Chapter 8
Yabelana: Designing and Introducing an Age-Inclusive and Context-Specific Information and Communication (ICT) Ecosystem

Vera Roos and Darelle van Greunen

Abstract Rapid developments in technological applications present as yet underexplored opportunities to assist with the impact of population ageing and limited resources. We adopted a sociotechnical paradigm—interlinking the social and technological—to inform the design and introduction, in four phases, of Yabelana ('sharing of information'), an age-inclusive and context-specific ICT ecosystem. First, drawing on data from the we-DELIVER research project, we defined the situatedness of a cohort of older participants, their needs and preferences in relation to cell phone technology and social systems (intergenerational relations) facilitating their ICT use. Second, the three-part development of the ICT ecosystem was approached pragmatically. Third, to introduce the Yabelana app and USSD code we involved student fieldworkers familiar with the language and culture of the participants. Fourth, the process of collecting, analysing and reporting the fieldworkers' reflections and older individuals' experiences informed recommendations for further improvements of Yabelana and of technology artefacts. We conclude that a user-centred and bottom-up approach is not a quick fix for promoting age-inclusiveness in technology. Rather, ICT use is the outcome of a complex combination of older users' dynamic involvement with technology, their diverse needs and preferences, facilitating social systems (e.g. intergenerational), and broader sociocultural contexts.

Keywords Age-inclusive · Context-specific · Information and communication technologies · Older user-centred technology · Sociotechnical paradigm · Technology · Yabelana ICT ecosystem

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8.1 Conceptual Boundaries around Age-Inclusive and Context-Sensitive ICT

The growing number of non-specialist technology users, including older individuals, and impressive digital advances since the beginning of the century offer unprecedented opportunities for developing ICT for people of all ages. In the field of human–computer interaction (HCI), ICT design involves the interdisciplinary "interactive and collaborative engagement" of the social and computer sciences (Tebes et al., 2014, p. 477). The purpose, motivation, and desired outcomes of technology are informed by different paradigms or world views (Kankam, 2019). A functional paradigm, adopting a largely "techno-centric approach" (de Cozza et al. 2017, p. 609), considers users in terms of human *factors* (Bannon, 1991) and design technology for the generic user. In the case of older individuals, when this paradigm is adopted, technology is designed to compensate for stereotypical age-declining inabilities or deficiencies (de Cozza et al., 2017; Peine, 2019; Righi et al., 2017; Sayago, 2019). The sociotechnical paradigm, by contrast, views technology users as social *actors* (Righi et al., 2017; Sayago, 2019), who are able to regulate and coordinate their behaviour, act autonomously, and engage with technology casually or discretionarily (with a purpose) (Bannon, 1991; Peine, 2019; Sayago, 2019; Scharlach, 2009). This perspective assumes that technological and social systems are interlinked and that ICT use is shaped by sociocultural, historical and economic landscapes (de Cozza et al., 2017; Neves & Vetere, 2019; Tebes et al., 2014).

To design our customized age-inclusive and context-specific Yabelana ('sharing of information') ICT ecosystem to link users to service providers, we adopted a sociotechnical paradigm. Age-inclusiveness refers to age-integrated, multigenerational societies and communities (Annan, 1998; Kaplan et al., 2017). In an age-inclusive society, ICT users are treated, irrespective of age, as members of diverse learning communities in which some users are more advanced than others (Barker et al., 2019; de Cozza et al., 2017; Righi et al., 2017). From a technical perspective, age-inclusive technology means technology that is affordable and widely available (Scharlach, 2009) and promotes access to information, services and products for everyone (de Cozza et al., 2017; Righi et al., 2017; Scharlach, 2009). Context-sensitivity, however, acknowledges the situatedness of ICT users—in their sociocultural or historical environments, for example—and the importance for ICT uptake of the broader local conditions (Tebes et al., 2014; Trickett et al., 2011).

The drive to develop age-inclusive and context-specific ICT in our study is contextualized against global population ageing (see Chap. 1), as this technology holds great potential for promoting equal access to information, resources and services delivery. The chapter describes the design and introduction of the Yabelana ICT ecosystem, drawing on our earlier we-DELIVER community-based research project (see Chap. 3). Phase 1 contextualized older users' situatedness, and identified their needs and preferences in relation to cell phone technology as well as the social networks that facilitate their ICT use. Phase 2 consisted of the three-stage

development of the Yabelana ICT artefact. In Phase 3, the Yabelana app and USSD code were introduced to older users by student fieldworkers from the same cultural background, who adopted a user-centred approach and employed appropriate and supportive learning strategies. Phase 4 comprised the collection, analysis and reporting of student fieldworkers' reflections and older users' experiences, which yielded suggestions for improving Yabelana. Although the evaluation of Yabelana falls outside the scope of this chapter, the process we followed illustrates transferable principles in the development of technology for older persons.

8.2 Phase 1: Older ICT Users' Situatedness, Needs and Preferences, and Social Systems

The design of the ICT artefact in the we-DELIVER project, provided details about our target population of older South Africans against the backdrop of the country's sociopolitical history. It also considered their ICT needs and preferences in relation to cell phones, and about the social systems that mediated their cell phone use.

8.2.1 Contextualizing Older South African ICT Users

The sociotechnical paradigm that guided the development of Yabelana views all users as agents who exercise choice and action when using ICT (Neves & Vetere, 2019). Following Astell (2009, 2019) to enable us to respond appropriately to the ICT needs of older individuals, we launched the we-DELIVER research project to obtain baseline data about their cell phone use. The chronological age of 60 years and older was used as a marker because this is a significant life stage at which age South Africans qualify for a means-tested old age grant (see Chap. 1).

8.2.2 Older ICT Users in South Africa

Given South Africa's history and the economic legacy of apartheid, most older South Africans—a quarter of a century into the new democratic dispensation—still live in deprived conditions, suffer from chronic illnesses (including HIV and AIDS and their effects), and live with the consequences of younger people's migration to urban environments (see Chap. 1). Most depend on local government for their basic and service needs. Municipal service delivery, however, is frequently uncoordinated or age-inappropriate and, particularly in low-resourced rural settings, may be entirely lacking (Hoffman & Roos, 2021) (see Chap. 2). Understanding the situatedness of older ICT users, therefore, is relevant to ensure that any proposed technology is a

good fit, and that its acceptance and use promote age-inclusivity in practice. This view informed the user-centric development of the Yabelana technology artefact.

Three distinctly different communities were identified for the we-DELIVER project: a rural tribal community (Lokaleng) and two large towns (Ikageng and Potchefstroom) in the North West province, and a large town (Sharpeville) in the province of Gauteng (Department of Cooperative Governance and Traditional Affairs, 2016). Older individuals ($n = 302$) provided information about their ICT use as well as suggestions to improve the Yabelana ICT system. The findings are reported in Chap. 6, but older individuals' social situatedness and their interface with cell phone technology are discussed here. As many as three quarters of the older persons (75.8%) in the sample were members of multigenerational households, consisting of spouses, children, and grandchildren, with levels of living standards ranging from average to low. Those with low living standards were characterized by minimal access to services, water, or the means to buy labour-saving appliances (see Chaps. 2 and 6).

Older persons contributed their old age pensions to support the livelihoods of all the multigenerational households in our sample, as well as providing instrumental and physical support as carers of younger people or sick family members, as confirmed by a corpus of literature (Ogunmefun & Schatz, 2009; Schatz & Ogunmefun, 2007; Schatz & Seeley, 2015). In relation to cell phones, almost all the older persons (90.6%) in our sample had access to one or more working phones, and half (50.0%) had connectivity on a pay-as-you-go basis. Even though our cohort of older persons rated their knowledge and skills in using cell phone technology as average, about two thirds (69.3%) were able to use only the basic features (making and receiving calls or sending and receiving SMSs), mainly to contact their children or other family members. A large majority (77.2%) preferred older generation pushbutton phones because they thought smart phones were too complex.

8.2.3 Intergenerational Relations (a Facilitating Social System)

Nearly three-quarters of our cohort of older persons (71.2%) regularly asked for help with using cell phones from younger (related and unrelated) people they trusted, who were nearby, and whom they perceived as knowledgeable and having a positive attitude (see Chaps. 6 and 7). Despite the often strained dynamics around older persons' cell phone use, older persons still turned to younger people as proxy users even though the latter were sometimes perceived as impatient, disrespectful, or unwilling to help. Younger generations are therefore suggested as important stakeholders in the social system faciliting older persons' cell phone use.

Further key trends reported earlier in this book and relevant to the specific context and social conditions informed the design of the Yabelana technology artefact and are summarized in Box 8.1.

Box 8.1 Key Trends in Older Users' Situatedness Informing the Design and Implementation of a Technology Artefact

- The reality of poverty and limited financial resources (see Chaps. 1 and 6)
- Lack of social and healthcare infrastructure, service delivery and information about local services (see Chaps. 1 and 2)
- Social protection of older persons through means-tested old age grant (see Chap. 1)
- Migration and need to maintain contact (see Chaps. 1 and 6)
- Lack of education (see Chaps. 1 and 6)
- High acceptance of cell phone technology but skewed preference towards older generation (pushbutton) cell phones (see Chap. 6)
- Self-reported average knowledge and skills in using basic phone features but positive attitude towards cell phone use (see Chap. 6)
- Heavy reliance on intergenerational support for using basic cell phone features (see Chaps. 6 and 7)
- Strained intergenerational interactions in informal contexts in the private domain around older persons' cell phone use, potentially inhibiting older individuals' ICT use (see Chap. 7).

8.3 Phase 2: Technology Artefact: Name, Design, and Populate with Information

The design of the ICT artefact involved three stages: decide on a name and appropriate branding (Yabelana); design an ICT ecosystem consisting of a website, a mobile application (app), and an unstructured supplementary service data (USSD[1]) code; and populate Yabelana with context-specific service provider information.

8.3.1 Assign a Name to the ICT Artefact and Design Appropriate Branding

Initially, we considered giving the ICT artefact the same name as the community-based project, we-DELIVER. However, following consultations with the project steering committee (PSC) (two researchers, two student fieldworkers, an older individual familiar with the three communities, and an information systems expert),

[1] USSD is communication protocol used by cell phones to communicate with a service provider's computer via text messages. This text-driven technology allows end users to interact using a menu selection system that operates in real-time.

Table 8.1 Images considered for the ICT artefact logo

Image	Appraisals of the image and text
 Image 1	– The gendered presentation excludes older men – It reinforces a stereotype that all older women carry water in containers on their heads – Unclear association of image with sharing of information – Text difficult to read
 Image 2	– Reinforces stereotypes of older people associated with traditional customs (clay pots normally colourfully decorated to store water, Roos et al., 2010) – Unclear association of image with sharing of information – Text difficult to read
 Image 3	Reinforces stereotypes of older people as passive recipients, dependent on the goodwill of others
 Image 4	– Two same-sized hands represent equal participation across all ages in sharing and receiving information, and providing feedback – Open hands symbolize safety and acceptance – Asymmetrical composition and different colours represent diversity – The colour purple-blue on the right disturbs the rhythm in the image – Text difficult to read

The initial logo design proofs used the name we-DELIVER.

it was concluded that using the same name for both artefact and project might create confusion. It was therefore decided to find a name that would reflect the information-sharing essence of the artefact. The PSC identified the term *yabelana*, which refers to 'sharing' in three of South Africa's 11 official languages: Sesotho (*abelana*), isiXhosa (*ukwabelana*), and isiZulu (*ukwabelana*) (L. Mathibela, personal communication, 23 January 2018).

Appropriate branding involved designing a logo that symbolized the artefact's meaning. Some images considered for this purpose, as well as their subjective appraisal by the PSC, are presented in Table 8.1. Image 4 in Table 8.1 was selected, following suggested revisions: to replace with black the purple-blue on the right of the image to provide a boundary for the logo; to accentuate the importance of contact when sharing and receiving information and providing feedback; and to make the text more readable. The final version is shown in Fig. 8.1.

Fig. 8.1 The Yabelana logo

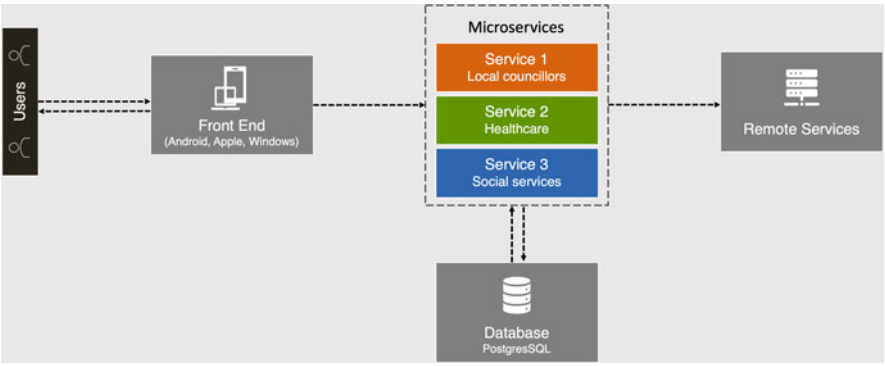

Fig. 8.2 Application architecture diagram for Yabelana presents a high-level overview of the components and fundamental interactions within the system. End users interact with the different services via the front end interface. Upon requesting specific information, the query is returned from the database to display either on the front end or offer a one-way result via the remote services

8.3.2 Design ICT Ecosystem Consisting of a Website, App and USSD Code

In creating the Yabelana ecosystem, the ICT designer considered the interface with service providers and ICT users.

From the Perspective of the ICT Designer The ecosystem was created with the core of the system linking all the subsystems and interfacing with the mobile provider, mobile application, push notification providers, website, and the mobile provider for the SMS (short message service) and USSD code. An application architecture diagram (Fig. 8.2) depicts the interactions between the different components of the system, which result in providing the end user with multiple interface options such as a website, smartphone applications (for Android and iOS) including push notifications, and text-based messages.

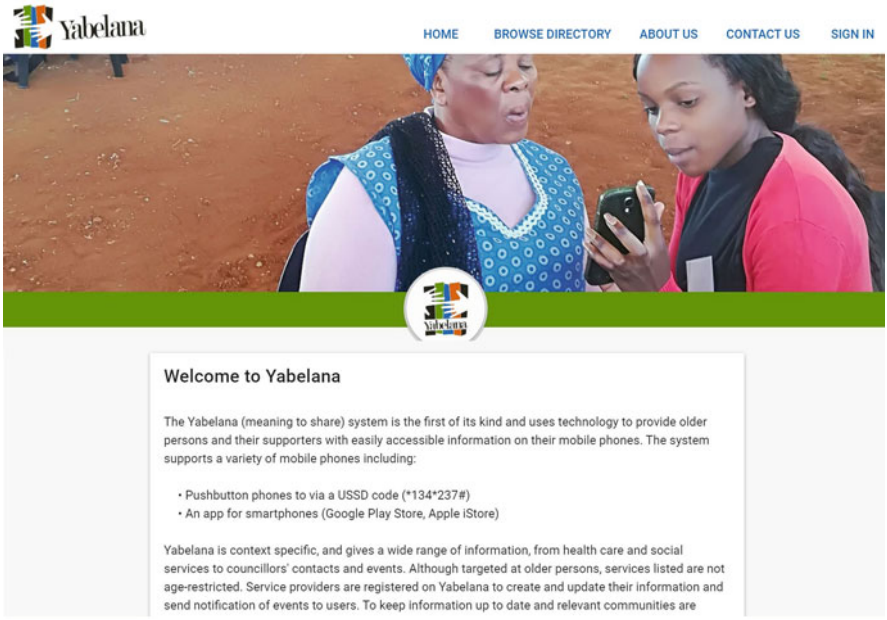

Fig. 8.3 A screenshot of the website's landing page

End users who use older devices have the option of using USSD and SMS (reverse billed) notifications free of charge. The website (https://yabelana.org/) lists the services, resources, and events that are available in their local areas and accessible from any internet browser. The landing page (see Fig. 8.3) of the website provides a description of services and instructions on how to download and use the mobile app, and the USSD code. The user accesses the service and event directory by clicking on the Browse Directory tab. The service and event directory search starts with the user selecting a location. The user is then shown a list of service provider categories available within the selected location or a list of upcoming events for that location (see Fig. 8.4).

Informed by Eriksson and Sjölinder (2019), the design of the different end user interfaces adopted a user-driven perspective to ensure that the interfaces meet the needs of both service providers and (older) ICT users.

Interface with Service Providers A practical consideration and a guiding ecological principle informed the technology interface with service providers.

Practical Consideration Service providers' registration and verification follow a distributed community approach. Community in this instance refers to the stakeholders (e.g. NGOs, practitioners, local municipality, social and health care) engaged in service provision for older persons. In practice, this means that

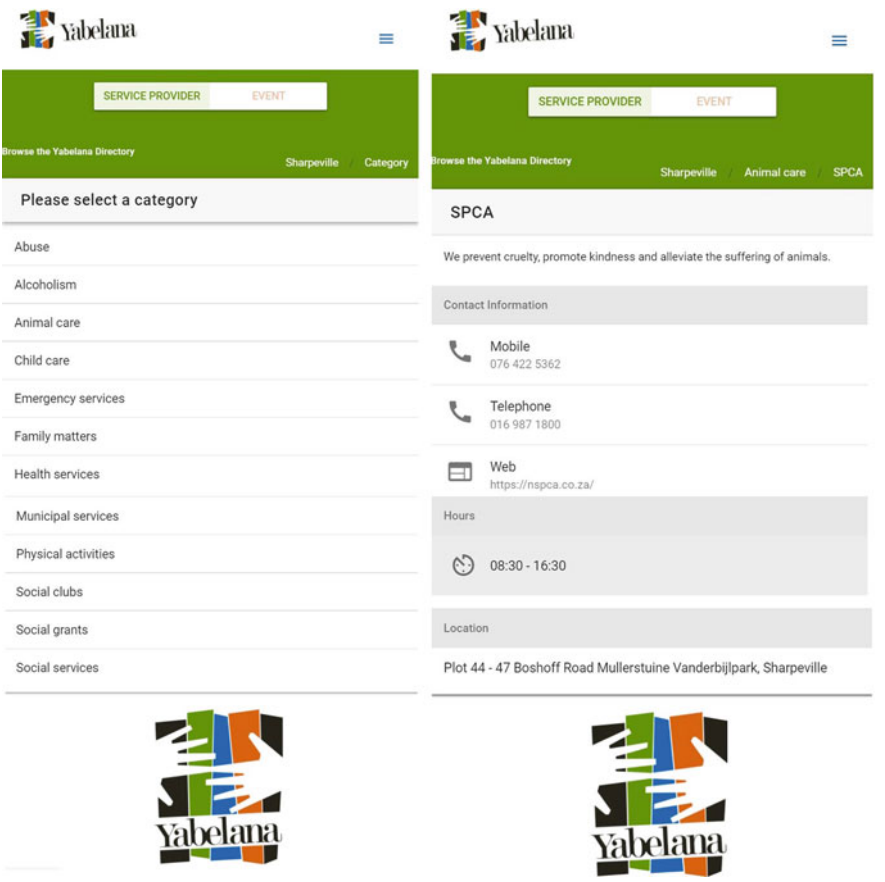

Fig. 8.4 Screenshots of information about example service providers on the website

prospective service providers enter their information and the cell number of existing service providers. The existing service providers receive a SMS with the request to verify a new service provider. Once a prospective service provider have been authenticated, they receive a SMS confirming their registration. The new service provider subsequently populates the app with information related to the services or events offered (see Box 8.2). This approach for adding new service providers eliminates the need for central administration.

Box 8.2 Service provider information relating to resources and services
- The service name (full version and a condensed version for use in SMS and USSD)
- Location (city)
- GPS coordinates
- Provider's name
- Address
- Telephone number
- A service description in condensed version for use in SMS and USSD.

Ecological Principle The ecological principle of finding an optimal fit between older individuals and the environments in which they function (Keating et al., 2013; Tebes et al., 2014; Trickett et al., 2011) guided our decision to include information relevant to locations. In practice this means that service providers list services and events for each specific area in which they operate; if they have multiple offices, they create separate service provider information for the different precincts. A summary of the steps required to register as a service provider and to create information about services on the mobile application platform is presented in Fig. 8.5.

Interface with (Older) ICT Users The application in the Google Play store or Apple App store is downloaded by searching for Yabelana. The process of obtaining information about service providers and providing feedback on smart phones is presented in Fig. 8.6.

Older generation (pushbutton) phones access information using a USSD code. The USSD menus are delivered through an interface with an external service provider. To use the USSD, the user can dial *134*237# from any mobile phone. This is completely free of charge. The process is explained in Box 8.3 and in Fig. 8.7.

Box 8.3 Users access information using the USSD code
- The user dials the number *134*237#
- A shortened version of the directory appears on-screen via USSD menus.
- The possible locations are displayed, to which the user replies to select one.
- The categories in the location are displayed. The user replies to select a category.
- The services are displayed, to which the user replies.
- The service details are displayed (condensed versions), to which the user could opt to have sent to them via SMS.
- A session cannot last longer than 3 minutes.

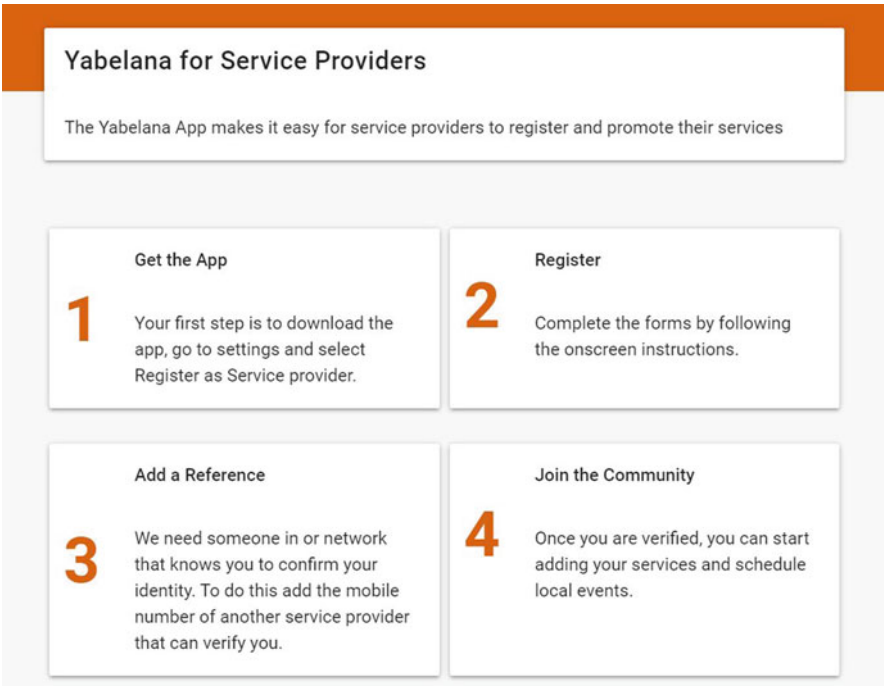

Fig. 8.5 Steps that service providers need to follow to register and list their services on the Yabelana app

Fig. 8.6 Process that the user follows to access information about service providers on a smartphone using the Yabelana app

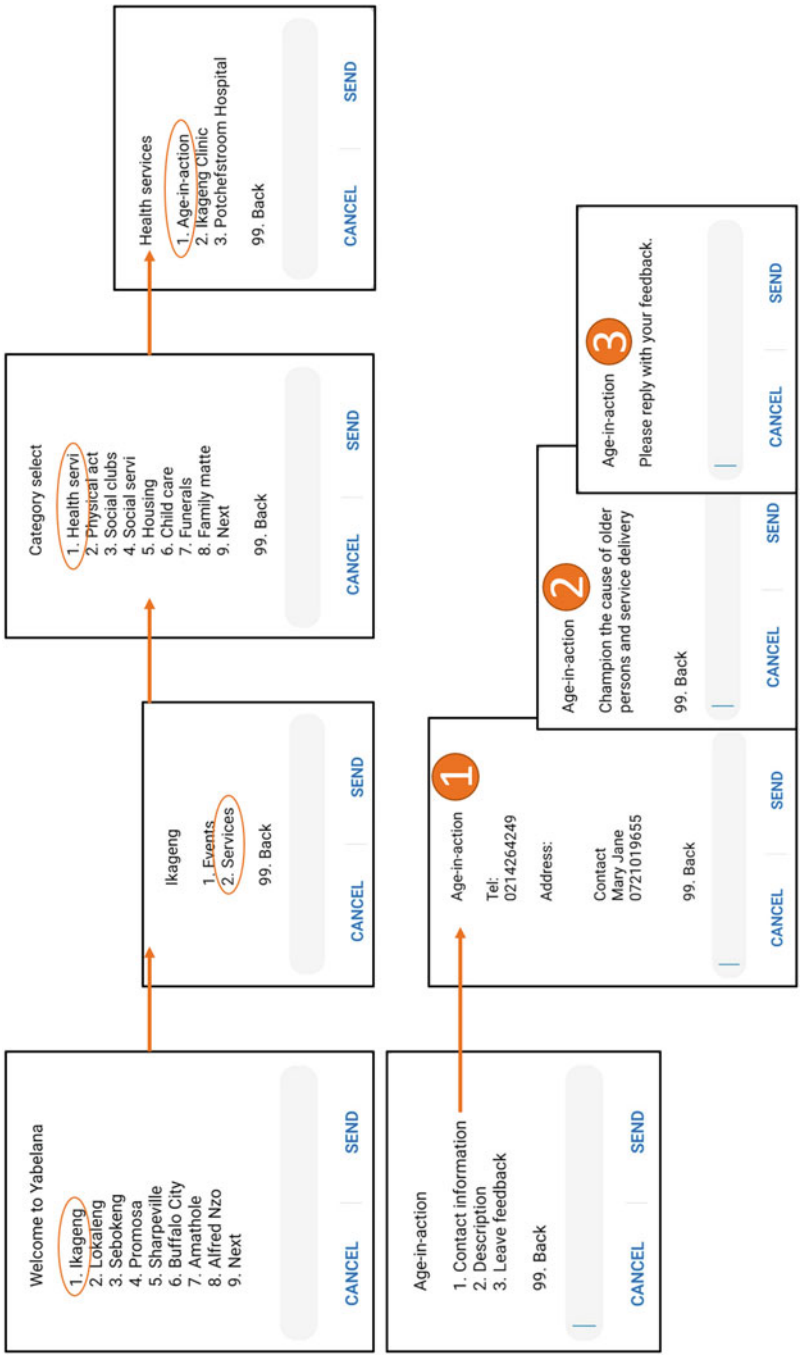

Fig. 8.7 Process that the user follows to access information about service providers, using USSD code

8.3.3 *Populate the Yabelana Ecosystem with Service Provider Information*

A multimethod approach was followed to identify services in the three communities.

1. Older persons' needs identified in the we-DELIVER project included: social security, medical, emergency, housing, safety and security, child care, electricity, sanitation, public transport, community centres and local economic development.
2. Interviews with NGOs involved with service delivery to older persons (e.g. Age-in-Action) identified services that were relevant but not limited to older individuals, such as child care, experience of abuse, and family matters.

In the pilot phase of populating the Yabelana ecosystem with information, we conducted a Google search to find service providers in the three communities, with descriptions of their services and contact details. We provided this information to the designers who populated the ICT ecosystem which we used to demonstrate the Yabelana app and USSD code to older individuals in the three communities (see Chap. 3).

8.4 Phase 3: Introduce Yabelana through Student Fieldworkers (as the Facilitating Social System)

The literature indicates that successful use of technology by older people is promoted not only through accessible technology and design but also through facilitated introduction (Neves & Vetere, 2019; Vaportzis et al., 2017). This insight underpinned our decision to invite student fieldworkers to participate in the we-DELIVER project. These young volunteers attended preparatory presentations on topics related to ageing both from international and local South African perspectives; community engagement (including interaction with older participants); conducting qualitative interviews; and completion of questionnaires using survey analytics on electronic devices (see Chap. 3). They then visited the three communities to collect data from the older participants about their cell phone use. After the data had been analysed and the Yabelana ICT ecosystem had been developed, the student fieldworkers visited the older individuals for a second time to introduce the Yabelana app and USSD code.

To facilitate the introduction of Yabelana, the fieldworkers engaged with the older persons individually or in groups of three or four (see Figs. 8.8 and 8.9). Small groups provided opportunities for close interpersonal interaction, not only with the facilitators but also among the older individuals as they practised and used the technology artefact (see Barker et al., 2019). Introducing technology to older ICT users in small groups also promoted observational learning and the ability to ascertain the older users' technology acceptance (also see Sayago et al., 2019). Following their interactions with the older participants, the student fieldworkers

Fig. 8.8 Student facilitator introduce Yabelana to older individuals

Fig. 8.9 Student facilitator introduce Yabelana to older individuals

wrote reflective notes about their experiences, reported verbatim the older persons' responses during the interaction, and suggested improvements to the Yabelana app and USSD code. Their reflections were thematically analysed according to the process recommended by Clarke and Braun (2013), and findings reported in Chap. 7.

Drawing on Roger's client-centred approach (Kunze, 2013; McCombs, 2013), the student facilitators introduced the Yabelana app and USSD code in the communities after they had already created effective interpersonal relationships with the older participants, at the time of their earlier data-collection visits (see Chap. 7). The literature suggests that a facilitator's approach, when introducing technology to an older user, plays an important part in its successful acceptance (Sayago et al., 2019).

The aim of the facilitation in our project was to promote acceptance and use of the Yabelana app among our target population. To this end, the student fieldworkers applied appropriate learning strategies (see also Chap. 3). One of these facilitators made it clear that they needed to make sure of the users' ability to work with the Yabelana themselves: "In my opinion, we should empower them [older persons] by being able to use it [Yabelana] and not just make them aware that it is there or quickly show how [it works]." To achieve their aim, many of the student fieldworkers described having to introduce Yabelana to the older participants "patiently and calmly" and "with compassion and empathy". The student fieldworkers first created an optimal interpersonal context and learning space to enable older individuals to verbalize their learning needs, as Kunze (2013) has pointed out. Two student fieldworkers captured older participants' responses as follows: "I just need you to show me where to press and what to do. That would make me really happy" and "You know the problem seems to be I am unable to grasp information immediately when someone teaches me. It takes me really long to finally learn."

In the process they followed, the student fieldworkers started by observing what the older individuals were able to do with their cell phones. They also observed the specific needs of the older persons in using the technology and then they responded appropriately. A student facilitator explained: "Each lady took her turn after I finished and in this time I was able to identify obstacles unique to them." Such observational knowledge informed the facilitation of the older individuals' ICT use.

Specific techniques for engaging with older users had been noted by McCombs (2013): verbal explanations and experiential engagement, specific augmenting strategies, repeating information, and using examples from real life. The reflections of student fieldworkers in our study revealed how effectively these techniques had worked in practice.

- *Verbal explanations and experiential engagement*. Every older person had a chance to practise the required skills after the student facilitators had explained the ICT application: "I gave each lady a chance, once I finished teaching her personally, to see if she could do it on her own."
- *Specific augmenting strategies*. The student facilitators supported the older participants' use of the artefact by introducing rhyming and rhythmic repetition of the steps to be followed: "While I was teaching her, I made up rhymes, like 'line,

number, line' for her to remember in which order to press the buttons, since this seemed to confuse her." Student facilitators and older persons also sang out the USSD code (*134*237#) to help them to memorize the information, which seemed to work well: "Now they know it and now I am glad." For the older persons who could read, student facilitators used written text. One explained: "I drew [a picture of the] buttons of the phone for her [an older woman] and wrote next to each of them what the purpose of pressing the buttons was." Another used prominent text only: "I wrote the USSD code on paper with bold and big letters for them to see" (see also Chap. 4). The student facilitators also used older individuals' hands as a means to concretize their memorization of the steps to access and use the technology:

> The thing is they cannot count. So they don't know which number is which or where to find it [on the cell phone]. So the solution I used was [to say] this is your right hand, the second button you press is to call, the next number is three. . .

- *Repeating information*. The young facilitators realized that some of the older participants needed the information to be repeated to enable them to learn and use it, because they seemed to "have difficulty in learning, memory or perception. Some of the information had to be repeated more than once for them to be able to understand."
- *Using real-life examples*. Learning was further supported when student facilitators used examples from everyday life to explain how the ICT app functions and what benefits it could bring. Two facilitators explained how they had engaged directly with issues the older persons raised. One reflected: "They started telling me about the problems they have in the village. That made it easy for me to explain how the [Yabelana] app works and how it will help them in finding solutions to their community problems." Another gave a service delivery example: "Most of them struggled with housing and water and electricity. So I showed them how they can easily get the contacts of relevant people concerning houses, and water and electricity."

A more optimal facilitating social system seemingly manifested in the relationship between older persons and student fieldworkers (unrelated younger people). Older persons experienced receiving supportive assistance from student fieldworkers who accommodated their learning and age-specific needs, were willing to repeat instructions, and showed respect to their elders at all times (see Chap. 7).

8.5 Phase 4: Improve the Yabelana App and USSD Code

In this phase, student fieldworkers' reflections and older users' responses were collected, including recommendations for improving their use of Yabelana (app and USSD code).

8.5.1 *Reflections of Student Fieldworkers and Older Individuals*

The student fieldworkers ($n = 135$) wrote down their reflections after interacting with the older participants, and included at least three verbatim responses from the older individuals during the interactions (see Chap. 7, Box 7.2 for the guiding prompts used). The reflections of the student fieldworkers and the verbatim responses from the older participants were anonymized, uploaded on ATLAS.ti 8, and subjected to thematic analysis (see Clarke & Braun, 2013). A coder and co-coder analysed the data using a coding system and code book (Morse, 2015). The prolonged engagement in the research process enhanced the trustworthiness of the findings (see Shenton, 2004).

Two themes emerged: older individuals' independent cell phone use, and enabling technology to access services.

Independent Use of Cell Phones Older individuals were pleased to be able to use Yabelana to access information on their cell phones, particularly when they could do so without having to get help from younger relatives. A student fieldworker reported: "The older persons were so happy that they can do it themselves. Because when the older people want to access their phone, they normally call the young ones. So they were happy that they can do it without them." The older participants were also pleased that they could access relevant information on older generation phones. A fieldworker reported the response of one of the older women: "She's happy about it. She can get the information using the phone that is not smart."

Enabling Technology to Access Services An older user confirmed that technology had enabled her access to services and service providers: "Now I will be able to talk to the municipality people because I have been wanting to talk to them for a long time." Another noted: "The app helped me to contact the ambulance because I had no contact with the ambulance and I'm also struggling with contacts of health services which are nearer to Lokaleng."

Technology such as Yabelana is designed to promote affordable access to service delivery by older individuals if financial resources are limited. Reversed billing, for example, can enable older individuals to access services or information without having to spend money. Two student fieldworkers reflected as follows on the economic benefits to the older participants: "They were happy that they can get access without using airtime" and "The app is cost effective because the older persons won't have to travel a long distance and spend a lot of money to go the municipalities or the clinics or the hospitals to lay their complaints. They'll just call."

Table 8.2 Recommendations to improve Yabelana (app and USSD code)

Yabelana app	USSD code
Use a toll-free number for users to call, with options from an automated voice response (in a language of their choice)	Extend the time available for interacting with options on USSD (e.g. extend 'time-out' time)
Keep the options on the app limited to as few as possible for easy navigation	Enlarge the font of the characters on the USSD menu
Use visual images to illustrate the different categories available on the app	
Add an option that allows for instant dialling of the number from the app (rather than the user having to write it down)	
Recommendations applicable to the app and USSD code	
Include functionality to purchase water, electricity, and airtime from the app and USSD code	
Present the list of information about services in all the official languages, or include English plus at least one additional language	
Offer more time to complete tasks to obtain relevant information	

8.5.2 Recommendations to Improve the Use of Yabelana (App and USSD Code)

Recommendations suggested by student fieldworkers and older users to improve the use of the Yabelana app and USSD code are listed in Table 8.2. The recommendations included specific accommodation of the older technology users' skills and abilities, revisions to the technology interface to promote visibility, and built-in functionalities to enhance usability.

8.6 Conclusion

This chapter illustrates the fact that, informed by a sociotechnical paradigm, technology developed by employing a bottom-up approach is highly appropriate to accommodate older users' actual diverse needs, preferences, and technology usage. In our study, facilitation of the older individuals' ICT use succeeded through the application of a client-centred approach, incorporating optimal interpersonal relationships in which compassionate facilitators offered the older individuals customized personal support.

The design of technology within this paradigm, however, provides no quick fix to improve older individuals' access to or use of technology. Our cohort of older ICT users clearly indicated that their use of ICT depended on repeated facilitation by younger people who were willing, able, and supportive, but which, unfortunately, was not always easily or productively available when they needed it most (see Chap. 7). Furthermore, introducing technology that has been developed using a sociotechnical approach does not guarantee uptake from government, social, or

health service providers. To encourage the level of interaction needed, Yabelana adopted a distributed community approach in which stakeholders and service providers became collaboratively accountable and responsible for ensuring that useful and updated information is available. The contribution that this chapter offers is its illustration of the way in which a grounded and generational approach can work in practice, and its demonstration of a process to inform technology design for all.

References

Annan, K. (1998, October 1). *Opening speech at UN International Conference on Ageing*. Retrieved from: http://undesadspd.org/Ageing/InternationalDayofOlderPersons/1998/SpeechdeliveredbySecretaryGeneralKofiAnnan.aspx

Astell, A. J. (2009). REAFF–A framework for developing technology to address the needs of people with dementia. In *Proceedings of First International Workshop RSW-2009.* Cambridge, UK, 5 September, CEUR Workshop Proceedings, ISSN 1613–0073, (pp. 5–10).

Astell, A. J. (2019). Creating technologies with people who have dementia. In S. Sayago (Ed.), *Perspectives on human-computer interaction research with older people* (pp. 21–36). Springer Nature.

Bannon, L. J. (1991). From human factors to human actors: The role of psychology and human-computer interaction studies in systems design. In J. Greenbaum & M. Kyng (Eds.), *Design at work: Cooperative design of computer systems* (pp. 25–44). Lawrence Erlbaum.

Barker, S., Wyacott, J., Vetere, F., & Hoang, T. (2019). The technology explorers: Partnering with older adults to engage with virtual reality and virtual avatars. In B. B. Neves & F. Vetere (Eds.), *Ageing and digital technology. Designing and evaluating emerging technologies for older adults* (pp. 231–246). Springer.

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective. *Psychologist, 26*(2), 120–123.

de Cozza, M., Angeli, A., & Tonolli, L. (2017). Ubiquitous technologies for older people. *Personal Ubiquitous Computing, 21*(3), 607–619. https://doi.org/10.1007/s00779-017-1003-7

Department of Cooperative Governance and Traditional Affairs (2016). *Integrated Urban Development Framework.* https://iudf.co.za/knowledge-hub/documents/

Eriksson, Y., & Sjölinder, M. (2019). The role of designers in the development and communication of new technology. In S. Sayago (Ed.), *Perspectives on human-computer interaction research with older people, 37–50.* Springer Nature.

Hoffman J. & Roos V. (2021). Postcolonial perspectives on rural ageing in (south) Africa: Gendered vulnerabilities and intergenerational ambiguities of older African women. In M Skinner, R. Winterton K. Walsh (Eds). Rural gerontology: Towards critical perspectives on rural ageing, 223–236. Routledge. https://doi.org/10.4324/9781003019435.

Kankam, P. K. (2019). The use of paradigms in information research. *Library and Information Science Research, 41*(2), 85–92. https://doi.org/10.1016/j.lisr.2019.04.003

Kaplan, M., Sanchez, M., & Hoffman, J. (2017). *Intergenerational pathways to a sustainable society*. Springer Nature.

Keating, N., Eales, J., & Phillips, J. E. (2013). Age-friendly rural communities: Conceptualizing 'best-fit'. *Canadian Journal on Aging/La Revue canadienne du vieillissement, 32*(4), 319–332. https://doi.org/10.1017/S0714980813000408

Kunze, D. (2013). The person-centered approach in adult education. In J. H. D. Cornelius-White, R. Motschnig-Pitrik, & M. Lux (Eds.), *Interdisciplinary applications of the person-centered approach* (pp. 115–125). Springer.

McCombs, B. L. (2013). The learner-centered model: From the vision to the future. In J. H. D. Cornelius-White, R. Motschnig-Pitrik, & M. Lux (Eds.), *Interdisciplinary applications of the person-centered approach* (pp. 83–114). Springer.

Morse, J. M. (2015). Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative Health Research, 25*(9), 1212–1222. https://doi.org/10.1177/1049732315588501

Neves, B. B., & Vetere, F. (2019). Ageing and emerging digital technologies. In B. B. Neves & F. Vetere (Eds.), *Ageing and digital technology. Designing and evaluating emerging technologies for older adults* (pp. 1–14). Springer.

Ogunmefun, C., & Schatz, E. (2009). Caregivers' sacrifices: The opportunity and costs of adult morbidity and mortality on female pensioners in rural South Africa. *Development Southern Africa, 26*(1), 95–109. https://doi.org/10.1080/03768350802640123

Peine, A. (2019). Technology and ageing–theoretical propositions from science and technology studies (STS). In B. B. Neves & F. Vetere (Eds.), *Ageing and digital technology. Designing and evaluating emerging technologies for older adults* (pp. 51–64). Springer.

Righi, V., Sayago, S., & Blat, J. (2017). When we talk about older people in HCI, who are we talking about? Towards a 'turn to community' in the design of technologies for a growing ageing population. *International Journal of Human-Computer Studies, 108*, 15–31. https://doi.org/10.1016/j.ijhcs.2017.06.005

Roos, V., Chigeza, S., & Van Niekerk, D. (2010). Coping with drought: Indigenous knowledge application in rural South Africa. *Indigilinga: African Journal of Indigenous knowledge systems, 9*(1), 1–11. https://www.ajol.info/index.php/indilinga/article/view/108749

Sayago, S. (2019). Editorial introduction–Perspectives on HCI research with older people. In S. Sayago (Ed.), *Perspectives on human-computer interaction research with older people* (pp. 3–17). Springer Nature.

Sayago, S., Bergantinos, A., & Forbes, P. (2019). Working towards fostering programming acceptance in the everyday lives of older and adult people with low levels of formal education: A qualitative study. In S. Sayago (Ed.), *Perspectives on human-computer interaction research with older people* (pp. 237–252). Springer Nature.

Scharlach, A. E. (2009). Creating aging-friendly communities. *Generations, 2*(Summer), 5–11.

Schatz, E., & Ogunmefun, C. (2007). Caring and contributing: The role of older women in rural south African multigenerational households in the HIV/AIDS era. *World Development, 35*(8), 1390–1403. https://doi.org/10.1016/j.worlddev.2007.04.004

Schatz, E., & Seeley, J. (2015). Gender, ageing and carework in east and southern Africa: A review. *Global Public Health, 10*(1), 1185–1200. https://doi.org/10.1080/17441692.2015.1035664

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information, 22*(2), 63–74. https://doi.org/10.3233/EFI-2004-22201

Tebes, J. K., Thai, N. D., & Matlin, S. L. (2014). Twenty-first century science as a relational process: From Eureka! To team science and a place for community psychology. *American Journal of Community Psychology, 53*(0), 475–490. https://doi.org/10.1007/s10464-014-9625-7

Trickett, E. J., Beehler, S., Deutsch, C., Green, L. W., Hawe, P., McLeroy, K., et al. (2011). Advancing the science of community-level interventions. *American Journal of Public Health, 101*(8), 1410–1419. https://doi.org/10.2105/AJPH.2010.300113

Vaportzis, E., Clausen, M. G., & Gow, A. J. (2017). Older adults perceptions of technology and barriers to interacting with tablet computers: A focus group study. *Frontiers in Psychology, 8*, 1687. https://doi.org/10.3389/fpsyg.2017.01687