promote spatial awareness and accentuate multi-sensory cues that enable enhanced spatial awareness, in particular the presence and activities of others, especially in unfamiliar places.

Central to MIXdesign's ethos is an expansive human-centered approach, one that looks to expand the traditionally normative constructs of user identity. The definition of user at the center of this process is defined intersectionally and across the multiple user profiles that represent the diverse population of our human fabric- across gender, race, ability, neurodiversity, age and socio-economy. The methodologies engaged that foreground the research and design approaches outlined in this paper, are similarly user-focused and include end-user engagement workshops, carefully curated and inclusive surveys, diverse focus groups and expert observation. Underpinning these methods is a commitment to diversity, inclusion, empathy and the user as an expert.

The overall goal of the MIX methodology is to gather data drawn from the lived experience of end-users, and consider the relationship between **people** and their intersecting user communities; **activities** they perform, in particular **places**.

The following are overarching principles that underpin all MIXdesign research and design work:

- **ADA+**: MIXdesign champions an alternative to the "separate but equal" model characteristic of most accessibility standards that prescribe physical accommodations like separate ramps and entrances, which unintentionally segregate and stigmatize those with different needs.
- **Intersectional Mixing**: Our approach differs from our peers who tend to narrowly focus on ADA code compliance alone. We cast a wider net and consider the intersecting needs of a broader spectrum of the population: we consider ability (people with mobility, sensory and neurodiversity challenges), gender (women, trans, non-binary individuals), and culture (spatial requirements associated with race and religion.)
- A **goal to enable the maximum number of differently embodied and identified people to interact in different settings** while recognizing. that there are ways of being different that also require specific accommodations (privacy for breastfeeding).

These principles culminate in MIXdesign's three-step Inclusive Design Methodology created to support common places for as many people as possible while also providing options for people with unique functional or privacy needs. (Fig. 54.2).

Step 1.0: Research and Analysis: First, we conduct an interactive, multi-modal needs assessment and perform a critical review of these findings with as many diverse end-user groups as possible using inclusive and accessible research tools.

Step 2.0: Comparative Analysis: Second, we conduct a comparative analysis of overlapping and conflicting end-user needs and activities within the spaces under study using a unique methodology of tools foundational to design thinking and public health disciplines.

Step 3.0: Design Strategies: The outcome is a matrix of shared design strategies that guide overall spatial organization as well as material and finish choices, recommendations for wayfinding, lighting, acoustics, and the specification of furniture and fixtures.

In this paper, MIXdesign investigates how the built environment may enable spatial orientation, agency, and a sense of security in public spaces through the study of individuals with three different ways of being—those requiring assisted mobility, those who are deaf, and those who are

autistic. Each one has developed novel coping mechanisms and ways of negotiating space that content experts and advocates have codified into formal design recommendations. Importantly and previously unrecognized, many commonalities exist among the strategies from each of these populations that we believe can be applied to the design of public domains for enhanced acclimation and safety for the majority of users within today's spatial paradigm placing health and equity at its center.

In this example, MIXdesign's space planning principles begin where buildings meet their surroundings. They emerge from an ongoing exploration of a prototypical public entry sequence within typical institutional buildings with a deliberate focus on optimizing spatial orientation and environmental stimulation for the three distinct end-user populations. This is an iterative, three-step process inspired by the insights encountered by MIXdesign thought leaders through their own lived experiences or work within the assisted mobility, deaf, autistic and neurodiverse communities. Sharing lessons learned allowed our group to identify unexpected commonalities across these distinct but intersecting communities.

MIXdesign's Quemuel Arroyo offers insights drawn from both his lived experience as a wheelchair user and his professional experience as the Chief Accessibility Officer for the New York State Metropolitan Transportation Authority (MTA). He advocates for unobstructed paths of travel that allow people with mobility challenges to maneuver with limited potential obstacles. He recommends firm and smooth surfaces, ideally wide enough for pairs of wheelchairs or combinations of wheelchairs and walkers or strollers to pass one another in two directions, avoiding abrupt surface level changes, and alternatives to deep carpets and other rough or non-firm textures that may collect debris, cause trip hazards, or impede movement.

He also proposes a more nuanced and expanded interpretation of typical wheelchair accessibility standards, ones that account for the wheelchair user as part of a social group moving through space together. Design codes and standards, such as the ADA prescribe single width ramps for wheelchair access, which assume a wheelchair user moving alone, which separates wheelchair users from either ambulatory social groups or other wheelchair users as they navigate the built environment, which is a common social pattern found particularly in public buildings and elevators. He encourages the consideration of these social patterns and creating wider ramps that allow groups to move together and remain in conversation and within their social grouping, rather than creating separations and segregation of users based on mobility. Arroyo also discusses the limiting geometry of typical standards that assume a linear trajectory of movement, again distilling wheelchair movement to a strictly utilitarian one, rather than a more nuanced, realistic, social and organic movement pattern, which reflects reality far more closely (Sanders et al. 2020).

Deaf people inhabit a rich sensory world in which many use sign language to communicate and maintain spatial orientation through vision, touch and varying levels of auditory input. Many Deaf individuals identify as belonging to Deaf culture—"a collectivist culture" (Mindess 2014) built around sign language, and shared life experiences. The built environment, largely constructed by, and for, hearing individuals, disables deaf access to clear visual communication and spatial awareness. When a group of deaf individuals are engaged in a signed conversation while walking along a city sidewalk it often becomes necessary for one or more to occupy the street to maintain sightlines needed for communication even though doing so poses the risks of walking within an active street.

Through this kind of daily lived experience, deaf people have devised cultural codes of conduct centered on visual communication and strategies for customizing their physical surroundings to enhance spatial awareness and communication. As deaf people congregate the group traditionally works together to rearrange furnishings to allow clear sightlines between all participants who further make adjustments to lighting and other background conditions like window shades to optimize visual conditions.

Socio-spatial interactions such as these are the basic building blocks of *DeafSpace* (Baumers and Heylighten 2010)—a long-held cultural practice and now architectural expression for sustaining personal safety, social connection, and well-being.

The DeafSpace Project—a user-driven design and research initiative at Gallaudet University's Department of American Sign Language and Deaf Studies (2006–2019)—was established to codify cultural practices of spatial modification into an architectural pattern language optimizing space for visual communication, sensory reach, and Deaf cultural expression. Outcomes are published in the *Gallaudet DeafSpace Design* Guidelines that have sense has been used to guide building projects globally.

Architecture for Visual Communication—The dynamics of clear visual communication are guided by *proxemics* (cultural, behavioral aspects of spatial distances between individuals) unique to visual communication and the visual qualities of light, color, and pattern of the spatial background upon which it is viewed.

Architecture for Sensory Reach—Spatial awareness is enhanced through socio-spatial and tactile strategies that extend *sensory reach* to encompass a full 360-degree sensory field. Visual cues seen through openings to adjacent spaces, or subtle images seen in reflected surfaces or felt through structural borne vibrations are tuned to deaf sensibilities through the fundamental aspects of architecture—form, material and light.

Architecture as Cultural Expression Drawing upon lived experience had a scholarship in Deaf Studies Dr. Matt Malzkuhn, one of the Project's first participants describes the widely recognized role of space and belonging within Deaf culture this way: "When deaf people are able to belong to place, whether it is theirs or not, they immediately feel connected to it and the people that occupy the space. This comes after a long history of being disconnected from families and friends through physical, communicative and geographical differences. So, in that sense, in customizing their space, it does not only allow them to feel connected to their environments and the world, but it also allows them to have human connections which also confirm their existence" (Malzkuhn 2009).

The DeafSpace operationalizes Deaf culture's keen awareness of the relationship between space, belonging and well-being—a critical perspective historically overlooked by the discourse on design for disabilities. Beyond its value to the deaf community, DeafSpace serves as a tangible example of how inclusive design practices can learn from different life experiences to create more inclusive and equitable environments for all (Fig. 54.1).

Magda Mostafa, author of the Autism ASPECTSS Design Index brings to this exercise comprehension and thoughtful reflection on the spatial needs of neurodiverse people compiled from the many years she has worked within the autism community. We use "autistic" and "neurodiverse/divergent" interchangeably only within this context given the significant overlap in the proposed facilitators to enable space usability. Autism refers to a profile in which an individual has a broad range of communication, social and behavioral challenges, and different perceptual models including a sensitivity to sensory overstimulation and distraction triggered by crowds, large, active open spaces, loud noise, and bright light. Available first person testimonies from autistic people recount little

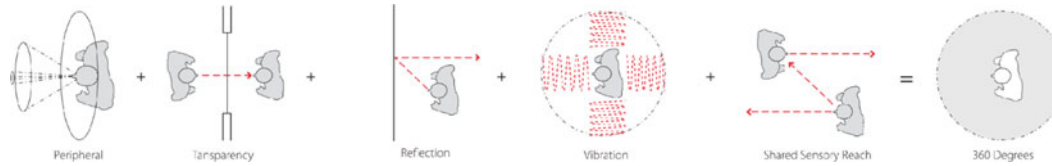

Fig. 54.1 DeafSpace principles, copyright Hansel Bauman and Gallaudet University, 2010

understanding of how best to navigate imposing, unwieldy, and untried places, acknowledging stressors inherent to busy and unfamiliar buildings uninformed by spatial sequencing, compartmentalization, transition zones, acoustic control, escape spaces, and sensory zoning (Mostafa 2014). To temper such myriad challenges, Mostafa recommends deliberate orientation of rooms, hallways, vestibules, atria, staircases, and restrooms in a predictable way informed by "high-stimulus" and "low-stimulus" zones separated by transition spaces to allow individuals to recalibrate between different experiences. As well, intentional design may reduce environmental stress by modulating acoustics to minimize background noise and reverberation and controlling light level intensity, color, and glare. Overall, this design intends to make public spaces intuitive to understand with clear signage and a readable organization of seating, reception, entrances, exits, and corridors to promote independence, confidence, and comfort in the navigation of new environments.

Importantly, formal recommendations for such adaptations to the built environment to accommodate neurodiversity remain largely undocumented, with binding codes and best practices largely absent (Krieger et al. 2018). In the United States, The Americans with Disabilities Act delivers limited guidance around standards for people with developmental, cognitive, sensory or learning differences. Our team recognizes the existing research in educational settings that demonstrates the benefit of design modifications on behavioral indicators in autism, meaning less dysregulation in supportive surroundings (Mostafa 2008). The same complexities reported by autistic people in interpersonal relationships and complex planning and problem-solving contribute to difficulty in relating to the built environment (Williams 2004). Consider: circuitous wayfinding, oppressive acoustics, rooms without clear purpose, narrow passageways with unpredictable pedestrian circulation, and limited signage with incomprehensible visual cues. Thus, intrinsic characteristics of an architectural space can have a measurable effect on autistic people and influence their participation in specific environments (Humphreys 2008). As we learn how best to advance our understanding of the improved functioning of autistics within our MIX imaginaries, the evidence base for such recommendations will grow.

In this effort, we promote the authentic exploration of the autistic experience within discrete elements of buildings as essential to problem-solving accessibility and usability. As primary investigators, we have learned participatory parity in needs assessments, design workshops, and proposing solutions requires flexibility within traditional public health research methodologies. Many autistic individuals articulate their reflections, experiences, and wants with extraordinary precision. Some do so with scaffolding to allow for preferred alternative communication systems or uncomfortable social interactions common to focus groups, interviews and workshops. As well, some autistics depend on caregivers to relate information on their behalf. Importantly, the autistic voice (and that of all end-users and stakeholders) must be primary in all cooperative designs and we must assume the privilege of amplifying what we hear and learn, with the intent to translate needs and opportunities into design solutions informed by their thought and integrated into proposals reflecting intersectional and broadly inclusive inspiration.

To date, for example, recorded and cataloged deliberation by autistics on the built environment of healthcare systems is saturated with common themes. This allows the architects of hospital systems to move this data into practical design. As mentioned, the following are recognized: acoustics, lighting, wayfinding, signage, cavernous spaces without clear definitions, unpredictable paths, and crowds stand out as troublesome. The beauty in identifying these discrete, scalable and largely feasible elements of structures allows us to leverage the potential of place-based and population-level interventions. It serves to complement and reinforce the individual level adjustments and accommodations that have proven helpful but incompletely effective.

54.2 Methodology

The second step in the process was to conduct a comparative analysis of the three end-user community perspectives to uncover affinities and differences between them. The final step was to identify design strategies that would meet the majority of needs of the three end-user groups and be relevant to the general public: everyone benefits from sensory cues that increase spatial awareness. Our objective was to allow the maximum number of people with diverse embodiments and identities to mix in public spaces while acknowledging that some individuals have unique functional and privacy needs for which we must also plan (Fig. 54.2).

The outcome of our study yielded a set of design principles that we call Multi-Sensory Wayfinding illustrated in this study for the entry sequence for a student college at an Ivy League higher education institution (Fig. 54.3). Multi-Sensory Wayfinding augments conventional signage and uses color, materials, lighting, and acoustics to differentiate two kinds of legible activity zones —Barrier Free Circulation Paths coded white in this plan, and Multi-Sensory Microclimates colored blue. The goal is to balance social distancing and human connectivity in a way that minimizes environmental stressors and increases spatial awareness for everyone.

The experience begins in the Vestibule where visitors may clean at hand-sanitizing stations before entering the building. A central planter and separate entry/exit circulation aisles prevent unwanted collisions. This transition Threshold, a concept found in the ASPECTSS Design Index to support autistic sensory adjustment, demarcates the intersection where circulation paths cross to allow occupants of all abilities to slow down, acclimate to changes in direction, and adjust their senses to recalibrate between indoors and outdoors, two very different environments with different levels of stimulation.

Immediately beyond the Vestibule, visitors encounter a Reception Wellness Hub that incorporates elements of Stalled! 2.0, a prototype for inclusive public restrooms developed by MIXdesign team members led by Joel Sanders. The

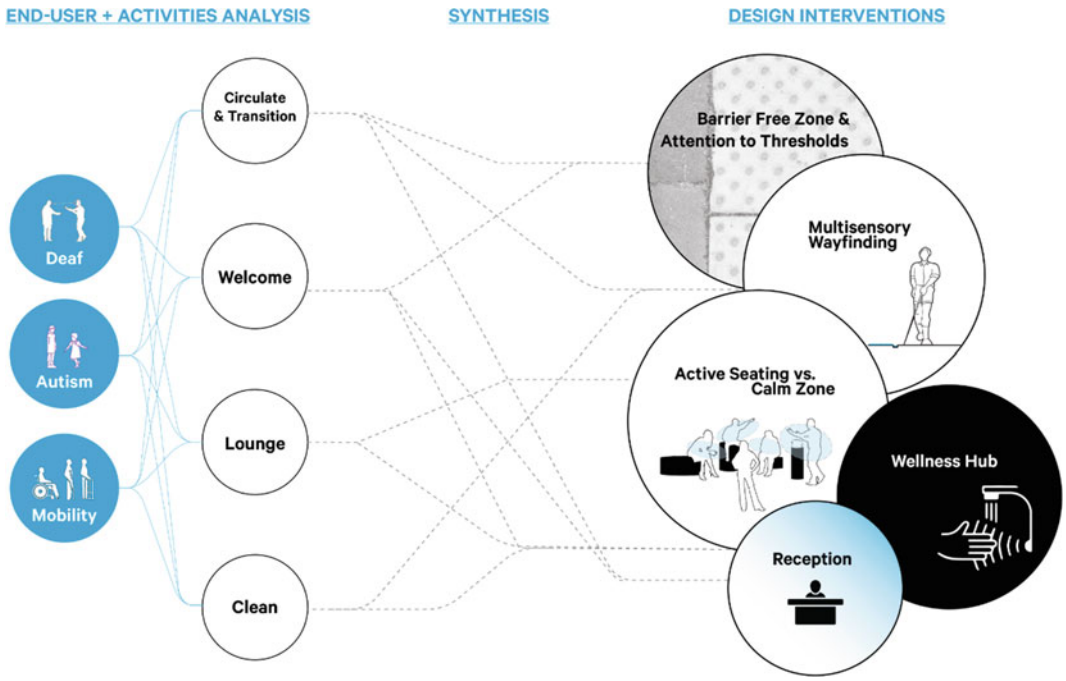

Fig. 54.2 Multi-sensory methodology diagram, copyright JSA/MIXdesign, 2020

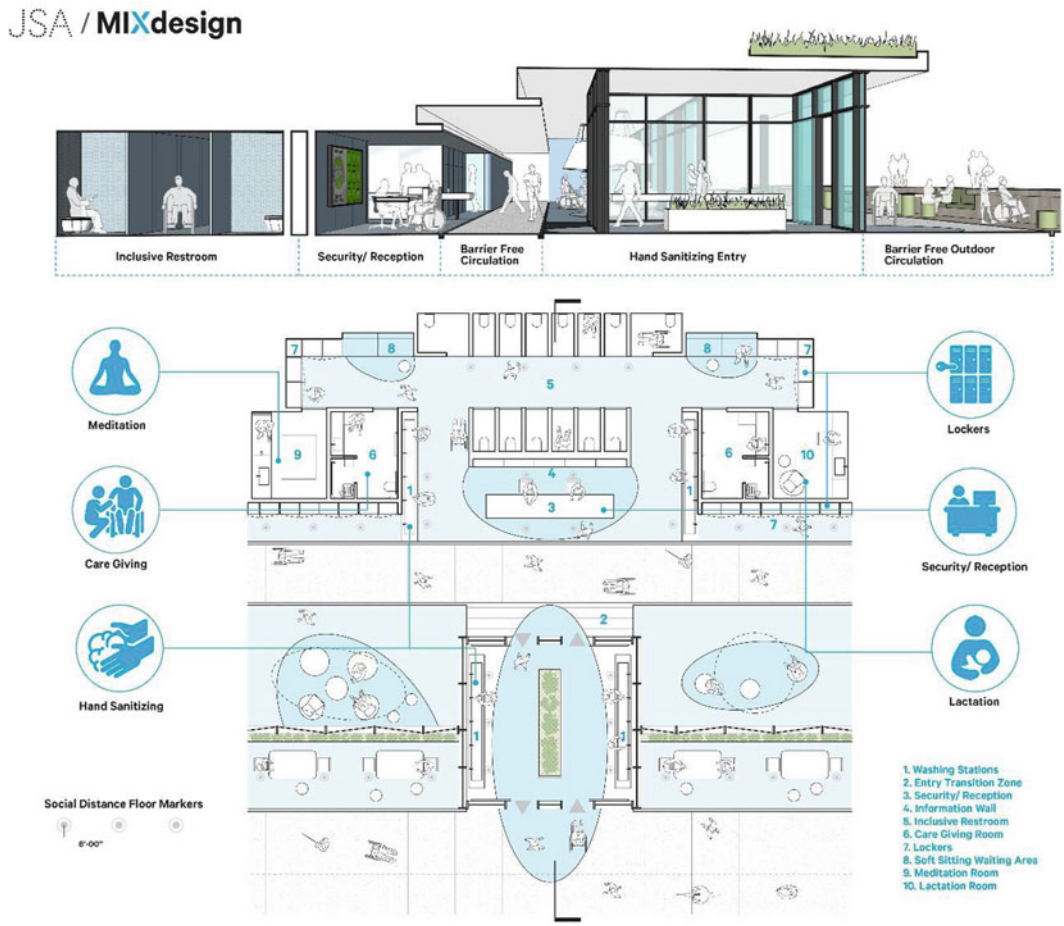

Fig. 54.3 Educational building case study: entry sequence, copyright JSA/MIXdesign, 2020

reception desk is designed to allow front and side approach for wheelchair users. It features a multi-level transaction counter that is deep enough to provide leg room for wheelchair users while also ensuring social distancing between visitors and receptionists. Multilingual information is framed by the backdrop of an electronic message board that includes American Sign Language and Picture Exchange Communication System which is a pictorial language used by the autistic community.

No longer hidden down a corridor, the Wellness Hub is conceived of as a porous extension of the main entrance. It features multi-height communal washing and grooming counters equipped with supplies to allow users to clean wheels, crutches, and canes to avoid tracking dirt from outside to inside. The space includes toilet stalls with full height doors as well as caregiving rooms with a sink, mirror, toilet, and hand shower to accommodate individuals who may require privacy including Muslims, Orthodox Jews, and men with shy bladder syndrome. In addition, the Hub includes dedicated spaces for caregiving, breastfeeding, prayer, changing rooms for bike commuters, and "escape spaces" for people who need to decompress and recharge. Color contrasting floor tiles, locker and stall doors create floor and wall patterns that designate suggested personal space for visitors to practice social distancing when required.

We also applied multi-sensory Wayfinding to the area adjacent to Reception, the Study Lounge, illustrated in this ground floor plan/section (Fig. 54.4). It is subdivided into barrier

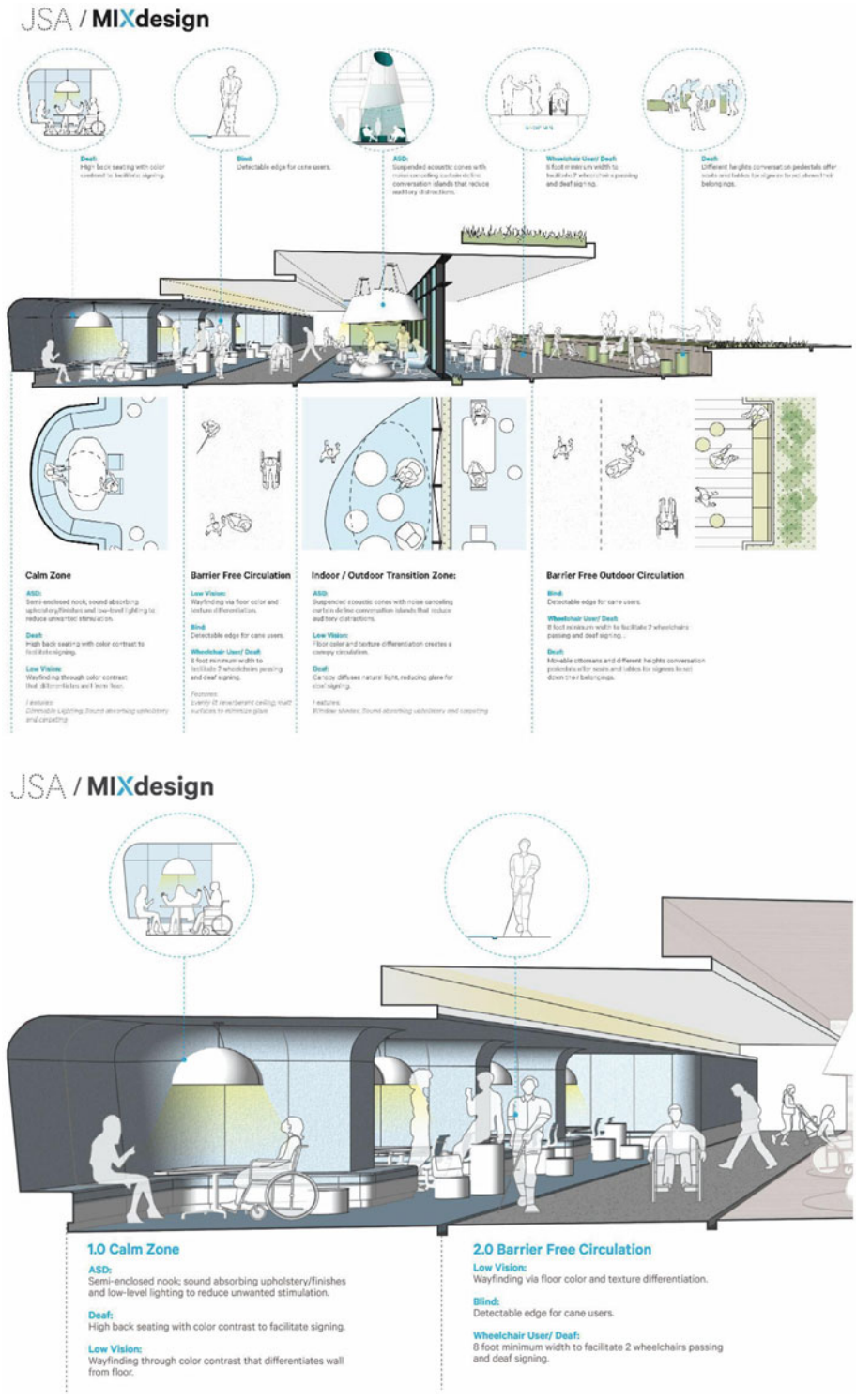

Fig. 54.4 Educational building case study: Study Lounge, copyright JSA/MIXdesign, 2020

Fig. 54.4 (continued)

free circulation zones and micro-climates. The Barrier Free Zone features a color-contrasting floor with a detectable edge for cane users and provides a wide differentiated circulation path for pairs of people and wheelchairs to pass. The Calm Zone features semi-enclosed nooks for small-group conversations with adjustable low-level lighting that reduces unwanted stimulation (a frequent comfort for autistic individuals as well as many others) and high back seating as a visually calm background for viewing American Sign Language.

Additionally, suspended overhead cones define two modulated sensory zones suited to accommodate any small group of individuals who prefer glare free daylighting and spaces without distracting noise. Located adjacent to a double paned glass wall shaded by a roof overhang, this microclimate speaks to the relationship between building performance (thermal and acoustic), energy efficiency, and human well-being.

54.3 Conclusion

Accessibility for marginalized and vulnerable populations has emerged as an urgent public health challenge (Elsabbagh et al. 2014; Khan et al. 2012). Social justice movements have broadened and deepened awareness of inequities for myriad communities deserving of influence over the builds of our schools, businesses, cultural centers, transportation systems, and health-care organizations. It is well documented and understood that many family-level, societal, system operations, and financial and demographic factors are significant influencers on access. These variables are amplified for groups with complex care needs or disabilities. To date, few from any discipline have asked how the built environment itself contributes to accessibility for populations without a visible physical limitation, and in turn, is consequential for health status, independence, and well-being. Deep and broad

understanding of the value and impact of our built environment on the opportunities and experiences afforded to those moving through and within spaces underscores this call to action: buildings require complex negotiations from their visitors—all visitors. The design and purpose of buildings can and should be deliberately imagined to support greater successful interaction for more users.

Attention to "universal design," a term popularized to describe construction that addresses the needs of all potential end-users with deliberate attention to diversity, has created a new demand for design solutions grounded in evidence and resulting from the empirical study (Hamilton and Watkins 2009; Martin 2009; Whitemyer 2010) New appreciation for how gender, race, ethnicity, religion, cognitive abilities, physical limitations, and behaviors moderate people's experience in community spaces is the foundation of intersectional design practices. Although model resolutions for evidence-based inclusive design are being considered by many firms, adoption and application to new construction have been limited, especially with respect to accommodations for individuals identifying along the spectrum of neurodiversity (Whitemyer 2010). Currently, design recommendations and code policy for structures intended to support those with social vulnerabilities and sensory sensitivities are largely based on anecdotal data that is influenced by cognitive biases and lacks necessary controls (Nussbaumer 2009). Notably, the UN Convention on the Rights of Persons with Disabilities calls for participatory parity in deliberative processes related to policy evaluation, reflecting the importance of including end-users of all abilities in the deliberative and investigative process (Sherlaw 2015) To date, few studies include such active participants in the research and design process, despite the need for maximizing the practical impact of research (Green 1995; Jivraj et al. 2014). Buildings develop purpose and meaning through the ways in which people experience them; (Baumers and Heylighten 2010) user potential for broader socialization, learning, sheltering and employing is only partially realized at this time. As pioneers in inclusive architecture, our investigative process and methodology may also serve as a template for the development of design strategies allowing communities to be increasingly open for educational, employment, recreational, and cultural exploration.

Multi-sensory Wayfinding is a work in progress and reflects our conviction that social equity and public health are mutually reinforcing propositions. Further, modeling for intersectionality centers around planning for potentially incompatible needs of end-user groups by offering flexible design elements informed by genuine community participation informing such builds. Designing through the lens of diversity promises to be a catalyst for creativity that can ultimately yield safe, accessible, and usable spaces for all of us.

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Inclusive Acupuncture in Campus Design: On the Intersectionality of Livability and Well-Being at the American University in Cairo

55

Momen El-Husseiny and Sara Seyam

Abstract

This paper assesses the post-occupancy evaluation of *urban acupunctures* at the American University in Cairo. Since the campus's emancipation in 2008, two genres of *urban acupunctures* have had the capacity to prevail: *service-based acupuncture* and *inclusive acupuncture*. By evaluating the community's engagement with these spatial nodes, there is a lost opportunity however to encompass SDG3 (well-being for all), SDG5 (gender balance and empowerment), and SDG11 (inclusive, safe, resilient, and sustainable environment). Building on the canonical work of Jane Jacobs, Christopher Alexander, Jan Gehl and Strange and Banning, the paper portrays the key components of livability at the university's plaza spaces and how initiating *acupunctures* as catalytic agents requires programmatic activation and spatial re-making. Using mixed-methods approach of photo-taking, mapping observations, space–time transformation, and a survey of 38 students, the study is developed to assess the physical, environmental and social dimensions. The paper concludes that revisiting *urban acupunctures* to foster their transition from *service-based acupuncture* to *inclusive acupuncture* is influential in re-making the campus sustainable—socially and environmentally.

Keywords

Campus design · Urban acupuncture · Inclusion · Livability · Well-being

55.1 Introduction

> I just want it to be less crowded or at least designed to minimize the noise levels.
> More shading and accommodating individuals with some level of social anxiety.
> More interactive seating areas allow people to communicate. (Students' survey responses, 2022)

The American University in Cairo (AUC) migrated from the urban core to the desert periphery of Cairo in 2008 following a general trend of universities relocation in search of more space and programmatic expansion (UN-Habitat 2022; Bacevice and Dunkley 2018). The transition to the desert edge resulted in struggles amongst the AUC community with a sense of detachment and unbelonging.

In an attempt to energize the campus's livable spirit, the administration added convenience stores and coffee shops in the in-between spaces of the campus's buildings. The masterplan's

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appropriations came in response to the direct needs of the AUC community. In urban design practice, spatial transformations respond to user needs. Lerner (2014) calls them *urban acupunctures* due to their magical power in solving socio-economic, and technical problems. Beyond solving immediate socio-spatial problems, acupunctures have an afterlife on their own terms (Banning and Kuk 2005). Their post-occupancy evaluation (POE), however, to become socially inclusive requires further theorization in urban design. This paper attempts to unpack the following question: how do acupunctures evolve with time from a human-centered approach? To achieve a healthy environment in a campus design, evaluating the performance of acupunctures from a human perspective through day-to-day interactions and recording journal diaries, and observing spatial relationships, is quintessential (El-Darwish 2022).

This article argues for a shift in developing *service-based acupuncture* into *inclusive acupuncture* and engaging with SDGs and their indicators and targets (UN 2015)—particularly SDG 3 (to ensure healthy lives and the promotion of well-being for all at all ages), SDG 5 (to achieve gender equality and the empowerment of women and girls to end all forms of discrimination and ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making), and SDG 11 (to make cities and human settlements inclusive, safe, resilient, and sustainable).

The SDGs act as a backdrop to examine the integration of acupunctures within the AUC community beyond an immediate response to a short-term emergency that is *service-based acupuncture*. The notion of the *inclusive infrastructure of acupunctures* indicates a long-term vision, where spaces and functions serve a sustainable goal in society, such as community outreach, civic engagement, sense of belonging, safety, comfort, and well-being. Transforming a linear "want-and-need" acupuncture into a cyclical mechanism of feedback loops with POE assessment leverages the value and mission of a campus within its community. The paper concludes with 7-guiding principles for *inclusive acupunctures* that are yet to be critically applied on campus through becoming user-responsive, community-oriented, environmentally conscientious, physically interactive, temporally eventful, unleashing the creative and imaginary impulses of students, adaptive to time and assertive to the latent potentials of well-being as drivers for campus design. While the demographics of the AUC community is approximately 6,500 students, faculty, and staff, the impact of the campus's migration to New Cairo resulted in an increase in the densification and urbanization of the area albeit in an enclave urban morphosis, hence the need for an inclusive approach of POE for an integrated network of *urban acupunctures* that can extend from the campus inside spaces and spill-over to the edge of its walls creating an engaging space with the neighboring community at the city scale. The AUC's plazas and nodes have the potential to generate a public-space from inside the educational vicinity to the outside city; the AUC's campus spaces are just the beginning for a city that is yet to evolve, integrating with its open spaces, vacant lots and surrounding built environment beyond the walls circumventing each parcel of land.

55.2 Literature Review

Campus environments influence student behavior, academic success, sense of belonging, and overall well-being of the community. Dewey (1986) explains that "we never educate directly, but *indirectly* by means of the environment. Whether we permit *chance environments* to do the work, or whether we *design environments* for the purpose makes a great difference." Campuses can be regarded as ecological systems, with mutually interdependent relationships among inhabitants (students, faculty, staff), environments (physical and social), and behaviors (learning and development) (Banning and Kuk 2005). By 1990, educators were exploring effective ways of organizing campus life and environments (Willits and Brennan 2016). In the discourse of developing learning environments,

"shared norms and values foster the pursuit of knowledge, personal growth, social responsibility, and respect for others" (Boyer 1990).

To date, the work of Boyer (1990) continues to guide the building of effective campus communities worldwide. Boyer's six principles define *communities of learning* as:

- An *educationally purposeful community*: a collaborative effort between faculty and students to strengthen teaching and learning.
- An *open community*: practicing quality and civil communication.
- A *just community*: individuals are encouraged to be their sacred, diverse selves.
- A *disciplined community*: Governed behavior within the academic and non-academic campus life.
- A *caring community*: individuals are recognized and valued and their well-being is supported.
- A *celebrative community*: traditions and rituals are appreciated, and a sense of belonging is affirmed.

To maintain such environments regular assessment methods must be addressed and monitored (McDonald 2002).

Communities of *learning* help individuals apply what they have learned beyond the classroom while engaging in interactions that deepen their understanding of themselves and others (Rullman and Harrington 2014). While academic spaces are crucial to students' learning development, Kuh et al. (1991) suggest that non-academic spaces are as essential, as the "interaction among community members is fostered by the availability of indoor and outdoor spaces where people can come together without much effort. Institutions should consider whether their campuses have adequate places that encourage spontaneous, informal interactions among students". The location and condition of these spaces are nonverbal communicative elements regarding the institution's values, vision, and capabilities (Rullman and Harrington 2014), considering that universities "are institutions of purpose and place" (Strange and Banning 2015).

Jamieson (2003) described the need for universities to design spaces that "generate interaction, collaboration, physical movement, and social engagement as primary elements of the student learning experience." Strange and Banning (2015) explore campus environments that better foster student learning and success, through a sense of inclusion and safety, opportunities for involvement or engagement, and experiences of the community; "without a fundamental sense of inclusion and security, the pursuit of more fulfilling educational experiences is a daunting task for any student. Without a basic sense of belonging to the campus community, free from threat, fear, and anxiety, attempts at other more lasting goals will likely fail" (Levitas et al. 2007).

Campus spaces can be welcoming and restorative, allowing students to recover from mental fatigue and restore their full capacity. Restorative environments can be defined as "places to relax, rest, recuperate, unwind, and feel safe" (Banning et al. 2010). Kaplan and Kaplan (1989) outline four elements of restorative places as (a) being away (disassociation), (b) extent (a whole place capable of fully engaging the mind), (c) fascination (interesting elements varying in intensity), and (d) compatibility (a setting corresponding to one's purpose or inclination). For restorative spaces, campuses should aim for sustainable happiness; "happiness that contributes to individual, community, or global well-being without exploiting other people, the environment, or future generations" (O'Brien and Howard 2020). Kuh et al. (2005) describe that "through buildings, signs and the landscape of the campus, the physical environment (of these institutions) communicates messages that influence students' feelings of well-being, belonging and identity." Psychosocial and behavioral responses are positively influenced by several elements on campus, including "the existence of and ease of movement between spaces for prospect (visual access to other people) and refuge (feeling safe and protected)" (Rullman and Harrington 2014) as well as natural daylight, sensory variability, sense of agency or ownership, opportunities for spontaneous social

encounters, moderate sound levels, and the presence of social equity and respect between people. Open spaces can alleviate student stress and promote a campus healthy life. By providing "control, or shelter from discomfort and overstimulation"—shade, flexible seating arrangements, etc., coherence is achieved, and a stress-free environment is provided (Lau et al. 2014). An essential part of on campus life is the food service provision, its affordability and quality, which plays an important role in "users' well-being, specifically when it provides access to good quality, healthy food, supports positive food choices, and facilitates positive social interactions" (Lugosi 2019).

The notions of healthy and livable built environments have been developed in urban design through four approaches: (1) 15 min city (Moreno 2020), (2) flexible city (Bergevoet and Van Tuijl 2016), (3) soft city (Sim 2019), and (4) smart city (Sassen and Kourtit 2021). While the 15 min City focuses on the provision of spaces for living, working, and enjoyment within walking distance of approximately 15 min, the flexible city is an assertive concept to allow changes with time in architecture and urban planning. The soft city argues for the union of density and diversity to achieve more livable and healthier environments. Critical mass and heterogeneity of activities play a pervasive function. Whereas, in the smart city, technology and applications provide a platform to improve livability in a healthier and less time-consuming manner. The intersectionality of these concepts, approaches, and configurations has several factors in common including attention to integration, inclusion, and diversity (Sepe 2022).

Jacobs (1961) defines diversity as "a mix of uses (and activities) including variety in 'cultural opportunities, the inclusion of a 'variety of scenes, and a 'great variety' in population and other users." In sustainable societies, the design of open spaces should be free of biases and inequities, with underlying attention given to gender equality. Open spaces embodying different activities at different times of the day "can make women feel safer" (Women's Health East 2021) and conversely, "when the space is occupied by women and girls, it is also occupied by more people in general" (Soraganvi 2017).

Gehl (1987) divides outdoor activities in public spaces into three categories, "each of which places very different demands on the physical environment: (a) necessary activities: compulsory activities, (b) optional activities: (only under favorable exterior conditions), and (c) social or resultant activities (activities that depend on the presence of others in public spaces and are linked to the two other activities)".

Through this interweaving communal fabric, "opportunities for meetings and daily activities in the public spaces of a city or residential area enable one to be among, to see, and to hear others, to experience other people functioning in various situations" (Gehl 1987)—an essential component of fostering stimulating student learning environments. Alexander (1967) stresses the importance of intertwined activities of cross-linked encounters, arguing that "we are trading the humanity and richness of the living city for a conceptual simplicity (a tree) which benefits only designers, planners, administrators, and developers". It is imperative that we regard our cities, or yet, a successful campus learning environment, as a semilattice organization—a melting pot of fabrics, activities, and systems.

To steer clear of dissociation, grasping that "urban campuses exist alongside many other institutions, organizations, neighborhoods, and people who more often than not are unaffiliated with the college or university environment but nevertheless impacted by its planning decisions" is key (Bacevice and Dunkley 2018). Livability and well-being not only matter within the immediate campus environment; they are regenerative echoes beyond the boundaries of a university campus, to "nurture a range of communities within their institutional structures" (Bacevice and Dunkley 2018). Bacevice and Dunkley (2018) explain that "learning, research, and the practice of scholarship are community endeavors" and many universities are already leading pioneering efforts to transcend and connect with their surroundings. To play a potentially transformative role in the city, a *Neighborhood Initiative* adopted by AUC "works

collaboratively across the University with faculty, students, staff, and administrators, as well as neighborhood residents, businesses, and public sector decision-makers" (AUC 2017).

55.3 Methods and Methodology

A mixed-methods approach of quantitative and qualitative methods was used to study selected acupunctures at AUC. First, extensive research focused on single acupuncture using journal diaries, observations, photo-taking, behavioral mapping, and environmental analysis. Three student research assistants were recruited in the Summer of 2022 for 4 weeks (from mid-June to mid-July) to participate for their well-rounded knowledge of the campus, developing student-inspired and student-led research. Secondly, a questionnaire was disseminated during the fall semester (first and second week of September 2022) for a comparative study of three acupunctures. A set of 20 questions were prepared and categorized into (a) student profile, (b) satisfaction levels of safety, happiness, diversity, inclusion, and environmental comfort —across the three acupunctures, and (c) the nature of activity and time spent in their preferred node. A reflection question asked users to redesign their preferred spatial node. Thirty-eight responses were collected, analyzed, assessed, and theorized.

55.4 Service-Based Acupuncture

55.4.1 AUC Campus Vision and Design

The new campus was designed to reflect the University's educational mission, by incorporating Egyptian architectural traditions into the timeless urban campus. The architects "sought to capture the international identity of the AUC community as well as the multidimensionality of the liberal arts curriculum" (AUC n.d.).

The architect's campus, Abdel-Halim Ibrahim, noted that architectural harmony was achieved through "geometry, materials, and landscaping", and choreography of movement inspired users along the spine through "chance meetings and encounters" (AUC n.d.). Visual connectivity between overlapping elements such as plazas, outdoor bridges, outdoor corridors, etc. generated surprising moments. The intertwined relationship between the campus's main spine and the parallel 400-m-long university's garden sparked powerful energy and opportunities for learning, communication, and interaction (AUC n.d.). Sasaki's urban designer, Dennis Pieprz explains that "all the in-between spaces outdoors, the campus streets and byways, the plazas, and the courtyards—every place designed to gather or pause—are designed to that end" (AUC n.d.).

55.4.2 Study Areas

This research explores three acupunctures: (a) *Quick* node at Omar Mohsen Gate, (b) *Quick* node at the library, and (c) The Bakery Shop (*TBS*) node. Due to the nature of their locations and activities, they form riveting relational connections between buildings, spaces, and their users.

In 2008, *Quick* node at Omar Mohsen Gate was added in response to a growing need for a convenience store. Adjacent to the Humanities and Social Sciences (HUSS) building, Quick has a strategic location overlooking a panoramic view of the School of Sciences and Engineering (SSE), the campus's main spine, and AUC's gardens. The space accommodates flexible seating arrangements overlooking the gardens and a staircase seating leading up to SSE's elevated porch that offers "an important physical and psychological transition from the public life" and is a "significant social/study/meeting/eating place" (Marcus and Francis 1997).

Due to the linear arrangement of buildings along the campus's main spine, traveling distance is significant. In 2012, *TBS* was located in HUSS building to serve its users. Unlike *Quick*'s node, *TBS* is enveloped by buildings from all sides, creating an intimate environment scented by the tantalizing aroma of coffee and bakery,

and surrounded by a smaller number of group gatherings and passersby.

In 2022, an additional *Quick* store was allocated in the gardens, overlooking the campus library and an expansive view of the surrounding landscape. In 1981, a survey conducted in Berkley showed that most campus users' favorite outdoor spaces "tended to be green or "natural" environments, and/or were not seen as the territory or home base of any particular building or department" (Marcus and Francis 1997).

Three acupunctures lie within the campus's strategy to be accessible, inclusive, and safe for all. Approximately 5% of the student population has a disability. AUC is one of "the first in the Middle East that serves all types of disabilities, from physical and psychological to learning" (AUC 2022a). An individual with a disability is a person who has "a physical or mental impairment that substantially limits one or more major life activities" (AUC 2022b). The disability policy implemented allows for reasonable accommodations—campus (ramps and compliance to ADA standards) and digital accessibility as well as support services—to allow for a healthy and performative campus environment.

The location and details of the spatial design impact the use and popularity of a space (Marcus and Francis 1997). To design new open spaces, it is crucial to document what seems to have worked or not, what is favored by users, etc. (Ujang 2010; Carr et al. 1992). The design of a successful learning environment should create meaningful spaces for its users, to develop "connections between the place, their personal lives, and the larger world" (Fig. 55.1) (Carr et al. 1992).

Shifting to an inclusive paradigm, the afterlives of these three acupunctures lie essentially in the sustainable and ever-adapting intersectionality of livability, and well-being. The campus urban skin can be better understood through acupuncture therapy: "… the identification of the spots and the channels of influence in the fabric that enable us to add new qualities, adequate energy, whether cold or hot and to empower urbanity in its various modes" (de Solà Morales 2008).

55.5 Inclusive Acupuncture

To embrace a wider understanding of what *inclusive acupuncture* may imply, a set of techniques were deployed including (1) spatial narratives, (2) socio-behavioral mapping, and (3) environmental simulation. Spatial narratives unfold human sensorial emotions to express feelings and observations using text. The second method, socio-behavioral mapping, employs artistic mechanisms of photo-taking, sketching, annotating, and reflecting. This technique trains the mind to focus on tracing bodies in space, and activities in time in a choreographic ballet. The third tool, environmental modeling, projects the movement of the sun in space as it lays its shade onto buildings. The purpose of an integrated qualitative-quantitative analysis is to trace the impact of space and environment on social inclusion (Fig. 55.2).

55.5.1 Spatial Narratives

Recording daily encounters in the form of text is a technique that de Certeau (1998) and Whyte (1980) often used to decipher people's inherent practices. These spatial narratives embed behavioral patterns and everyday rhythms. Excerpts from students' observations were collected during this study:

> During the morning (9:00–9:30 am), small number of people gather in front of *Quick*. The number of students significantly increases after 9:30. Throughout this hour, people buy coffee or water, and the movement of people is quick. No one sits on the steps, which are exposed to the summer sun with no shade.
> During assembly hour (1:00–2:00 pm), more students are seen in groups of two or three. Every now and then, a group of 4 appears. These larger groups aggregate in specific parts around the corner steps. Some people wait for their friends, greet each other, head someplace, or enter *Quick*. This catch-up corner acts as a meeting point… Some people decide to sit on the shaded seats beside the Administration building overlooking *Quick*, where *Quick* acts as a backdrop for sitting and watching people passing by. People sit for a short time (few minutes) … to eat a snack or wait for someone.
> In the late afternoon (4:00–5:00 pm), more staff and faculty appear. A lot of them pass by in groups

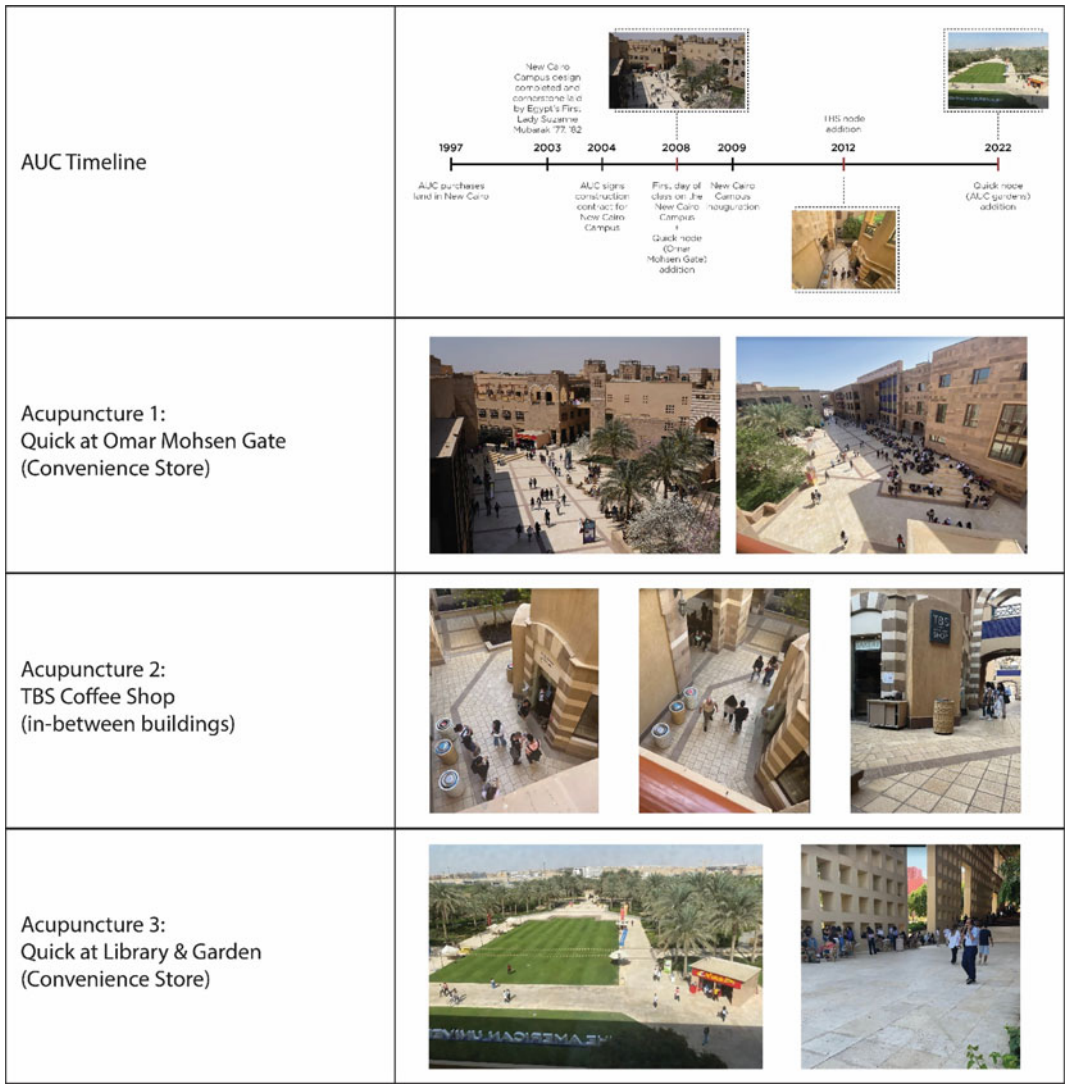

Fig. 55.1 Timeline and locations of AUC acupunctures

of two. There is a pattern of women with their children leaving at the end of the day. There is a noticeable movement of birds and cats when the sun is setting; there is more shade.
In the evening (8:00–9:00 pm), there is an outflux of masters students coming out of classes; they sit around *Quick* and walk/linger around in groups of three to five. Such aggregates make the area feel somehow dense. *Quick* is the largest and brightest source of light in the area at night. Many seek the light for a sense of safety.

An observation that runs across the diaries—girls are more visible than boys. students use *Quick* to wait for friends; they aggregate at the edges and sit around to watch people pass by as a movie play (Fig. 55.3).

55.5.2 Socio-behavioral Mapping

The spatial narratives depict a complex engagement with *Quick* due to its strategic location at the intersection of several buildings. Counting people, mapping movement, and observing

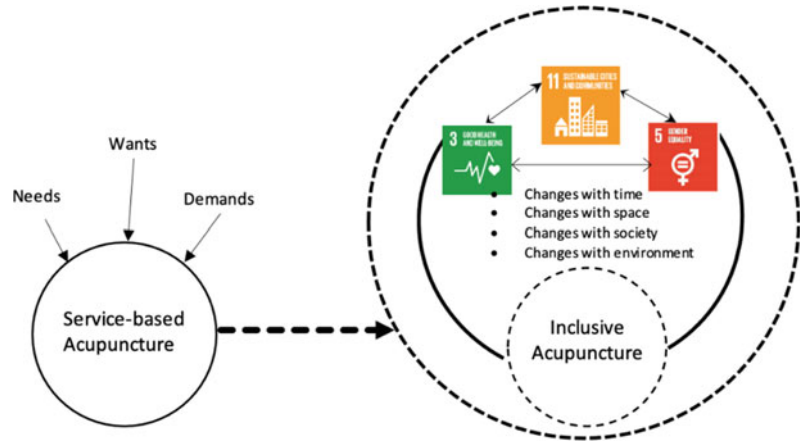

Fig. 55.2 Tropes of acupuncture and their transition to tackle SDGs

activities aid in understanding the function of *Quick* as a spot for social groups' formation: individuals, pairs, or more. People mostly gather around *Quick* during assembly hour. These gatherings do not necessarily mean sitting, staying, and socializing for long. In fact, it was noticeable that almost no group stayed more than 15 min. Students first pass by *Quick and* then decide to enter or stay.

Throughout the week, there are more females than males, who exceed slightly at night. Since the 8–9 pm time consists mainly of Master's students, this could also suggest that there are more male graduates. The chart (Fig. 55.4) also shows the number of students at peak times when classes start and end (e.g., 9:45 am, 4:30 pm). The graph shows the different gender-group formations and their numbers at different time slots. Each time slot is dominated by a significant type of group, with different male-to-female ratios. In the 9:00–10:00 am slot, fewer groups are formed due to students rushing to class. At 1:00 pm, students meet after class and go to *Quick*, mostly mixed groups of males and females. At 4:00–5:00 pm, more female groups are created mainly coming from the administration building. Most female-staff walk in groups while male-staff walk individually. At nighttime between 8:00 and 9:00 pm, masters students walk mainly in mixed groups and spend more time on the steps compared to other groups during the day.

55.5.3 Environmental Modeling

The results of the solar analysis show that most of the areas are not shaded, particularly the garden area that has the maximum solar radiation during winter and fall. In winter, there are more shaded areas; at 9:00 am most of the steps are shaded; at 3:00 pm, the steps are almost shaded, yet the area in front of *Quick* is not shaded. During summer, there is more exposure to solar radiation; the least shaded areas are at 9:00 am and 12:00 pm, whereas at 3:00 pm, some of the steps and the area in front of *Quick* get lucky with shade.

55.6 Results and Findings

The qualitative investigation shows that the *Quick* acupuncture is not fully integrated into the campus design despite its strategic location. Students seeking refuge to relax and nourish their minds and souls are faced with over-exposure at the social level, the absence of enclosed spaces, and steps that are uncomfortable seating causing archaic body positions. Environmentally, the space faces long hours of direct sunlight. *Quick* has been limited to an *added* object despite its potential. For a broader understanding of *Quick* in relation to three other acupunctures on campus, a survey was distributed tackling aspects of

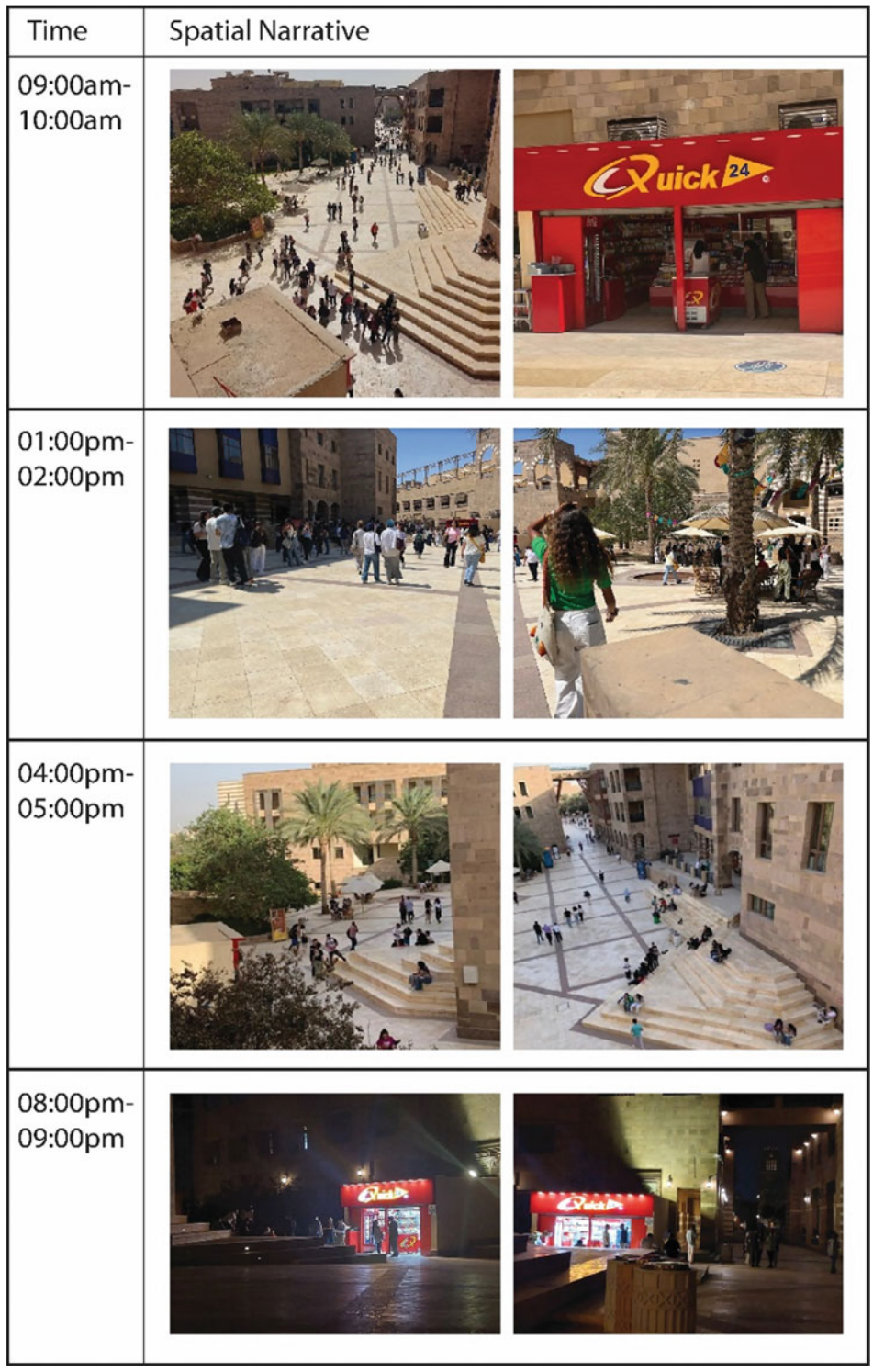

Fig. 55.3 Spatial narratives in student's journal diary

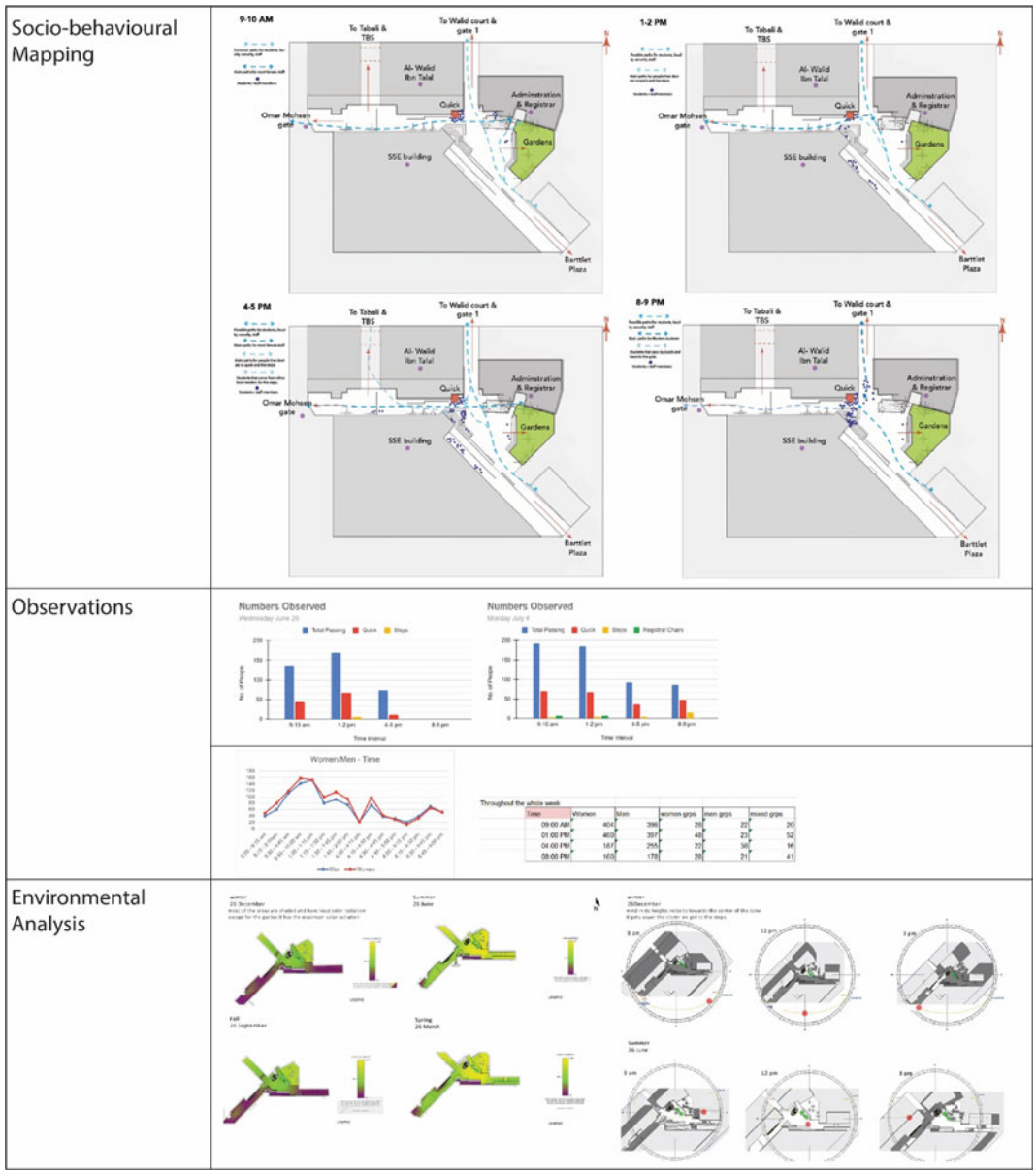

Fig. 55.4 Socio-behavioral mapping and environmental analysis

well-being, safety, gender sensitivity, and social dynamics. The comparative insight aimed to create a constructive dialogue between functions to extract spatial attributes and characteristics that would help guide urban designers and campus planners in the decision-making of integrating acupuncture. The following points are the resulting outcomes of the survey.

(1) **Acupunctures provide a sense of social safety and satisfaction when correlated with various experiences of enclosures and exposures**

The *TBS* shop and *Quick* at the library's garden increase the sense of safety for social livability as they act as destination areas and connect to spatial pockets of

shade and indirect sunlight in the neighboring buildings.

(2) **The choice of materials, texture, semiotics, and soundscape plays a role in accommodating special needs related to accessibility, stress, and calmness levels**
Adjacent to *TBS* and *Quick*-library, there are ramps for wheelchairs and flexible furniture to co-create seating arrangements in response to the scale, size, and shape of the group, which differs from time to time depending on social anxiety, alienation, and nature of the social-mix. In the survey, students said: "add more comfortable seats and some tables", "add different seating options and maybe increase the shaded spots by either adding pergolas or trees."

(3) **Environmental-friendly features of restorative qualities and landscape design deliver serenity and tranquility**
Students' responses reflect the need for campuses to accommodate: "Quiet space with vegetation and maybe a water features with shaded seating area", "More shading, and accommodating individuals with some level of social anxiety"; "Make more shade"; "Quick would be redesigned to suit university aesthetics, exposure is very high in Quick node by Omar Mohsen gate."

(4) **Acupunctures invite users to stay when freedom of expression, liberty, and community activism are supported**
Students' responses demonstrate that they would sit, view, and do other activities than grab a coffee and move Quickly. In the existing acupunctures, they spend from 5 to 15 min there. An added value would be to co-create the acupuncture to spend more time for "happiness and relaxation" as well as learning about other things happening in life and real-world activism by bringing inspiring talks such as TEDx in these spaces, as explained by one of our interlocutors.

(5) **Acupunctures have a role in co-facilitating the exchange of ideas, knowledge, and experiences across class, gender, age, and abilities**
Students remain confined in their social networks despite the opportunity to expand their networks informally and learn in a cross-disciplinary manner in such intermingled spaces.

(6) **Acupunctures are magnets for refuge and escape, and can transform into spaces of caring, sharing, listening, and bonding**
The repetitive responses express the need for slow-paced acupuncture that helps students to meditate and release their stress levels from education. They used the following adjectives in answering what they would aspire for the campus's acupunctures in open spaces: "Peaceful", "Peaceful and relaxed", "Comforting", "Calm, serene, taking a break from the day, contemplating the present time."

(7) **Acupunctures need to be adaptive to changes over time for co-design and co-creation**
There is a multifaceted capacity to generate simultaneous temporalities of different activities that serve the mission and strategic goals of universities. In that light, the architecture of acupunctures may adopt folding and unfolding movable structures. Spaces around those anchor points of shops and kiosks may allow students' artistic talents for self-expression and participatory engagement in developing the acupuncture's architectural character in harmony with the campus's urban design guiding principles.

Overall, the survey shows that well-being is co-created through an interactive engagement with the community, environment, and space (Fig. 55.5).

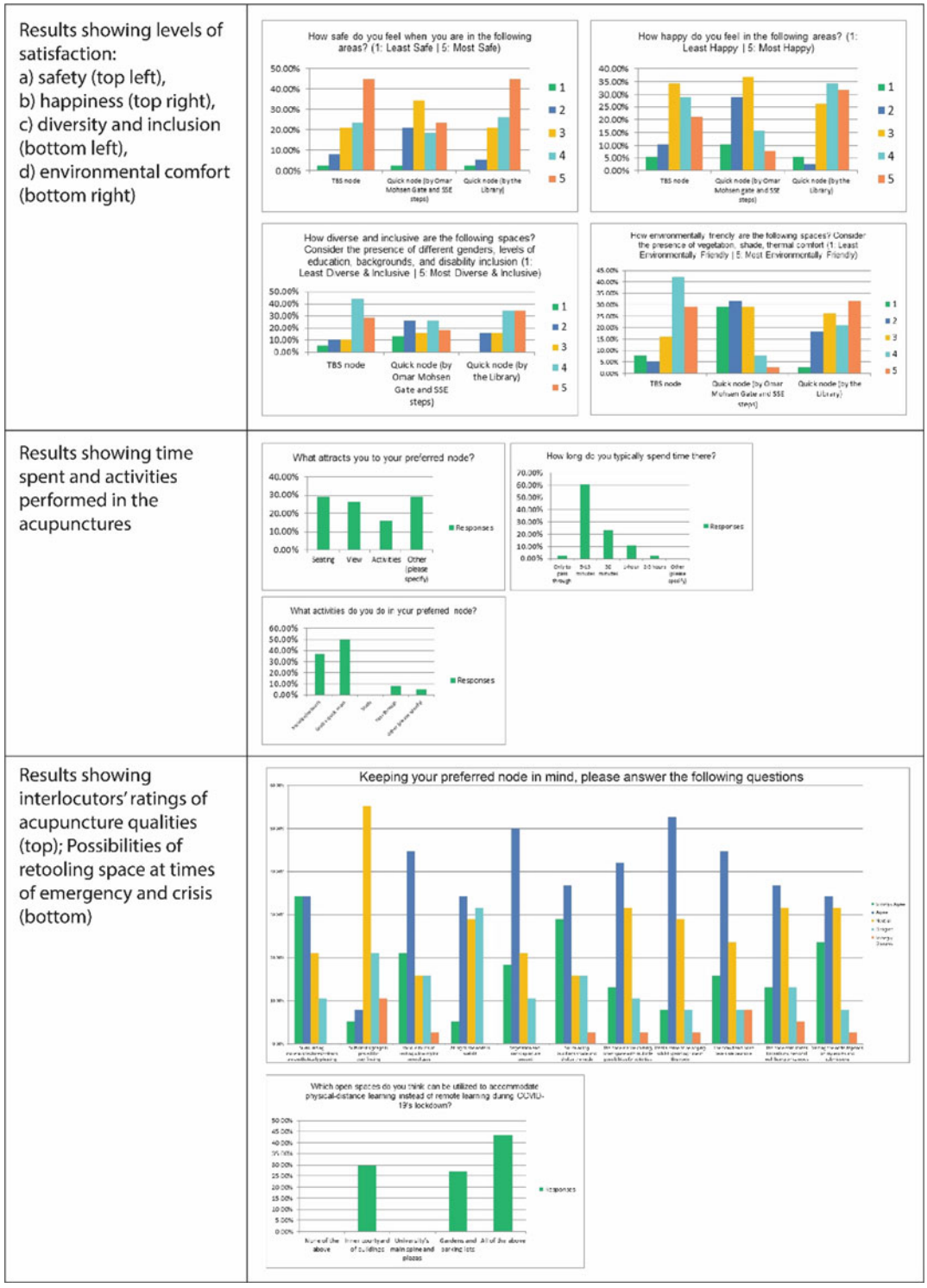

Fig. 55.5 Survey results

55.7 Conclusion

Opening its doors in 2008, the university migrated to an empty neighborhood surrounded by parcels of gated communities and construction sites. Emerging as an enclave with exceptional harmony and architectural character, new demands surfaced, and the administration responded by adding new structures and rearticulating the open spaces and areas in-between buildings to offer the material needs required. Through unpacking students' diaries, text, photos, and experiences that pertain to livability and well-being in existing acupunctures, it becomes important how SDG3, SDG5, and SDG11 are critical in everyday life on campus. Hence, the paper articulates inclusive acupunctures as a design approach rather than service acupunctures that do not respond to the multifaceted complexities of physical, mental, and social needs. This study employed qualitative and quantitative methods for data collection, mapping, journaling, questionnaire, and environmental simulation. Investigations covered the acupunctures that were added over the years, to serve different areas on campus.

The *Quick* node at Omar Mohsen Gate yielded the least satisfaction amongst the student body regarding its social, physical, and environmental qualities. Although the initial assumption suggested that *Quick*'s location would create a strong anchorage, the results showed that there is a clear detachment between the space and user experience. The campus community interacts with *Quick* on their way to another location; a spot for a quick grab and go rather than a destination or place of comfort. On the contrary, the recent additions of the *TBS* node and *Quick*-library are more attractive to the community. The intimacy and aroma of the *TBS* node and the wide overview of the greenery surrounding the library are more meaningful to students; these spaces better embody qualities that allow for studying, relaxation, contemplation, socializing, and most importantly, support and a continuous learning process.

The design and appropriation of open spaces should essentially meet the student's needs and ensure a positive environment for a healthier and livable campus. This will only proceed to happen should the selection and design approaches allow for responsive acupunctures that are assessed, monitored and within the framework of development goals for a sustainable community. This paper highlights the importance of imagining *urban acupunctures* beyond their need-based solutions within the campus's interweave of linkages and relational connections. The study demonstrates the urgency of POE for urban acupunctures that often fall short beyond their initiation—socially and environmentally, when they can be regenerative, creative, and influential becoming a resourceful spatial infrastructure and platform for learning. Indeed, there is luxury in adding a workable acupuncture. Yet, a balanced approach aids in addressing pertinent design registers of livability, well-being, social inclusion, etc. These issues are challenging to research in the global south due to entrenched cultural norms and gender biases. The authors acknowledge that AUC is a confined campus located in Cairo and focusing on this urban campus alone is not enough. This research was an experimental ground to apply a rigorous methodology in the normative sense of conducting fieldwork as the limitations of testing POE in the city open a wider array of difficulties, resulting in diverting the research focus and objectives to tackle what is doable in "public spaces" with the presence of security personnel and a censored urban environment. The outcome of the paper's 7-research takeaways and guidelines for enacting *inclusive acupuncture* is to *tactically* build on them when researching in "closed neighborhoods" and

districts where social networks and community-based kinship would offer a safety net for researchers and ease in the transferability of knowledge.

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A Behavioural Analysis of the Intersectionality of Gender in Housing Among Indian Middle-Class Families

56

Sanmathi N. Yelamali and Rutuja Sunil Ulhe

Abstract

The effect of architectural planning, facade, materials, and space, in general, on every user often goes unnoticed. The influence of built spaces on the well-being of humans is noticeably another evolution of architecture. Gender plays a significant role in Indian households and varies across different socio-cultural and economic backgrounds. Men are often linked with the public sphere, whereas women are usually connected with the domestic sphere. While designing, an architect needs to understand the seemingly small but crucial aspects of architecture that impacts human behaviour in households. Designers should entrust themselves in noticing gender disparity (if any) in the built environment for better and inclusive design decisions. The paper explores the complex ground of each human's unrealized right to comfortable housing through more exemplary space planning and the resulting need for barrier-free design. It strives to introduce the framework of an intersectional analysis as a gender-comprehensive way to study existing cases of different typologies of home across coastal Karnataka, India, as the primary study along with certain international cases to understand the global scenario. Due considerations would be given to various socio-cultural and economic backgrounds so that congenial housing becomes a reality for all humans, including women, men and the LGBTQIA + communities.

Keywords

Intersectionality · Gender · Housing · Inclusive · Socio-cultural · Equality

56.1 Introduction

Intersectional design is a method of designing by considering how factors of identity, like gender and age, interact. Feminists since the last century have strived to propose common kitchens, laundries, dining halls, kitchen-less households, and cities using new methods of architecture and urban design to exemplify new values of equality. Betty Friedan (Hayden 1982), the first feminist in the United States to recognize the economic exploitation of women's domestic labour, referred to a housewife's barriers as "issues without a name" in the early 1960s. The

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purpose of the late-nineteenth and early-twentieth-century feminist movement was to overcome the division between personal and public life established by capitalism, which impacted women. In the twenty-first century, it is critical to analyse if women with higher education, jobs and better rights have the flexibility to choose either a traditional or unconventional sphere of work while doing other kinds of work.

As per the references studied to date focus on women in poverty in South America, Africa or/and India (Rabenhorst et al. 2011; Varley 1993; Adebanjo et al. 2012), we notice a gap in research regarding the behaviour of middle-class families, female/male-headed families, and the LGBTQIA + communities that raises a research interest.

The Indian middle class (Wadhw 2021) is defined as families with over Rs 2.5-lakh per annum and a net worth of less than Rs 7 crore. This category includes around 56,400,000 families in India. Considering (ArcGI 2013), the average number of people in a household is 4.4, and 24,81,60,000 Indians fall under the middle-class category. This constitutes about 19% of the overall population, 79% of taxpayers and 70% of consumer spending. According to The Financial Express (Ghani 2021), over 55% of the Indian population will reach the middle class. Because India's demographics are far younger than China and the United States, India's middle class might be the world's largest by 2025.

Equity over equality has now gained recognition in design research and testing. At the core, equity (GWU 2020) accepts that each person has contrasting conditions and assigns resources and opportunities needed to acquire a similar result. We need the associated data to design spaces that help women and other genders. The preference to talk to men seems peculiar, as the paper shows. Solutions begin with the simple act of starting a conversation with every user.

56.1.1 Aim

To investigate the intersectionality of gender in housing among Indian middle-class families.

56.1.2 Objectives

- To analyse gendered spaces in middle-class houses.
- To discover if there is a significant difference between males and females concerning architectural space, planning and gender bias.
- To observe the behavioural patterns of women and men in an Indian middle-class household.
- To understand a feminine perspective concerning the utilization and adaptability of spaces in middle-class households.

56.1.3 Scope

Whilst most of the focus is on housing amenities for economically marginalized women in South America, Africa or/and India, the impact of design and planning is poorly understood in the middle class.

The scope of the study is limited to interviewing and surveying women of different age groups belonging to middle-class households.

56.1.4 Limitations

- Access to homes of the women and men of four to five typologies of households can be limited due to the COVID-19 pandemic resulting in a lack of real-time understanding of the spaces and the residential feel.
- Assessing the longitudinal functioning of the households to be studied and measuring change or stability over time is constrained by the time factor.
- Conscious and unconscious biases shall be avoided and proofread before the data is studied, as this study aims to examine the intersectionality of different genders.
- Male and female genders have been considered for the study, but transgender, non-binary genders and LGBTQIA + families have not been due to lack of access.
- Gender biases and differences depend on resident relationships, psychology, and

personal preferences. This study shall focus on the spatial aspects that impact gender biases in houses.

56.2 Methodology

56.2.1 Sample

While the study sample (As shown in Table 56.1) cannot be considered as a representative of the total population, generalizability was not a primary goal. Any effects evident in this study can be generalized to similar residential capacities under a similar paradigm.

56.3 Data Collection (Part I)

The qualitative research method was used for the study. It is elaborated below.

1. Interviews (with a questionnaire): Interviews (with a questionnaire): It included preparing an open-ended questionnaire beforehand and chatting with women from three households. Transcribing and recording interviews with consent was a part of the interviews.
2. Participant observation: It included visual grasping while observing the residents/interviewees' trajectories and how they carry out chores in their household. Data was recorded through audio-visual recordings and note-taking.
3. Secondary data collection: It includes case study materials for the focus of the analysis. Studying research papers, articles, books, and stories to learn more about authentic experiences.
4. Survey (Data collection part—II): It included conducting online surveys through a Google form survey.

56.3.1 Secondary Case Study

Spatial and communication practices of Chettiar women in their ancestral homes, Ramalakshmi and Arulselvan (2020).

The authors address a gap regarding Chettiar women's spatial and communication practices from an insider perspective. The Chettiars are a Tamil subset that originated in Chettinad, Tamil Nadu, India. In the Chettiar culture, which comprises the symbolic expression of patriarchal ideologies, women normalized their spatial and communication practices. Chettiar houses were sprawling mansions (As shown in Fig. 56.2) designed to accommodate large joint families (Radhakrishnan et al. 2011).

Architect Periyannan states that these houses were designed this way to suit the lifestyle and needs of everyday life: "Chettiar men carried out business-related activities including meeting outsiders in the outermost zone (As shown in Fig. 56.3). The only purpose men had to go inside the house was to dine. The women used the innermost zone of the house to carry out household chores. Women do not use the outer area due to their natural inhibition towards men and lack of purpose to use this space. Women

Table 56.1 The four typologies of families studied were (As shown in Fig. 56.1)

	Data collection part I (case studies)	*Data collection part II (survey)*
People of interest	Women of four typologies of households	People belonging to a broad demographic
Fixed constraints	Socio-economic background and gender, i. e., middle-class families and women	Socio-economic background, i. e., middle-class families
Floating constraints	Ethnicity, sexuality, and age, i.e., castes, religions, and different generations of women	Gender, ethnicity, sexuality, and age, i.e., identities, castes, religions, and different generations of people

Fig. 56.1 The a-Nuclear family (Married parents and offspring), b-Single-head family (Single parent and offspring), c-Joint family (Sets of siblings, spouses, and children) and d-Extended family (Including at least three generations)

Fig. 56.2 A Chettiar house (Reproduced from Ramalakshmi and Arulselvan 2020)

have started shedding their inhibitions in the last two decades and do not hesitate to use the outermost zone.“ The authors demonstrate that spatial practices affect communication practices. Women who live in ancestral homes, irrespective of age, are more conservative in their spatial and communication patterns. Culturally, women were not permitted to converse with men. This kind of intervention stopped when women began going with their spouses abroad. The study shows that the space or the house design of the modern houses where these families lived in other towns and cities affected the spatial practices of Chettiar homes.

Women commonly only accessed the forefront of the house to use the telephone in the Munkattu. Previously, ladies entered the ancestral home via Rendamkattu (As shown in Fig. 56.4) rather than Munkattu. However, first and second-generation women emphasize that such a tradition has been subverted, and they enter the house via the Munkattu. While they would utilize it as a roadway, ladies still cannot sit here. This indicates a dichotomy in spatial behaviour, as ladies entering through the Munkattu would arrive at the Valavu only to find themselves amidst other women. The movement and overlap between male and female house members happen in the external plinth area, corridors, dining hall and bedrooms. (As shown in Fig. 56.5).

Chettiar women were recognized for their skilled domestic administration and were involved in household decision-making. However, they were culturally conditioned to regard men as superior by subordinating themselves to the prevalent patriarchal paradigm. Thus, the power dynamics that prevailed in the household were defined by domestic roles, age, and gender.

Comparative Study of Transformations in Traditional House Form: The Case of Nagpur Region, India, Kotharkar and Deshpande (2012).

The author's approach to studying a traditional house form does not seek a vernacular form; instead, it seeks deeper meanings and how the built form addresses spatial and activity patterns.

The author elucidates that family structure has primarily affected the urban context. The pattern of cooking gives information on the role of women in the household and has an impact on spatial organization. The Wadas followed a standard pattern of house construction with courtyards. The open porches called the Osari (As shown in Fig. 56.6), where men socialize surrounding the Chowks, enable all members' various activities. The Chowk serves as a transition between public and private rooms. The livestock shed, servants, and bathrooms are all in the rear, allowing for greater functional flexibility.

Fig. 56.3 Women prepping for dinner in the Rendamkattu (Reproduced from Ramalakshmi and Arulselvan 2020)

Fig. 56.4 Men socializing in the Mugappu (Reproduced from Ramalakshmi and Arulselvan 2020)

The village home is an example of the traditional link between spatial structure and activity pattern. The community's traditional extended family system and gender distinctions remain. Traditionally, men and women in the household utilize the external spaces (Dewadi, Osari) for various daily tasks. They act as the most significant part of the house as there is an overlap of usage (As shown in Fig. 56.7). Social interactions, family gatherings and 'feminine' and 'masculine' work like cleaning, drying of grains, and firewood result in the mingling of both genders of the house (Fig. 56.8).

As shown in Fig. 56.9, gender use determines which areas of the house are allotted to what gender. The semi-open space at the entryway

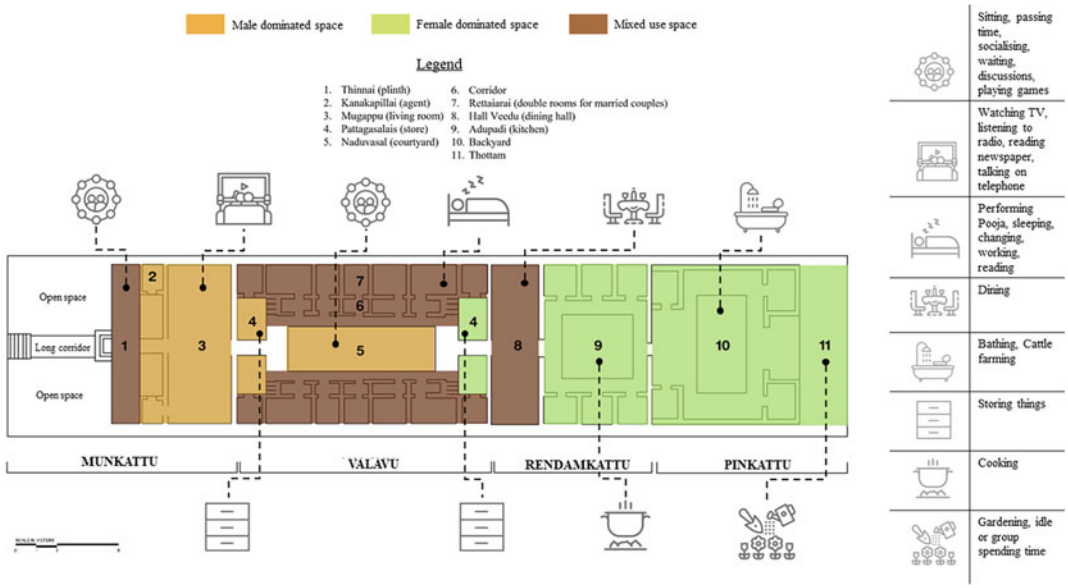


Fig. 56.5 Activity mapping (*Source* Author)

Fig. 56.6 Osari (Reproduced from Kotharkar and Deshpande 2012)

(Osari) is usually utilized for socialising by the males of the house. Homemakers use the open side space (Dewadi). It allows neighbouring women to assemble in the afternoons to jointly prepare various food products preserved and consumed throughout the year. The home's centre area called as the Khasgicha Chowk (As shown in Fig. 56.8), serves as a kitchen and a place of prayer, and it is the sole enclosed room in the house that serves as a private zone, which the women of the family usually utilize. Women are responsible for cooking, serving food, and cleaning the kitchen; however, they are not permitted to visit this area during their menstrual cycle. The spatial planning and neighbourhood of villages are subjected to fewer changes compared to bigger towns and cities and lag time in external causes of change. The movement and overlap between male and female house members happen in the internal plinth area, corridors, and bedrooms.

Fig. 56.7 Phadacha Chowk (Reproduced from Kotharkar and Deshpande 2012)

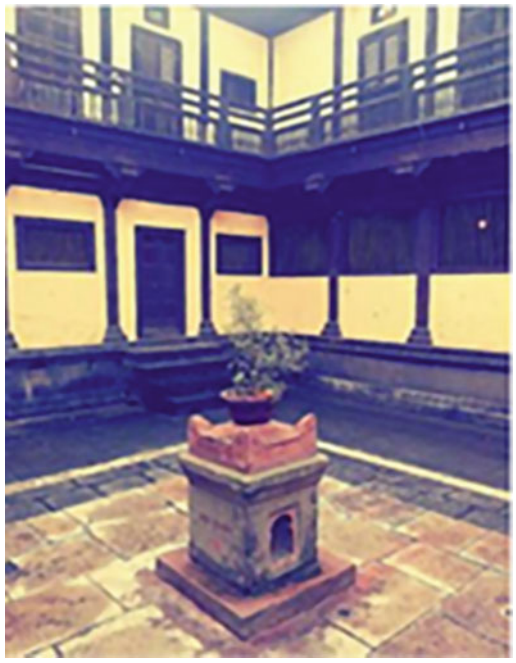


Fig. 56.8 Khasgicha Chowk (Reproduced from Kotharkar and Deshpande 2012)

56.3.2 Primary Case Study

Sample questions for the primary case study:

(1) What spaces do you personally consider male or female spaces?
(2) What is a typical day like for you? What did you do yesterday?
(3) What are your primary responsibilities as a part of this household?
(4) Do you get help in terms of daily tasks? And by whom?
(5) How often do you and another resident argue about household chores, and when?
(6) Where do you spend most of your time in your home?
(7) Are there spaces in the household that facilitate your hobbies?
(8) How do your general lifestyle and spaces at home affect your job (if any)?

Narayani, Indrali, Udupi district, Karnataka, India.

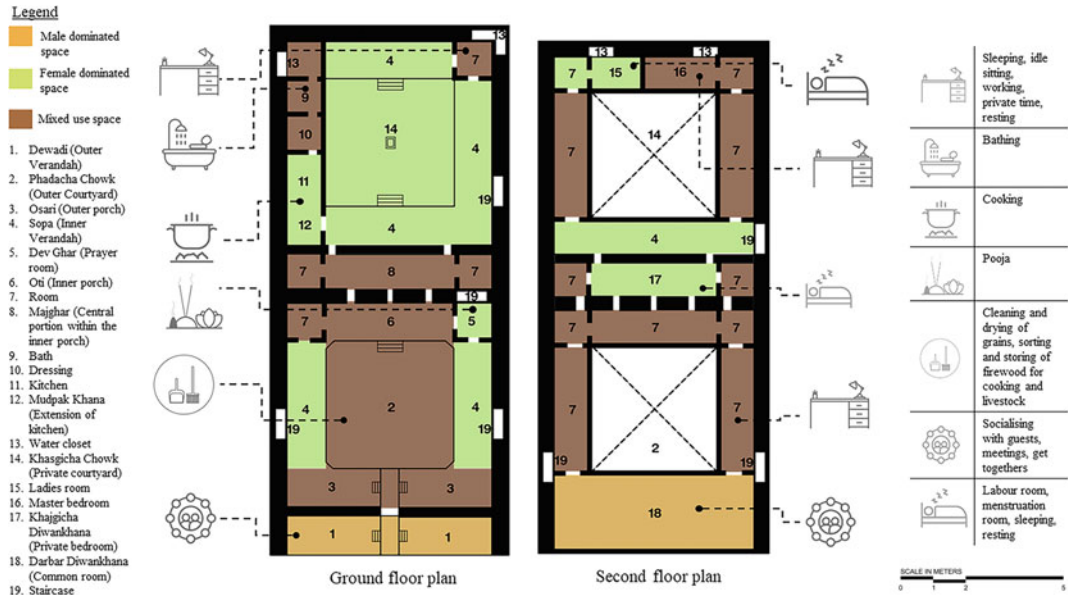
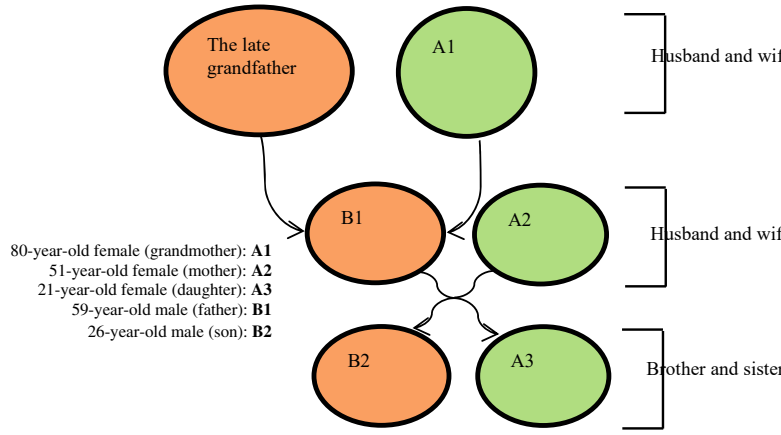


Fig. 56.9 Activity mapping (*Source* Author)

Fig. 56.10 Family chart



As show in the Fig. 56.10, the residence is an extended family home built in the 1970s and accommodates five people. The grandfather was the head of the family before he passed away in 2013 and was the client that interacted with the civil engineer.

In the 2BHK (2 Bedroom, Hall, and Kitchen) residence (As shown in Fig. 56.11), the master bedroom (7) was built by the grandfather for himself, catering to his personal needs, while four people shared the bedroom (5). In A3's opinion, the unnecessarily vast washing area and storage area could be utilized as more private bedrooms (13, 14) for her and her brother (B2). In the kitchen, the women generally do cooking-related tasks (As shown in Fig. 56.12).

A3 has always felt the need for privacy, but her brother (B2) does not need personal space even while working from home. He sits in the hall or the master bedroom and can work as if nothing has changed. He sleeps in the hall (As shown in Fig. 56.13), their grandmother in the master bedroom, and their parents in the bedroom. Therefore, A3 cannot paint, study, or work

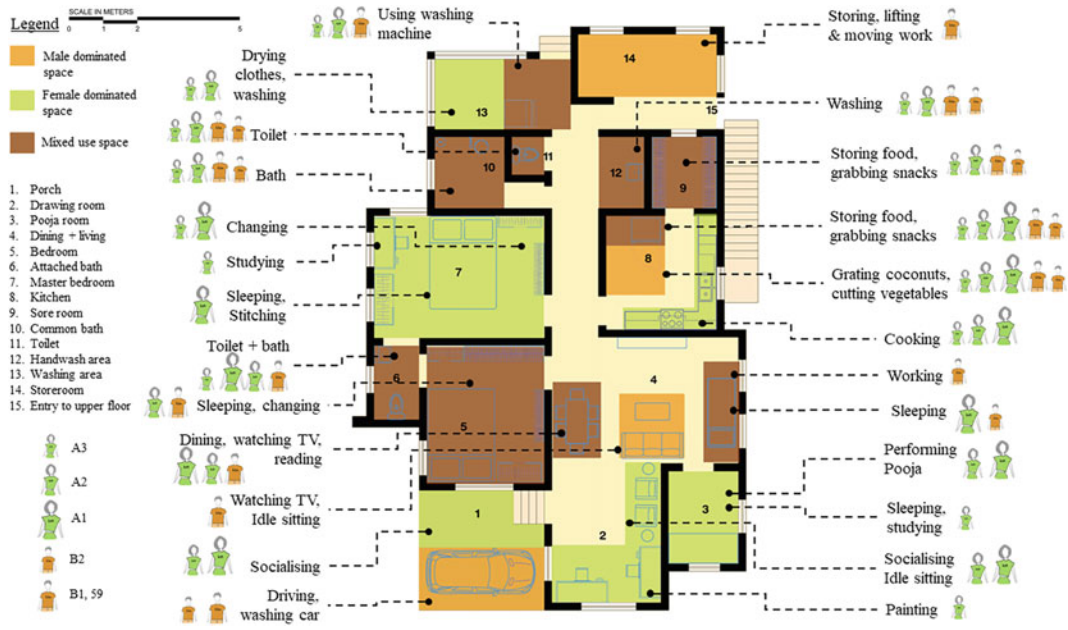


Fig. 56.11 Activity map (*Source* Author)

Fig. 56.12 Women cooking during the festive season (*Source* Author)

Fig. 56.13 Living room (Hall) (*Source* Author)

during the day or night except in the Pooja room. She complains that due to this, her back hurts as there is no table there. Before her father retired, the hall would be empty most of the time, but as he spent all his time there, she felt uncomfortable working or spending time in the hall. She takes a bath at her grandma's apartment, where she feels more secure as it is embarrassing to walk through the hallway to her room after a bath at her home. "They should have designed it, keeping the joint family in mind", she states. She wishes her grandfather had kept all users' future requirements and privacy in mind.

According to A3, the tall trees and small windows sometimes obstruct sunlight from coming in. She loves the landscape area (As shown in Fig. 56.14), which covers a massive chunk of the land surrounding the entire residence. The vast trees make her feel like a "small part of a big world", even though she does not spend time amidst the garden (Table 56.2).

As shown in the Fig. 56.15, the residence consists of a single-parent family built in 2007 and accommodates five people currently. C1 has been the head of the family since 2006 after her husband passed away.

The civil engineer and C1 both strongly believe in Vastu Shastra. (According to www.designingbuildings.co.uk, Vastu Shastra is an ancient Hindu system of architecture and design). Therefore, the house was planned according to it. She believes that when it comes to the planning of the house, men usually dominate, and women's opinions do not get considered. When her brother visited her to help during construction, she expressed that he often dominated her decisions. However, she would speak up, make her case, and get things done as she would be the primary user of the household. She considered the future and requested a staircase that connects to the 1st floor (terrace), either for the house to be extended or to build another one by her children.

All the chores are divided equally. According to c1, there is no gender bias in the house's spaces. She does not believe in male and female spaces. Although during menstruation, women

Fig. 56.14 Onsite landscape (*Source* Author)

Table 56.2 Constructive tools for the residence

Aspects	*Constructive tools*
Planning and usage	• Creation of dedicated spaces for people and particular functions • Making the most of all the space available • Consideration of the female perspective
Privacy	• Creation of private, green outdoor spaces connected to rooms • The utilization of rooms on the rear end for personal activities

Sushantha Kripa, Hebri, Udupi district, Karnataka, India

do not enter the Pooja room. A hierarchy of seating is followed even at the dining table between ages. C2 and C3 work together as D1 works at the shop. C2 considers her room a private space, while C3 prefers the hall. C2 shares the bedroom with her spouse and toddler, while C3 shares it with her mother. They do not have any privacy issues.

D1 spends most of his time working at the shop, where he gets help from C3 and C2, who take turns. Nevertheless, he does not help with the kitchen chores but helps with cleaning, moving, and lifting. C1 thinks that humans are drawn to ways to make their life better. She loves to see people build their own homes. She states that women have way more input than men when

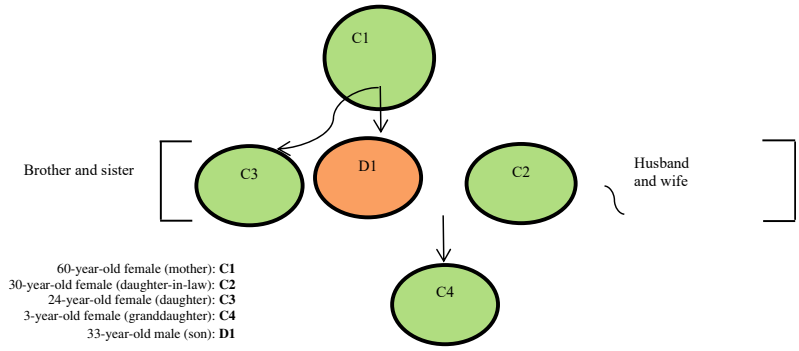


Fig. 56.15 Family chart

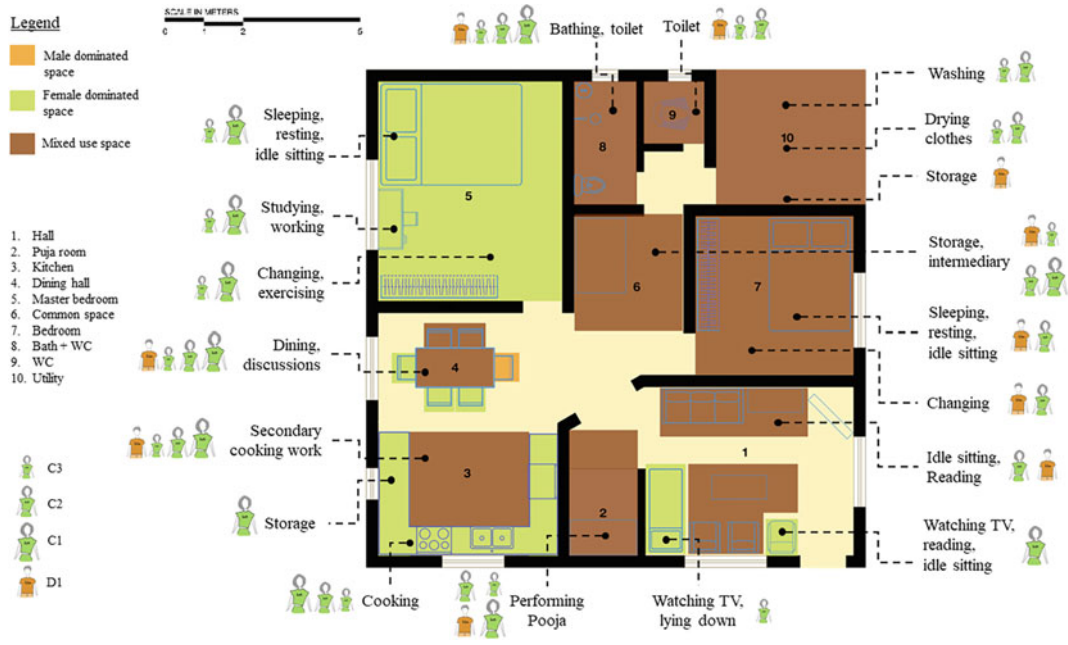


Fig. 56.16 Activity map (*Source* Author)

building a house, talking of a conventional Indian middle-class home. She declares, "If women are left to prosper, the house will prosper by itself" (Fig. 56.16, 56.17, 56.18, 56.19 and Table 56.3).

As shown in Fig. 56.20, the residence consists of a nuclear family built in 2013 and accommodates six people currently.

Even though an architect was involved, F1, the father, did all the planning (As shown in Figs. 56.21, 56.22) and showed the children and wife the ongoing progress. It was primarily built keeping the female users in mind as F1 mostly lives abroad. The children helped choose many design elements, even though they were young. There are no gendered spaces when the father is not in town.

The users were keen on narrating the aspects they loved most about the house. They are fond of the massive window on the stairwell, which brings in most of the light. They point out the mood boost caused by the ventilation and illumination sources through the central cut-out of the living area (As shown in Fig. 56.23). There is

Fig. 56.17 Living room (*Source* Author)

Fig. 56.18 Women working in the kitchen (*Source* Author)

Fig. 56.19 Dining area (*Source* Author)

Table 56.3 Effective tools for the residence

Aspects	Effective tools
Planning and usage	• Consideration of the future while designing • Consideration of the female perspective
Hierarchy	• Creation of relatable spaces • Segregation and division of chores equally

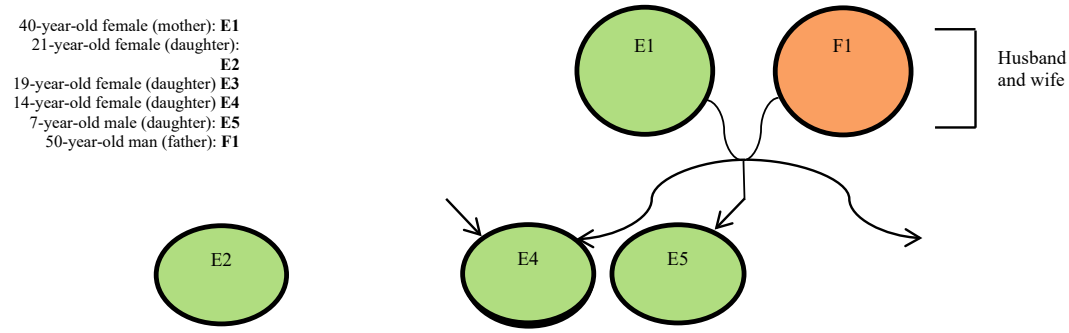


Fig. 56.20 Family chart

Fig. 56.21 Activity mapping (*Source* Author)

Fig. 56.22 Activity mapping (*Source* Author)

Fig. 56.23 Living area (*Source* Author)

a private balcony on the top left corner of the house as part of the guest bedroom, where they all individually spend time. They perform hobbies there as they consider the lighting and view to be the best on that edge. According to E2, rooms on the edges have more privacy, making it easier to focus. All the users find the attached bathrooms with private closets in each room to be their favorite space.

There are two kitchens, one to wash utensils and cook, while the other kitchen is used for baking, grilling, and having meals together (on the island counter). E1 does appreciate the amount of work and detail put into the planning of the kitchens by her husband but expresses that this leads to more work. The women prefer the island counter to the dining table, a more private eating space. (As shown in Fig. 56.25).

The father (F1) wanted a feeling of richness and grandeur to intimidate men if they tried to follow the daughters' home. To bring out the same feel, massive pillars are placed on the façade (As shown in Fig. 56.24), but the older daughters find them a waste of money. The house is designed for large gatherings like weddings as they have extended family relatives.

The women expressed that F1 considered privacy while planning the house for all four of his daughters. Work and hobbies are primarily performed in their rooms, the guest room, and the dining room, with no space left unused (Table 56.4).

56.3.3 Comparative Analysis

The comparative analysis demonstrates the various factors that determine the contrast (As shown in Table 56.5) and similarities (As shown in Table 56.6) between multiple houses studied based on the typology of families. These factors were picked based on the interview responses.

Fig. 56.24 Massive pillars on the façade (*Source* Author)

Fig. 56.25 Kitchen with an island counter (*Source* Author)

Table 56.4 Effective tools for the residence

Aspects	*Effective tools*
Planning and design	• Involvement of all the users • Sufficient natural light and air
Privacy	• Space for each user of the residence • Segregated space for each activity—hobbies, resting, studying

Table 56.5 Comparison of contrasting aspects

Contrast	*Narayani House, Udupi*	*Sushantha Kripa, Hebri*	*Ayaan House, Katpadi*	*Chettiar house, Tamil Nadu*	*Wada House, Maharashtra*
Designer and/or planner	Civil engineer	Civil engineer	Architect + head of the family	Architect	Traditional architects
Plan form	Longitudinal plan with no transitional spaces	Square plan with transitional spaces (intermediate space, storage space)	Square plan with central spaces (circulation, natural light)	Longitudinal plan with transitional spaces (courtyards, corridors)	Longitudinal plan with transitional spaces (courtyards, corridors)
Women's opinions during the design process	Not directly communicated with women. Only with one man	Fully discussed with all members of the family	Fully discussed with all members of the family	Ancient planning of house. Not consulted by any users	Ancient planning of house. Not consulted by any users
Mixed spaces (points where the trajectories intersect)	Neutral intersection points—Men and women of the household mostly have segregated activities	High intersection points—Men and women have similar activities that are divided equally	Neutral intersection points—Men and women of the household mostly have segregated activities	Low intersection points—Men and women of the household have highly segregated activities	Neutral intersection points—Men and women of the household mostly have segregated activities
Hierarchy in spaces	Least. Personal hierarchies were created in each individual space after the house was designed	Observed. Hierarchies were sorted when the house was designed. The same has been followed	Observed. Hierarchies were sorted when the house was designed. The same has been followed throughout	Observed. Hierarchies were sorted when the house was traditionally designed and followed	Moderate. Hierarchies were sorted when the house was traditionally designed and followed
Kitchen	Moderate area, placed at the center of the house. Facilitates many women working together	Moderate area, placed at the corner of the house. Open kitchen facing dining, more welcoming to the users	High area—2 kitchens, placed close to the entry of the house. Facilitates different types of cooking	High area, placed at the end of the house. Facilitates many women working together. Segregated, and is not welcoming to the users	Least area, placed at the end of the house. Facilitates only women working. Very private and is not welcoming to the users

(continued)

Table 56.5 (continued)

Contrast	*Narayani House, Udupi*	*Sushantha Kripa, Hebri*	*Ayaan House, Katpadi*	*Chettiar house, Tamil Nadu*	*Wada House, Maharashtra*
Consideration of future users in the design of the house	Currently, looks bleak. The grandchildren's habitat takes place in spaces that are unsuitable for sleeping, working, studying, etc	Looks optimistic. No privacy issues (as told by the users). Spaces for personal time and work are present	Looks optimistic. No privacy issues (as told by the users). Spaces for personal time and work are present	Has been bleak. As it is a traditional type of planning being followed for centuries, there is no flexibility. Currently, due to urban migration, it has increased	Has been bleak. As it is a traditional type of planning being followed for centuries. Currently, due to urban migration, it has increased
Gender bias in spaces (according to users)	Yes, according to the youngest female of the five users. No, according to rest	No	No	Yes, according to female users of all ages	Not known

Source Author

Table 56.6 Comparison of similar aspects

Similarity	*Narayani House, Udupi*	*Sushantha Kripa, Hebri*	*Ayaan House, Katpadi*	*Chettiar house*	*Wada House, Maharashtra*
Kitchen—Primary female-headed spaces	Yes. Women have been cooking for generations. More masculine chores like grating coconuts are done by men	Yes. Women cook and perform secondary kitchen work like grating coconut and using kitchen appliances	Yes. Women cook and perform secondary kitchen work like grating coconut and using kitchen appliances	Yes. Women have been restrained to the kitchen for generations, not just for cooking related activities but also for their personal time	Yes. Women have been restrained to the kitchen for generations, not just for cooking related activities but also for their personal time
Female dominated activity mapping	High-moderate. Men and women of the household mostly have segregated activities. Women perform more household chores	High-moderate. Men and women have similar activities that are divided equally. 3/4th of the users is female	High-moderate. All household chores are performed by women of the house and 5/6th of the users is female	High-moderate. All the household chores are performed by women	High-moderate. Almost all the household chores are performed by women
Role of the head of the family	Design of the house discussed thoroughly by 1st generation man of a 3-generation household	Design of the house discussed thoroughly by 1st generation single mother of a 2-generation household	Design of the house discussed thoroughly by 1st generation man of a 2-generation household	Design of the house discussed thoroughly by older men of a multiple generation household	Design of the house discussed thoroughly by older men of a multiple generation household
Dining area	A space that brings all users together, irrespective of gender	A space that brings all users together, irrespective of gender	A space that brings all users together, irrespective of gender	A space that brings all users together, irrespective of gender	A space that brings all users together, irrespective of gender. Although, there is no formal dining space except the Chowks

Source Author

56.4 Data Collection (Part II)

56.4.1 Sample Questions from the Survey

Firstly, demographic information of the respondents was asked, such as age, gender, location, and typology of family.

(1) What spaces of home do you consider men's spaces?
(2) What spaces of home do you consider women's spaces?
(3) Where do you spend most of your time when you're at home?
(4) Do you get enough privacy in the spaces of your home?
(5) What are the private spaces of your home that you spend time in?
(6) What do you like most and least about your home?
(7) What spaces in your home facilitate your hobbies and work?
(8) Any experience of gender segregation/biases in terms of spaces and habits? How do you see/perceive that as?

56.4.2 Responses

The survey was circulated among friends, family members and acquaintances through Google forms. With over 150 responses, it was conducted to understand basic perceptions, experiences, and behavioral habits of a higher demographic (As shown in Fig. 56.26). Age groups ranging from 18 to 80 years have equally participated. The respondents had a majority of female, working and homemaking, nuclear and middle-class families. They reside in places that range from a village in Udupi, Karnataka, South India, to Seoul, South Korea. Interestingly, the architect did not discuss with a higher number of male participants' needs than female participants.

As shown in Fig. 56.27, when asked about their experiences of gender biases at home, women express themselves elaborately compared to men and most of them stated that only female residents work in the kitchen, cleaning and washing areas. In one instance, a participant expressed that most women spend time in the kitchen or the bedroom during family gatherings while men take up the living room to socialize. They described how women are usually okay with considering themselves secondary. Some women also expressed that they found no bias in spaces. When the same was asked of men, most of them mentioned that they had never experienced gender biases in the house. It is important to note that heads of middle-class households have become increasingly concerned with the comfort of their female tenants over the years. Therefore, a designer needs to address what space facilitates what gender in a residential set-up to improve the residents' behavior at home.

56.4.3 Indicators of Behaviour—A Comparative Analysis

As shown in Fig. 56.28, a comparative analysis of the indicators of behavior was done based on the answers received through the survey. The Design Intelligence research inspired the comparison method (Nazidizaji et al. 2014), combining Emotional Intelligence (EQ) and a t-test.

The comparative analysis demonstrates the scale at which each indicator of behavior affected people in their households. The indicators were picked based on the questions relevant to the study. The percentages were calculated via the responses received, and a five-point scale was used for logging them down.

56.5 Results and Discussion

Indian middle-class families have evolved significantly over the last decade due to the influence of technology, education and, therefore, awareness. As shown in Fig. 56.29, the family dynamics are complex and depend upon individual resident relationships, psychology, personal preferences, and culture.

One of the primary findings was that the head of the family made design decisions with the

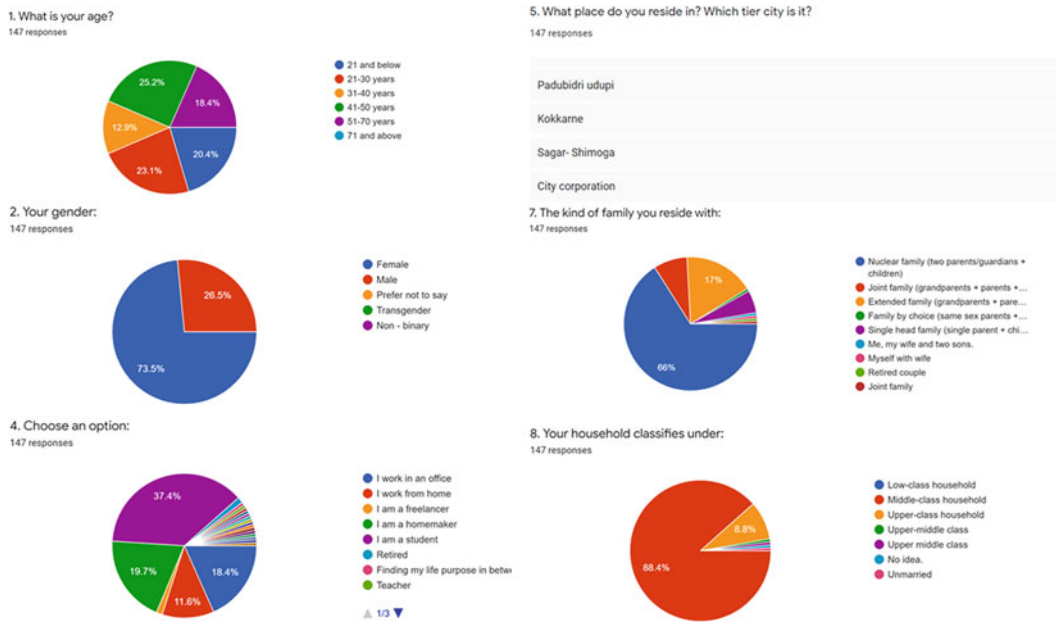


Fig. 56.26 Basic demographics of the respondents (*Source* Google Forms and Author)

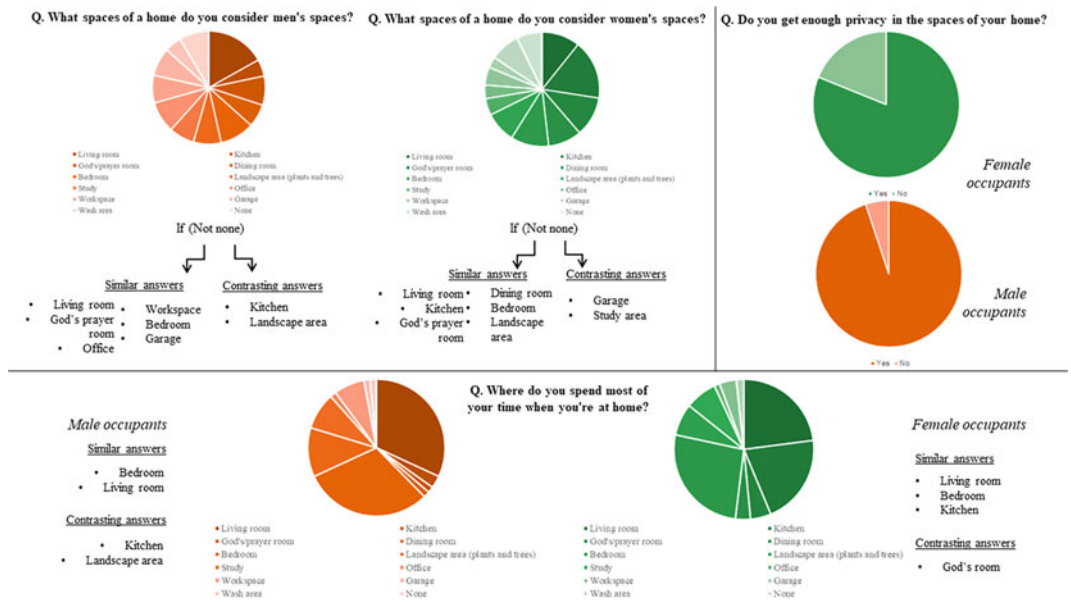


Fig. 56.27 Men's and women's spaces, privacy and spaces spent time in most (*Source* Google Forms and Author)

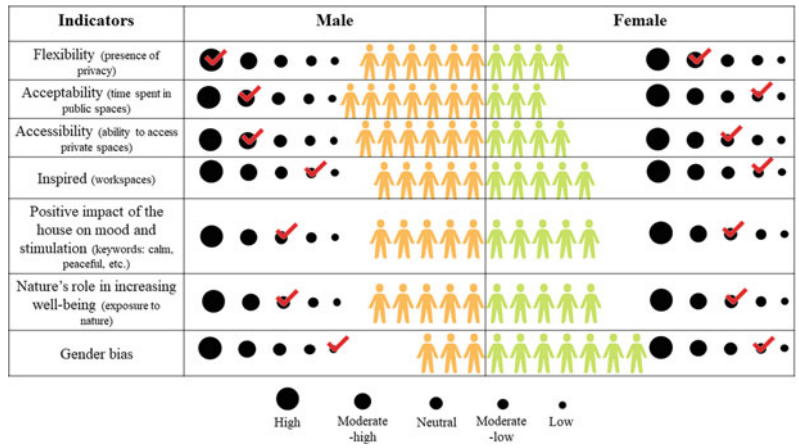


Fig. 56.28 Comparative analysis (*Source* Author)

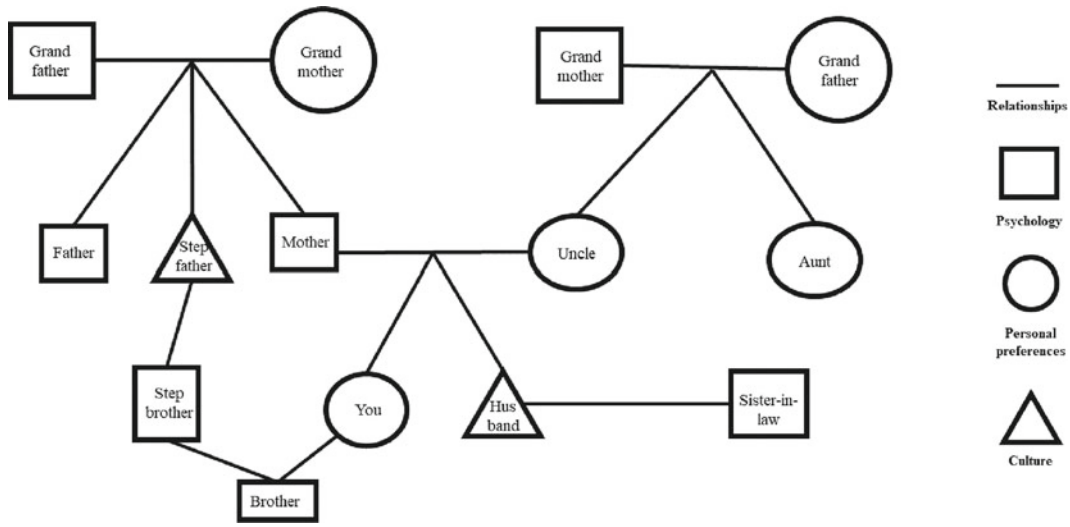


Fig. 56.29 The way various factors affect family dynamics (*Source* Author)

architect/civil engineer and played a significant role in determining the hierarchy and intersection points in houses, as one would expect, whether they regarded their family members' opinions or not. Nevertheless, women have gained more importance in decision-making and spatial planning. As the number of unconventional family types has increased (for example, single-parent families), the house has also transformed. Considering women's opinions during the design process played a pivotal role in all residents' user comfort. It was observed that different aspects could affect different genders similarly through a behavioural lens. The probability of change in the future is high due to technological advances; for example, working parents will bring more changes in the behavioural patterns in the house, which would eventually impact the space design.

Primary and secondary case studies in the research demonstrate the intersections of different genders in a household, therefore, gender considerations do matter when concerned with

privacy. Women expressed the need for it more significantly than men. The case studies in the research also proved that modern houses have better inclusivity and behavioural patterns for all users than older houses. Neutral to high intersection points of men and women in mapping indicated that duties were likely to be equally divided between residents.

As shown in Fig. 56.30, the research concludes that even though transitional spaces like courtyards tend to bring all genders together, it appears that modern houses had very little male-dominated spaces in comparison to traditional courtyard houses. The dining areas always played an essential role in bringing all the residents together. A hierarchical segregation of spaces was observed in spaces either due to gender segregation, equally divided household activities or chores.

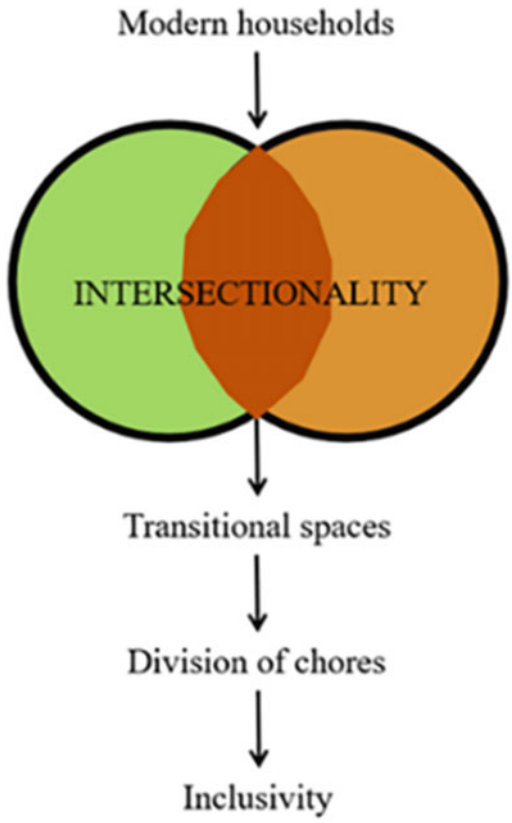


Fig. 56.30 Inclusivity (*Source* Author)

According to the users, due consideration is required while planning/designing the houses or residences as they recognized that the families expand or shrink considering the future. A few prominent similarities were that kitchens were primarily female-headed spaces, and the men did secondary cooking work.

Since the primary case study was conducted within the 30 km range, the secondary case study within 800 km and the survey within a broader range of about 5000 km radius, we get a comprehensive understanding of the research. Testing the research hypothesis considering factors like architectural characteristics, spatial planning and gender bias concludes the fact that these aspects are interdependent and highly significant for the designer/architect to consider while designing spaces. Considering the dynamic aspects in a household/family, this research is a continuous and it is not just limited to the studied samples, but the hypotheses of this research could be tested on different houses locally and globally with varied cultural or economic backgrounds using dynamic and evolving assessment methods.

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Inclusive Building Performance: A New Design Paradigm

57

Victoria Lanteigne, Traci Rose Rider, and Peter A. Stratton

Abstract

Inclusive Design is a process for creating more functional environments and products that address the needs of as many people as possible, regardless of age or ability (Design Council, 2008). As demands for social justice continue to rise around the world, Inclusive Design is emerging as a strategy in popular building performance rating systems including the WELL Building Standard, LEED, the Living Building Challenge, and Enterprise Green Communities. While this is a step in the right direction, Inclusive Design is often framed as an optional pathway within initiatives that primarily focus on sustainability, health, and efficiency. This paper explores repositioning Inclusive Design as a standalone building performance initiative and proposes a roadmap for realizing this vision. A new paradigm for design called Inclusive Building Performance is introduced, which promotes inclusion as a central tenet, thereby challenging the standard practice of measuring building performance by functionality to include aspects of qualitative human experiences. Key benefits of adopting Inclusive Building Performance are shared including the potential to drive equity in the built environment and support the achievement of the United Nation's Sustainable Development Goals (SDGs).

Keywords

Inclusive design · Building performance · Accessible design · Universal design

57.1 Introduction

The concept of building performance emerged in the late twentieth century, transforming the discipline of architecture. No longer are buildings simply about structural integrity. Today, architecture practitioners exert an enormous amount of effort to ensure buildings make a positive impact on people, communities, and the planet. Global building rating systems are common roadmaps for implementing building performance in practice (WGBC n.d.), most often by

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outlining core and optional design strategies that collectively offer a pathway for achieving high levels of sustainability, health, and efficiency. Inclusive Design is emerging for the first time in recent history as a strategy in popular building rating systems. This shift is monumental as Inclusive Design and related efforts, such as Universal Design, have historically struggled to reach mainstream status.

Given increasing demands for social justice, equity, and inclusion that are similarly reflected in the United Nation's Sustainable Development Goals (SDGs), there is an opportunity to reposition Inclusive Design as a standalone building performance initiative. This paper introduces a new paradigm for design called Inclusive Building Performance as a pathway for realizing this vision. This paper also seeks to expand upon dominant approaches to measuring building performance based on functionality and energy usage (Deru and Torcellini 2005) to additionally include aspects of qualitative human experiences. Critical audiences for this work include scholars, practitioners, policymakers, students, and others interested in advancing inclusive environments and shaping the future of building performance.

57.2 Background

The disciplines of Accessible Design, Universal Design, and Inclusive Design are historically intertwined and often conflated. To bring clarity to these like-minded efforts, overviews of Accessible Design, Universal Design, and Inclusive Design are offered below, primarily from a U.S. perspective.

57.2.1 Accessible Design

The Disability Rights Movement of the 1960s and 70s sought to eliminate systemic discriminatory practices, policies, and attitudes that had been facing people with disabilities throughout history. Much like Civil Rights activists advocating for racial and gender equality, Disability Rights activists were also fighting for equality including, among other freedoms, the right to equal access and use of the built environment (Barnartt and Scotch 2001), otherwise known as Accessible Design. While the passage of the Americans with Disabilities Act (ADA) in 1990 and other federal laws aimed to support disability inclusion represented considerable progress, the promulgated design requirements merely promoted a baseline level of accessibility (U.S. Access Board n.d.). The trend toward minimum accessibility levels continues to be reflected in more recent legislation (DOJ 2010). Although in practice "ADA Compliance" has become synonymous with disability inclusion, existing accessible design requirements have only scratched the surface when it comes to creating truly inclusive environments for people with disabilities.

57.2.2 Universal Design

Founded by architect Ronald Mace, Universal Design was originally defined as "design that's usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Mace 1985). Having gained prominence in the 1990s after the passage of the ADA, Universal Design encouraged inclusion beyond federal accessibility requirements. Put differently, "accessible design is not always universal…but [universal design] is always accessible" (Story 1998). The principles of Universal Design advocate for crosscutting solutions for people with physical, cognitive, and sensory disabilities and aging populations that simultaneously support as many additional users as possible (Mace et al. 1997). More recently updated frameworks are emerging that position Universal Design as a process for addressing greater aspects of social justice, equity, and inclusion in the built environment across gender, culture, LGBTQ + identity, among other individual and intersectional identities (Daniels and Geiger 2010; Sandhu 2011; Steinfeld and Maisel 2012). Despite this gradually increasing interest in Universal Design as a tool for advancing

social justice, the discipline remains largely understood in architectural practice as an approach to enhance environments for people with disabilities (O Shea et al. 2018).

57.2.3 Inclusive Design

Inclusive Design is a process for designing more functional environments and products to "address the needs of the widest possible audience, irrespective of age or ability" (Design Council 2008). The movement originated in the UK with the intent of creating more usable, aesthetically pleasing, and innovative environments, products, and services for people with disabilities that work for as many users as possible (Coleman 1994; Persson et al. 2015). Today Inclusive Design can be described as "a holistic approach…to designing for human diversity—in regards to age, gender, race, religion, personality, and other factors…" (Maisel et al. 2017). Unlike Universal Design, extensions of Inclusive Design aimed at advancing social justice for a broad range of users have been adopted by academia and the architecture industry (Azzouz and Catterall 2021; Berliner et al. 2022). Moreover, organizations that were once focused on Universal Design as a panacea for social justice are making the concerted switch, citing Inclusive Design as a more holistic approach to advancing diversity, equity, and inclusion in the built environment (IHCD n.d.; SWA n.d.). This burgeoning interest in Inclusive Design begets the opportunity to explore repositioning the discipline and thereby the goal of inclusion as a critical component of building performance.

57.3 Defining Parameters for Accessible, Universal, and Inclusive Design

Despite the variances in Accessible Design, Universal Design, and Inclusive Design described above, there is little industry consensus around the exact divergences between these disciplines which often share similar goals (Persson et al. 2014). The connections between Accessible Design and Universal Design, for example, are so pervasive that the two terms are often used interchangeably and without disclaimer. It has further been argued that ambiguous understandings of Accessible Design, Universal Design, and Inclusive Design are harmful to the growth and development of these disciplines (Lanteigne et al. 2022). Recognizing the evident and historical fluidity between Accessible Design, Universal Design, and Inclusive Design is a necessary practice when building knowledge around any one of these disciplines.

Clarity can be gained on the differences between Accessible Design, Universal Design, and Inclusive Design by exploring the intent, application, and reach of each discipline. Accessible Design is largely understood as a compliance-based approach for enhancing environments for people with physical disabilities (Story 1998); thus, addressing a somewhat limited population. Universal Design advocates for increased levels of accessibility beyond the requirements of federal laws and building codes with the aim of primarily addressing those with wide-ranging disabilities and aging populations (Salmen 2011). Like Universal Design, Inclusive Design promotes disability inclusion as a central goal (Design Council 2008); however, over time Inclusive Design has evolved to also include more targeted approaches that better respond to the real and diverse needs of building users. For example, Inclusive Design has been explored as an approach for supporting the Black experience in space (Berliner et al. 2022) and for advancing welcoming environments for LGBTQ + people (Azzouz and Catterall 2021). Today Inclusive Design can be perceived to encompass both universal strategies that benefit most users and targeted strategies that address the needs and priorities of traditionally marginalized groups.

Given these descriptors, the three design disciplines can be collectively viewed as nested efforts: Accessible Design at the core with the narrowest reach, followed by Universal Design with an increased level of application, culminating with Inclusive Design as having the broadest reach and application (Fig. 57.1). While

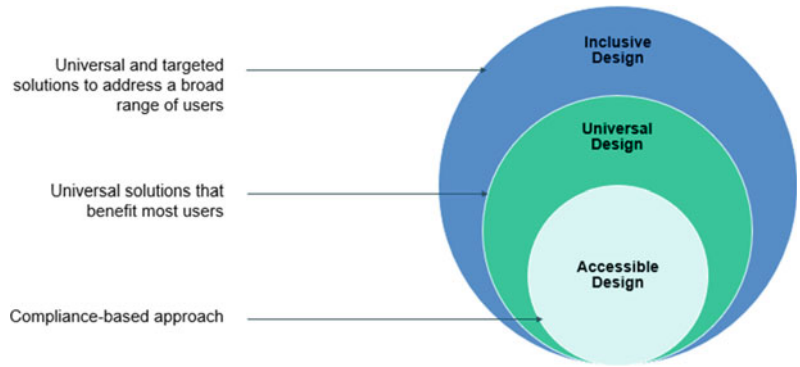

Fig. 57.1 A conceptual diagram defining parameters for Accessible Design, Universal Design, and Inclusive Design by intent, application, and reach of each discipline. *Source* Authors

significant industry buy-in is still needed around these proposed defining parameters, a unified approach would benefit researchers, practitioners, and educators focused on growing these disciplines.

57.4 Building Performance and Inclusive Design

Building performance evaluation can be defined as "a systematic and rigorous approach encompassing a number of activities including research, measurement, comparison, evaluation, and feedback that take place through every phase of a building's lifecycle including: planning, briefing/programming, design, construction, occupancy and recycling" (Mallory-Hill et al. 2012). Metrics for building performance typically focus on functional and objective aspects of buildings, such as energy and water consumption, building use, thermal comfort, indoor air quality, etc. (De Wilde 2018). Both Inclusive Design and Universal Design are emerging in several popular building rating systems including the WELL Building Standard, LEED, the Living Building Challenge, and Enterprise Green Communities. In line with the proposed conceptual diagram (Fig. 57.1), the Universal Design standards outlined in building rating systems are connected with accessibility efforts aimed to increase inclusion for people with disabilities (Enterprise 2020; ILFI 2019; IWBI n.d.); whereas the *Inclusive Design Pilot Credit* in LEEDv4 "prioritizes the experience and participation of building users by considering the full range of ability, age, gender, language, cultural understanding, and other characteristics of human diversity in the context of place" (USGBC 2019).

The introduction of Inclusive Design in building rating systems is a step in the right direction; however, several challenges exist with this approach that must be addressed. First, Inclusive Design in this context is framed as a supporting, rather than a standalone, strategy for achieving building performance. This hierarchical positioning diminishes the importance of Inclusive Design as a discipline that is arguably robust enough to qualify alone as building performance. Second, assessment tools for measuring building performance are concertedly focused on capturing quantitative metrics of building usage and functionality[1] rather than qualitative data such as human experiences, feelings, and emotions which are likely outcomes for Inclusive Design and related efforts (O Shea et al. 2016). Put differently, existing building rating systems are not fundamentally designed to truly capture the effectiveness of Inclusive Design. Third, Inclusive Design standards within building rating systems remain as optional pathways in almost all cases, doing little to drive adoption rates of Inclusive Design or to elevate

[1] A review was conducted of the Universal Design and Inclusive Design standards outlined in WELLv2, LEED v4, Enterprise Green Communities, and the Living Building Challenge. Limited guidance was found for measuring outcomes of Inclusive Design within the context of building performance.

inclusion as a priority for building performance. Such an approach seems out of step with the increased calls for diversity, equity, and inclusion that are echoing across the architecture industry (Carruthers 2020; Day 2020). If unaddressed, these challenges will impede both the evolution of building performance toward greater social justice and the advancement of architecture as a discipline.

57.5 Inclusive Building Performance: A New Design Paradigm

There is an opportunity to reconceptualize building performance to address the above-mentioned challenges by centering on inclusion as an emerging pillar of architectural success. Introduced here as *Inclusive Building Performance*, this new paradigm elevates Inclusive Design as a central priority, bringing power to a discipline that has otherwise been seen as superfluous to high-performing buildings. Positioning Inclusive Design as building performance acknowledges the increasing demands for diversity, equity, and inclusion that are also reflected in the SDGs. Recognizing Inclusive Design as building performance further calls on the architecture discipline to expand upon dominant approaches for measuring success that are too often narrowly focused on quantitative metrics. Framed in this way, Inclusive Building Performance aims to encapsulate both quantitative and qualitative data, to be collected through emerging evaluation methods that assess the functionality and experiential outcomes users have within the built environment.

57.6 Benefits of Adopting Inclusive Building Performance

Inclusive Building Performance as a new paradigm for design has the potential to significantly impact the discipline of architecture. Most notably, Inclusive Building Performance could bring a greater equity lens to the high performance building arena by (1) prioritizing the design of environments for traditionally marginalized groups; (2) underscoring the significance of qualitative human experiences as critical building performance metrics; and (3) encouraging a truly integrated approach to building performance. Each of the potential benefits of adopting Inclusive Building Performance is discussed below.

57.6.1 Design Environments for Traditionally Marginalized Groups

Equity can be defined as the "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential" (PolicyLink 2015). Following this definition, it could be surmised that to impact equity in the built environment, stakeholders must fundamentally address barriers that disparately impact how people experience buildings based on individual and intersectional identities. This need is emphasized by research that suggests that a range of physical and spatial barriers exist in the built environment that impacts marginalized populations based on race, gender, and LGBTQ + identity (Delany 2010; Doan 2015; Weisman 1992). Rooted in Inclusive Design, Inclusive Building Performance highlights the importance of considering the true diversity of building users in the design of the built environment in an effective and meaningful way. Such express consideration of marginalized groups in design is fervently needed in the building performance realm, given that under current building performance rating systems a project could achieve both a WELL and LEED Platinum Certification without ever having considered elements of Inclusive Design.[2] Inclusive Building Performance brings the argument to the forefront that a building cannot be high

[2] In WELLv2 and LEEDv4 the Universal Design and Inclusive Design standards are both optional pathways to certification. As such, project teams can achieve platinum-level certification under both rating systems without adopting the Universal Design or Inclusive Design standards.

performing unless it is firstly inclusive to our most vulnerable populations.

57.6.2 Measure Success Through Human Experiences

Building performance today is still a predominantly numbers-driven approach to understanding how a building functions across energy usage and other facets of day-to-day operations (De Wilde 2018). While metrics are important, the adoption of Inclusive Building Performance would call into action the development of more nuanced approaches for measuring success. Limited research exists that expressly explores qualitative measurements of Inclusive Design outcomes; however, literature suggests that experiencing barriers in the built environment may have psychological and emotional outcomes on building users. For example, in the article *The Lived Experience of Disability*, Toombs (1995) writes of maneuvering through her world in a wheelchair due to multiple sclerosis, citing experiencing feelings of shame, embarrassment, and disrespect. Similarly in the book *Design Justice: Community-Led Practices to Build the Worlds We Need,* Costanza-Chock (2020) provides a narrative account of their experience navigating an airport security system as a "non-binary, trans, femme-presenting person" (p.1) and their experiences of feeling shame, anger, and frustration. Inclusive Building Performance aims to prioritize aspects of human experiences of the built environment such as these as critical indicators of success. Doing so acknowledges that accolades of high performance should speak not only to building function and usage but also to qualitative outcomes of design that can have lasting psychological and emotional effects on occupants.

Assessing human experiences of the built environment is not a novel concept; however, many post-occupancy evaluation tools rely on objectivist frameworks for gathering data such as Likert scales, multiple choice questions, and rating scales (Artan et al. 2018). The introduction of qualitative data to inform Inclusive Building Performance is intended to support, not supplant, more commonly gathered quantitative metrics. To gather qualitative data, varying methodologies must be adopted including phenomenological, ethnographic, narrative, and case study inquiries. Methods used for qualitative data collection could include personal interviews, focus groups, and other tactics that result in thick and rich descriptions. As a result, qualitative data gleaned could address attitudes and emotions around belonging, inclusion, enjoyment, and spatial ownership that are currently not represented in typical building performance assessments. Inclusive Building Performance uniquely elevates the importance of both quantitative metrics and qualitative data to truly measure the impact of our built environments.

57.6.3 Encourage Truly Integrated Building Performance

Building performance initiatives are often communicated as single-issue guidance, as is evident by the innumerable building rating systems that focus on sustainability, health, or efficiency. With the core philosophy of inclusion, adopting Inclusive Building Performance could also encourage a more integrated approach to address all initiatives that support high-performing buildings. Past efforts have been made to synthesize building performance efforts, such as the Whole Building Design Guide, which promotes collective objectives, including accessibility, aesthetics, cost-effectiveness, functional/operational, historic preservation, productive, secure/safe, and sustainable (WBDG n.d.). Models like the Whole Building Design Guide, however, are simply a consolidation of existing design and evaluation methods that are still largely dependent upon quantitative metrics for evaluating success. Inclusive Building Performance differs by framing inclusion as a central ethos, encouraging a crosscutting exploration of a range of strategies that may enhance the performance of a building through an equity lens. For example, rather than focus singularly on creating a healthy building, an Inclusive Building

Performance approach would aim to integrate tenets of sustainability, health, and efficiency with a focus on enhancing human experiences of environments based on the true diversity of building occupants.

57.7 Discussion: A Roadmap for Adoption

Inclusive Building Performance as a new design paradigm is still under development by the authors of this paper and other collaborators; undoubtedly a roadmap is needed for realizing this vision. As a starting point, one could look to the history of past successful building performance initiatives related to sustainability, health, and efficiency. Following past precedent, a series of likely steps for formalizing Inclusive Building Performance could be posited. First, a consortium of industry experts could be established to serve in an advisory capacity. This advisory consortium should be an interdisciplinary set of individuals with diverse backgrounds who would be tasked with gaining industry buy-in, developing key definitions and design strategies, and identifying a unified approach to Inclusive Building Performance. Second, the potential to develop a global rating system could be explored that offers varying certification levels. Such a program would uniquely center on rating the design and programming of a project based on tenets of inclusion and equity as critical building performance goals confirmed by assessing a range of human experiences. Once the approach and evaluation methods are established, a third step could be to harness marketing, research, and development efforts to proliferate the adoption of Integrated Building Performance across industries and geographical areas. Further exploration could be conducted at this time on how Inclusive Building Performance supports the achievement of relevant SDGs, including good health and wellbeing, gender equality, reduced inequalities, and sustainable cities and communities, among others.

Based on the potential benefits discussed, the adoption of Inclusive Building Performance is poised to drive equity over time (Fig. 57.2). Applying such a holistic equity lens is an important shift, particularly as new building rating systems emerge to guide equity in the built environment, such as the WELL Health Equity Rating. Adopting Inclusive Building Performance negates the need for an added building rating system and instead brings an equity lens to all affiliated efforts. Currently, this proposed roadmap for realizing Inclusive Building Performance remains very high level; however, an ultimate strategy will likely be a research-driven, community-centered approach that integrates aspects of building performance through an

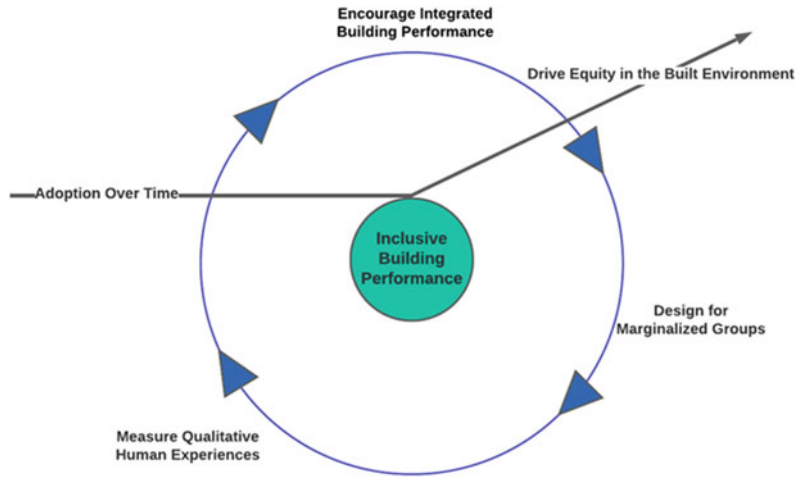

Fig. 57.2 Inclusive building performance equity model illustrates key benefits that would drive equity in the built environment over time. *Source* Authors

equity lens using a range of quantitative and qualitative methods focused on assessing building functionality and usage as well as human experiences.

57.8 Conclusion

The concepts of building performance and Inclusive Design have existed for decades. Distilling the objectives of each initiative reveals a unified goal to make buildings better for people, communities, and the planet. While historically Inclusive Design has not been considered a key pillar of building performance, this paper suggests the need for a paradigm shift that would instead elevate inclusion as a priority for high-performing buildings. Doing so would position Inclusive Design as a discipline that addresses the priorities of traditionally marginalized groups in the design of the built environment while integrating aspects of building performance including accessibility, sustainability, and health, among others. Today high-performing buildings are functional, usable, and efficient. By adopting Inclusive Building Performance, the buildings of tomorrow could also be environments where all feel welcome and supported to thrive.

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