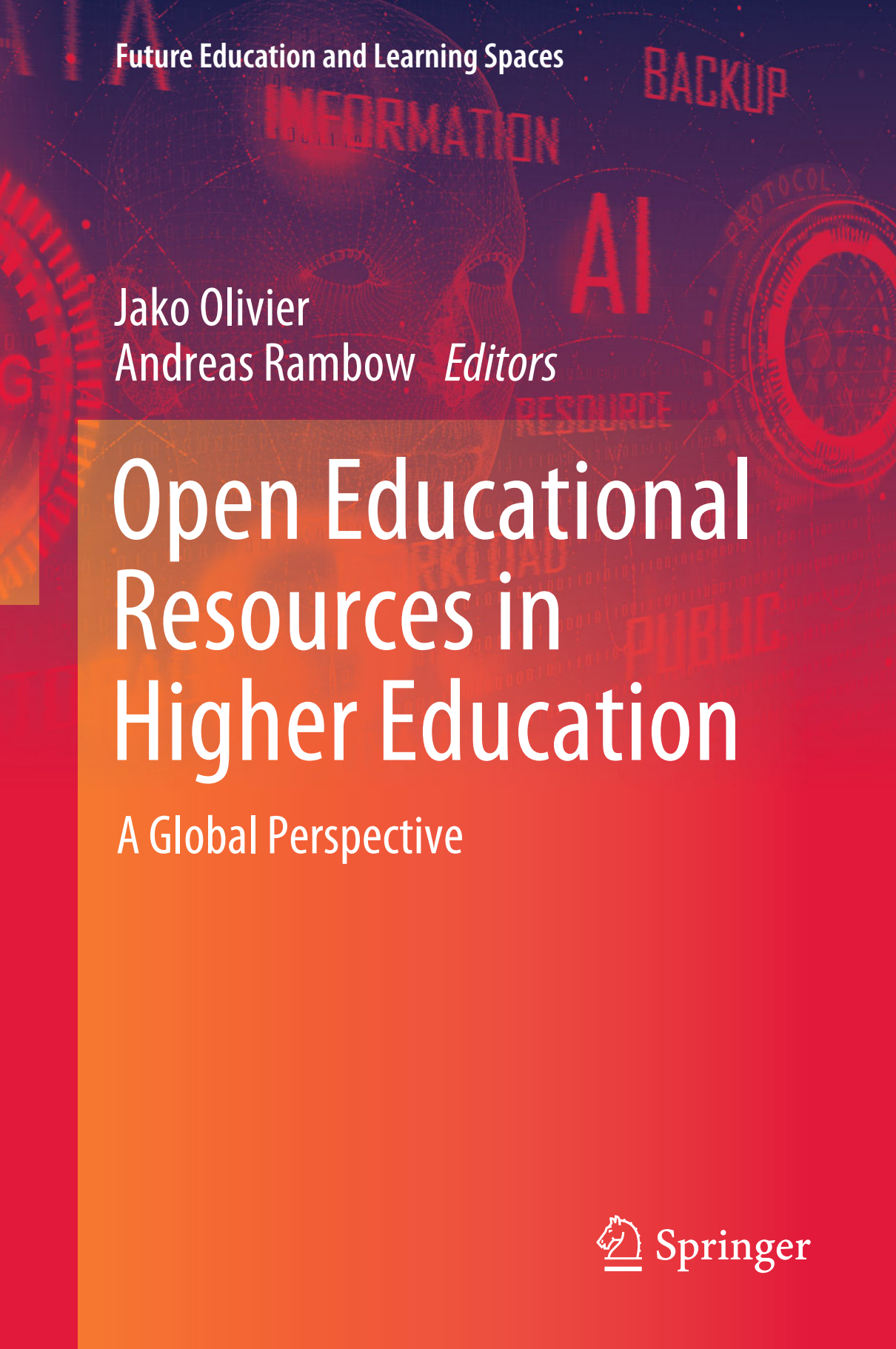
Future Education and Learning Spaces
Jako Olivier
Andreas Rambow Editors
Open Educational Resources in Higher Education
A Global Perspective
Springer

Future Education and Learning Spaces

ICT & Education in Uncertain Times

This series focuses on the possible education responses that can be implemented in uncertain times. Uncertainty could happen in times of crises or also in normal situations, where some information or actions are not known, resulting in uncertain educational scenarios. Besides, it also shows how emerging technologies, including Artificial Intelligence, Blockchain, Educational Games and Virtual Reality/Augmented Reality, will reshape the future of education to provide efficient learning/teaching experiences and assessments. Furthermore, the series discusses innovative pedagogical and learning approaches (e.g., the use of open educational practices and peer-to-peer learning) that can be applied in this rapid moving technological era to maintain education, including in uncertain times. Particularly, new instructional methods, such as game-based learning, should be designed based on the integrated technologies to provide effective learning experience, resulting in better learning outcomes. Future education should not solely focus on technology, but also on the applied instructional methods, as well as the human touch to maintain authentic and effective learning experience. The series also discusses how learning spaces can be designed to meet the growing tendency of Open and Distance Education, where thousands of learners can be taken the same course from different cultures, backgrounds and learning needs.

This series aims to establish itself, through the published books/textbooks and research, as a medium to provide guidelines and recommendations for different stakeholders, including policy makers, educational designers, teachers and students on how to enhance both learning and teaching experiences in the future for better learning outcomes, as well as how to maintain education in uncertain times. It also provides one-step ahead towards future education to prepare different stakeholders for the rapid evolution of education, even in times of uncertainty.

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Editors

Open Educational Resources in Higher Education

A Global Perspective

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Foreword

What is higher about higher education? Is it just the higher level of education beyond primary and secondary education? Is it something to do with teaching a set of particular subjects? Or is it only about research and development? Universities are often referred to as centres of higher education. Research and development activities are also carried out by industry and specialised research centres but are hardly considered part of the higher education system. The function-wise role of universities covers teaching, research, and extension, providing a solid platform for higher education. What makes the university an excellent example of higher education is not just its function of teaching subjects at the advanced level or conducting research, but the environment it provides for critical thinking, questioning the so-called truth, freedom of expression, and free flow of ideas from generations to generations. Higher education is a breeding ground for researchers, scientists, and philosophers, who play a critical role in advancing our thinking and knowledge about our planet, country, society, and self. In essence, higher education provides an ecosystem of 'openness' for creativity and innovations that propel our economies.

Over centuries of development, the focus of higher education has shifted from sharing knowledge to 'commodification of knowledge' and 'monetization of ideas'. The emergence of Open Educational Resources (OER) at the beginning of the twenty-first century brings fresh air to the higher education ecosystem when higher education is not accessible to millions, is not affordable, and is plagued with issues of poor quality in many countries. Low- and middle-income countries must focus on providing increased access to quality higher education due to the relative advantages of the high private and social rate of returns. As governments have competing priorities, establishing brick-and-mortar universities as centres of excellence and providing higher education to all who need it is not always an option. However, governments can invest in creating enabling policies and digital infrastructure for open education and OER to increase access to quality higher education.

The editors of this book bring in scholars from around the world to highlight the crucial role of OER in increasing access, improving quality, and reducing higher education costs. Focusing on the social justice agenda, chapters in the book highlight the importance of the OER movement to support the United Nations Sustainable

Development Goals, strengthen human rights and peace, and mitigate climate change. The UNESCO OER Recommendation 2019 focuses on (i) policy development, (ii) capacity building, (iii) equitable access to quality OER, (iv) developing sustainable business models, and (v) international cooperation. The book provides some excellent case studies in these areas. OER offers opportunities for new pedagogical practices and improved engagements in higher education by promoting students as a creator of knowledge and facilitating collaboration. The use of OER in teaching and learning has a default advantage that improves students' understanding of copyrights and good academic practices. Repositories play a vital role in the sharing and distribution of OER. Therefore, efforts must focus on making available teaching, learning, and research materials with open licences discoverable. Chapters in the book also highlight issues related to gender equality, diversity, inclusion, and how OER are used in different contexts.

Readers of this monograph will receive insights from the personal experiences of the authors of the chapters in using, developing, and mainstreaming OER. While the role of every individual in the higher education ecosystem is significant to make it truly higher, leaders need to focus on creating enabling environment by adopting relevant policies and providing professional development opportunities to adopt OER. In addition, there is also a need to focus on the essence of higher education and ask questions about OER and open education. I am sure readers will reflect and ask questions relevant to their context. To paraphrase Noble Laureate Rabindranath Tagore, let everyone awake in the higher education environment, 'where the mind is without fear' and 'where knowledge is free'. OER will help us in this direction.

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Contents

Chapter 1
Contextualising Open Educational Resources in Higher Education

Jako Olivier and Andreas Rambow

Abstract This book aims to explore the current state of open educational resources (OERs) research and innovation worldwide by bringing together some of the key authors in the field and the book provides in-depth research while also highlighting recent and innovative open education practices. In this chapter, the theoretical basis is presented for this book, while an overview is presented for the following chapters. Within this context, this chapter shows the relevance of the Theory of Transformative Learning and andragogy as theoretical concepts for open education. Each chapter—obtained through an open call followed by a review process—has its own aims and methodologies, but they all relate to open education and OER.

Keywords Open educational resources · Open educational practices · Open pedagogy · Higher education · University education · Andragogy · Theory of transformative learning

1.1 Introduction

This book explores Open Educational Resources (OERs) and open educational practices (OEPs) through research conducted on this topic globally. This book engages with intersections between OER, social justice, equality, and policy in terms of OERs. Numerous examples of open praxis are also included, ranging from OER courses to the affordances of artificial intelligence, data-driven learning, and open textbooks in this context. This book covers several key areas in which OER scholarship is currently focused: social justice, open pedagogy, policy, artificial intelligence, and open praxis. Furthermore, this book explores the current state of OER research and innovation worldwide by bringing together some of the key authors in the field.

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Finally, this publication provides in-depth research while highlighting current, innovative open education practices. The chapter selection has been based on the call for chapters disseminated to scholar, researchers, and practitioners in the field of OERs worldwide. The final selection of the chapters was based on the currency, applicability, and global dispersion of the contributions, and last, but not least, by the number of chapters the publisher was willing to accept for publication. Moreover, this publication is aimed at academics and scholars working within open education as this contains original research within this field.

1.2 The Definition of Open Educational Resources

Central to this publication is the concept of OERs and, consequently, it is essential to define how this concept is understood. The William and Flora Hewlett Foundation is a significant player in providing OERs and provided the first definition of OERs for teaching, learning, and researching (Butcher, 2015). Open educational resources are in the public domain under an intellectual property license permitting free use and repurposing (Bliss & Smith, 2017). David Wiley, a professor at Brigham Young University, created the Common Creative licensing framework for using OERs (Hilton et al., 2013). This licensing framework grants users free and perpetual permission to use OERs, provided users reference the creative work of the original developer. Wiley coined the term *5R activities* outlining the use of OERs (Wiley, 2014). The 5R activities are (a) retention, (b) reuse, (c) revision, (d) remix, and (e) redistribution. Retention refers to the right to make, own, or control copies of the content (e.g., downloading, duplication, storing, and managing). Reuse represents the right to use OERs in various contexts, for example, in the classroom. Revision refers to the content's adaptation, adjustment, modification, or alteration. Remixing allows the user to combine original and revised content with other OERs, and redistribution of OERs allows the opportunity to share the open material with students in the classroom at no cost. UNESCO's General Conference adopted the Recommendation on OER at its 40th session on 25 November 2019, representing the first international normative instrument to embrace the field of openly licensed educational materials and technologies in education (UNESCO, 2022).

1.3 The Origins of Open Educational Resources and the Development Over Time

The origins of OERs lie in the concept of learning objects (Weller, 2014), which refers to the reuse of digitally structural materials. The idea of reusing digitally structured materials did not develop further due to difficulties in discoverability and interoperability (Mishra, 2017), which led to the open education movement.

Researchers of OERs divide the history and origins of OERs into two periods. The first period started in 1994 and ended in 2004. The National Science Foundation provided a grant in 1994 led by James Spohrer, which resulted in the creation of the first OER repository in 1997 named MERLOT. In 2017, MERLOT hosted more than 40,000 curated and rated items, and educators could share intellectual content over the web for use by others (Bliss & Smith, 2017). Open access initiatives grew from a small beginning in 1993 to the creation of PLOS in 2001. PLOS is the largest open-access journal database, hosting more than 11,000 open journals worldwide (Rae & Hincks, 2018). The Budapest Open Access Initiative of 2002 helped lift the concept of OERs to an international level. The combination of these three events formed the foundation of the rise of OERs (Budapest Open Access Initiative, 2012).

Since then, the William and Flora Hewlett Foundation has become a major player in the field of OER. The founder of the company Hewlett-Packard, William Redington Hewlett, established the privately funded foundation in 1966 and is a contributor to OERs in the United States. The foundation's objectives were long-term and focused on the promotion of free educational materials for all. These long-term objectives embedded three approaches regarding the use of OERs. These approaches supported quality OER content providers in developed and developing parts of the world, the creation of infrastructure and removal of barriers to OERs, and the development of a world movement for OERs. As a result of these efforts, Catherine Ngugi, the creator of the African Virtual University's Research and Innovation Facility, founded OER Africa, a South African Institute for Distance Education project to support OER users and communities across Africa (Bliss & Smith, 2017). International organisations such as the OECD, Commonwealth of Learning, the Asia-Pacific Economic Cooperation, and UNESCO financially support OER efforts and initiatives.

1.4 The Reasons for the Use of Open Educational Resources

The use of massive open online courses (MOOCs) for the past decades gave rise to the emergence of OERs (Weiland, 2015). A leading contributor to OERs was the Massachusetts Institute of Technology (MIT) by launching its Open Course Ware site (Rodríguez et al., 2017). The goal was to make learning materials available to anyone who could change, modify, or redistribute the material (Bonk et al., 2015). Many colleges and universities started or continued this process by using OERs to cut college costs and make higher education more affordable for students (Thompson & Cotton, 2017). Despite the move forward, many faculty members are unaware of OERs and do not know where to find or locate the resources (Hilton, 2016). Adopting an open-access textbook is intellectually more demanding for an educator than adopting a commercial book (Wang & Wang, 2017). Furthermore, universities have no financial incentive to provide support unless such activity is grant-funded (Jhangiani & Biswas-Diener, 2017). Often, faculty members who look for OER material for courses receive little support.

1.5 Theoretical Framework Underpinning the Use of Open Educational Resources

1.5.1 Mezirow's Theory of Transformative Learning Among Adult Learners

Jack Mezirow, a professor at Columbia University, developed the theory of transformative learning in 1981 (Mezirow, 1981). The idea has become a rather complex phenomenon describing how learners construe, validate, and restate their experiences and meanings. A learner adds and integrates ideas found within an existing thinking and behaviour pattern, and the shift of thought and perception occurs through learning. Learners can change their beliefs and perception of meanings, but the learners must reflect critically on their experiences, and this reflection can lead to perspective transformation.

To understand what the meaning is telling the learner, the learner must understand the importance of experience. Some learners will follow the explanation by somebody who embodies an authority, for example, a textbook editor. Learners perceive the textbook as the ultimate authority in knowledge creation and ignore the presence of other sources of learning. In times of open educational resources, learners must identify their learning styles. Identifying one's learning style involves making interpretations about the experienced phenomenon and merely acting on someone else's beliefs, purposes, and judgement. Promoting such an understanding is at the very heart of adult education.

The transformation of an individual perspective happens much less frequently. Mezirow believed the lack of such a transformation is the immediate result of a disorienting dilemma. A disorienting dilemma is the outcome of a life crisis or a significant change in someone's life. However, Mezirow noted a disorienting dilemma could also result from changing perspectives of some period. Mezirow explained the transformation process as a process of steps. These steps are:

- Disorienting dilemma
- Self-examination
- Sense of alienation
- Relating discontent to others
- Explaining options for new behaviour
- Building confidence in new ways
- Planning a course of action
- Knowledge of implementing plans
- Experimenting with new roles
- Reintegration.

Some criticism exists with respect to Mezirow's theory. Critical responses have emerged, and researchers argue the theory of transformative learning emphasises the rationality aspect. Studies to this end show mixed results. While the process of

learning is to some degree rational, the involvement of experience is more of a spiritual and emotional process. The discussion of controversial topics unfolds pain and emotions to make sense of the world and cope with a disorienting dilemma. Learning in this fashion requires risk-taking, the willingness to accept vulnerability, and being open to criticism in the form of having attitudes and assumptions challenged. The transformative learning process includes the experience of a profound and structural shift in terms of thought, feelings, and actions. Learners realise a paradigm shift irreversibly alters the way of worldly existence. Assuming transformative learning forms the basis of adult education, creating a learning environment in which adult learning can occur should consider the educator's role, professional development, and the learner's role.

Transformative learning is not a process unfolding itself automatically. The educator's role is to permit students to actively participate in open discourses, encourage equal participation, set objectives to promote independent thinking, and promote discovery in the learning process through student engagement. Instructors must provide the framework for transformative learning. Educators must make learners aware of not accepting facts for granted and carefully question assumptions. Furthermore, students must learn to recognise frames of reference in their critical thinking. Educators can achieve this reference framework by restating problems from a different perspective, for example, by stating the deliverable of a problem but allowing learners to approach the assignment using their preferred learning style. The result is creating a community of learners who share their experiences to give meaning to their lives.

Professional development is critical for the professional educator, as educators should examine their teaching practice and question it critically. Instructors act as agents of social change. Strategies for the implementation of social change and transformative learning include the use of case studies, critical thinking discussions, and the provision of open educational resources.

Educators act as facilitators in the students' learning process. Learners construct knowledge about themselves and others, accept social norms, and play an essential part in the learning process. Furthermore, students take responsibility, exercise civility, and show respect for others. The combination of these factors contributes to transformative learning. Learners must actively participate in the course and welcome diversity. Through communication, students learn to reflect critically on their beliefs and assumptions.

1.5.2 Knowles' Theory of Andragogy as a Catalyst for Self-Directed Learning

The German educator Alexander Kapp coined the term *andragogy* initially in 1833 (Loeng, 2017). Eugen Rosenstock-Huessy developed the concept of andragogy into a theory of adult education and, as this chapter relates to higher education, this term is

quite apt within the context of this book. Andragogy became later very famous in the United States. The American educator Malcolm Knowles claimed andragogy (Greek: "man-leading") should be distinguished from the more commonly used term pedagogy (Greek: "child-leading"). Knowles' theory is based on six assumptions. These assumptions are need-to-know, foundation, self-concept, readiness, orientation, and motivation.

The need to know reflects the need of adults to be aware of the reason for learning something. Unlike young learners, adults tend to question learning unless the learning is related to their personal and professional lives. Learning should build on prior experience, which reflects the foundation concept. The term *self-concept* assumes adult learners are responsible for and take charge of their decisions in education and would like to have input in the decision-making process regarding planning and evaluation of instruction. Educators should bring practical exercises to class. Practical exercises put the learners at the forefront of topics relevant to the learner's work and personal lives. Adult learning should be problem-centred to allow adult learners to apply knowledge in a practical context. This opportunity provides learners with an orientation. Finally, adult learners respond better to external motivators. External motivation is essential for learners to advance in their careers and professional lives.

The theory of andragogy is subject to criticism. Knowles changed the position on whether andragogy only applied to adult learning and started believing that andragogy and pedagogy represented a continuum with teacher-directed education on one end and student-directed understanding on the other. Hanson, (1996) noted any differences in learning are not based on age or stages in one's life. Instead, learning is related to individual attributes and differences in context, culture, and power. Another criticism of Knowles' work is the inability to use andragogy in practice. Students, even adult students, do not always precisely know what to get out of a course and seek more detailed guidance from the instructor. An adult does not rely on self-directed learning in each situation.

1.5.3 Intersections Between Andragogy and Transformative Learning

Both the concepts of andragogy and transformative learning promote self-directed learning. Knowles saw *self-directed learning* as a process of individuals taking the initiative without using the help of others to identify learning needs, formulate goals, identify resources, and evaluate learning outcomes (Knowles, 1978). On the other hand, Mezirow (1981) pointed out self-directed learning is more crucial to adult education than any different concept. Andragogy supports the use of prior life experience in adult learners and guides the thinking and current learning process. Transformative learning reflects on previous learning experiences to generate a new understanding of the current learning situation. The intersection between andragogy and transformative learning lies in the perspective transformation of adult learners.

1.5.4 Intersections of Andragogy and Transformative Learning in Adult Classrooms

A fair amount of research exists testing the concepts of andragogy and transformational learning. Some research has supported the original concepts, while other research results have shed some doubt on the practical applicability. In general, educators have found implementing either theory in the classroom confusing when attempting to use either concept as a strategy to promote and maintain adult learning in the classroom. The crossroad between both concepts is present in the development of learning and perspective changes of adult learners in the classroom while being engaged in the learning process.

1.6 Chapter Overview

The last section of this chapter involves an overview of the thirteen following chapters. These chapters included conceptual and empirical work on open education in the higher education sphere from different contexts across the globe.

Chapter 2 provides a detailed theoretical framework for the rest of the book as it explores how OERs can be a catalyst for social justice and equity. In this conceptual chapter, Ebba Ossiannilsson masterfully explores OERs, micro-skills, universal markers for learning, and the open pedagogical approaches needed to address the need for resilient, sustainable, and high-quality open education. The chapter concludes by noting a need to take knowledge-based action for global sustainability and that this implies creating and leading change. Moreover, this means changing cultures and systems to achieve sustainable change for the future of human rights and social justice. In this regard, it is essential to consider that the openness plan cannot address quality without addressing equity, human rights, and social justice. This chapter sets the conceptual scene for the rest of the book and positions the open praxis within a context of social justice and equity.

In Chap. 3, Tanja Urbančič, Dominic Orr, Mitja Jermol, and Tel Amiel discuss how supportive policies and strategies for OERs can be implemented. This chapter focuses on two aspects: UNESCO Guidelines for OER Policy which was used as a framework, and the Open Education Policy Game, which was used to determine gaps and define priorities in terms of open policy and strategy design among a group of master's degree students. The research was conducted within the Leadership in Open Education Master's course, Open Education Strategies. It was found that both elements contributed to professional development focused on addressing the need for leadership within open education. It was determined through this program that it would be possible to implement open practices sustainably. Similar interventions can be built in other contexts from the lessons learned in this chapter.

Furthermore, Chap. 4, by Deborah Anne Banker and Dana Kay Manning, presents an engaging narrative review that aims to explore the perceived promises of OERs,

examine current practices in the use of OERs, and identify how the problems and solutions associated with the help of OERs could be used to inform policy decisions at varying levels of higher education. This chapter recommends that the use of OERs needs to become a top-down priority for all institutions of higher education around the globe. Furthermore, as the practice of OERs continues to be accepted and evolve, the sustainability and challenging issues of OERs stand to be resolved with innovation, cooperation, and flexibility. The global economic conditions require an increasingly trained workforce beyond secondary schooling, and in this regard, OERs promise equity in learning for marginalised global citizens.

A collaborative picture book, as a unique and novel OER, is explored by Chrissi Nerantzi and Paola Corti in Chap. 5. Here, the focus is on using an open-licensed collaborative picture book format in the context of learning, teaching, and assessment in higher education. The shared experiences and case studies found that picture books are currently not widely used across disciplines and professional areas in higher education and that further research is necessary in this regard. However, the potential and affordances of using open, collaborative picture books as a strategy to build a community for social learning and alternative assessment and feedback within higher education practice were evident. Even though picture book activities are not necessarily appropriate in all situations and circumstances, the authors recognise that a variety of active learning approaches is crucial and can lead to stimulating learning opportunities and diversifying engagement.

In Chap. 6, Alannah Fitzgerald, Shaoqun Wu, Jemma König, Steven Shaw, and Ian H. Witten explore a new paradigm for sustainable data-driven language learning systems design in higher education by reflecting on remixed OER content. The paradigm presented in this chapter challenges established business models and deeply embedded cultural or institutional norms that present obstacles to OER expansion, traction, and the movement's sustainability. Furthermore, the paradigm for open data-driven language learning systems design supports greater access to and reuse of the artifacts of the academy and professional domains such as law. Moreover, this chapter shows the perceived value that corpus linguistics researchers and knowledge users working within English for Academic Purposes (EAP) place on pedagogic, professional, and research texts that can be mined for aspects of domain-specific language with data-driven learning systems. Finally, this chapter shows how open educational practices can be fostered to re-use, remix and redistribute EAP resources for uptake across formal and non-formal higher education in increasingly uncertain times.

How students and faculty can jointly play a role in how OERs are created and deployed by assigning students to expand Wikipedia pages is central to Chap. 7. Here, Laurel Smith Stvan reports on what was concluded from multiple semesters of using classroom editing assignments to show that Wikipedia editing tasks can empower students and enhance faculty goals in mutually beneficial ways. This chapter concludes that through editing Wikipedia entries, pedagogical benefits in case studies from multiple disciplines—in composition and rhetoric, as well as STEM, social sciences, and humanities fields—were evident. Within the courses, it was found that students and faculty can jointly play a role in how OER is created and

deployed. Furthermore, it was found Wikipedia is made more useful as participants work individually and collaboratively, class by class, and editor by editor, to create material that can complement more extensive individual OER collections. From this work by Stvan, the potential affordances of Wikipedia in an educational context are clear, and this may prompt further similar engagements in the higher education context.

Susie Gronseth, Haoyue Zhang, and Waneta Hebert describe an engaging design case of an open textbook project in Chap. 8. In this project, graduate students were content contributors to developing a textbook that has since been implemented as part of an undergraduate course. This project was initiated during a 16-week graduate course in the Learning, Design, and Technology program area. It details how the textbook and associated supporting materials were used during its implementation in the four-year undergraduate educational technology course. In addition, the design considerations of openness, legacy-framing, designed flexibility, text format, and readability for the target audience were covered in this chapter. The chapter also found that the affordance of creating an OER offered benefits to the writers of gaining experience in authorship and deepening their understanding of foundational concepts and skills. Furthermore, it was significant that creating an OER for use as an undergraduate course textbook mitigated cost barriers for the pre-service teachers and allowed for authentic examples and applications of the target concepts from their classrooms provided by local teachers.

In Chap. 9, Francisco Iniesto, Patrick McAndrew, Shailey Minocha, and Tim Coughlan present findings on the motivations of learners with accessibility needs when taking part in MOOCs, and they derive recommendations on how MOOCs should be designed to be more accessible. This research employed pre- and post-course survey data from 14 Open University MOOCs on the United Kingdom's MOOC platform, Future Learn. This chapter found that the motivations of learners with accessibility needs find MOOCs useful for personal development, CPD, and as a route to access HE. Also, such learners consider the low cost of MOOCs to be an essential factor, and they like the flexibility of accessing MOOCs, studying at their own pace, and opportunities for self-regulated learning. In essence, they feel that MOOCs provide a friendlier environment compared to classrooms. The chapter also concludes with some practical recommendations for making MOOCs accessible for learners with accessibility needs. These needs include specific design, resource, assessment, and support aspects. The need for increased MOOC personalisation was also essential for this research. This data-rich chapter provides a unique and very pragmatic insight into MOOCs.

In Chap. 10, Maria Perifanou and Anastasios A. Economides explore a selection of open textbook repositories for higher education. These authors identified twenty major open textbook repositories for higher education and then analysed the characteristics, popularity, and visitors' engagement of these repositories using manual inspection and web analytics tools. Few repositories apply quality assurance procedures, and almost all of them curate the OERs with Creative Commons licenses. The open textbook repository traffic is often locally driven, and visitors are referred to them by a search engine, but visits tend to be short. Furthermore, most of the

repositories achieved a good link influence score. Some repositories may need to upgrade their digital infrastructure, improve mobile friendliness and work on accessibility. The chapter concludes with suggestions to repository administrators and adds exceptional value to the ongoing discourse around open textbook repositories.

Jessica Turcat examines in Chap. 11 how using OERs can align with feminist pedagogy. In this regard, the chapter engages with the theme of "course design" by drawing on the author's experience teaching Gender, Women's, and Sexuality Studies courses at Oklahoma State University. According to the author, an essential element of feminist pedagogy is the challenge of building community while decentering the role of the instructor. Consequently, in the course design, the personal relationships that students could create with the course themes were meaningful. Using OERs, the courses were designed to empower students to co-construct knowledge, learning from each other by introducing topics adjacent to the course themes that emerged during the semester. From the chapter, it is evident that implementing OER praxis and feminist pedagogy requires additional labour and energy from the instructor. However, OER usage can streamline feminist pedagogical goals if university and departmental support are provided. With this unique authorial voice, this chapter adds an exceptional contribution to the broader open scholarship.

The Wikipedia Education Program as OEP is the focus of Chap. 12. In this chapter, LiAnna L. Davis, Shani Evenstein Sigalov, Filip Maljković, and João Alexandre Peschanski provide an overview of global cases of work conducted in Serbia, Israel, the US/Canada, and Brazil to support college and university students writing articles in the Serbian, Hebrew, English and Portuguese Wikipedias. Despite local-related, context-dependent, and language-related challenges, the authors showed that many challenges are similar and shared benefits to collaborating with Wikimedia projects as a teaching and learning platform. These benefits seem identical across different languages, contexts, disciplines, and models of engagement and usually include improved skills and literacies, in addition to thematic knowledge relating to course work. Notably, the authors determined within this context that Wikipedia has the potential to foster active learning, create a sense of responsibility towards knowledge, and improve awareness as digital citizens of critical topics of our time, from misinformation and fake news to bias, knowledge gaps, and knowledge equity.

In Chap. 13, Shani Evenstein Sigalov, Anat Cohen, and Rafi Nachmias investigate the design and implementation of a new course while highlighting the benefits and challenges for students and faculty, the course's social impact, and specifically focusing on the integration of Wikidata into the academic curriculum. This chapter explored the course design and implementation while focusing on Wikidata's integration into the academic curriculum and highlighted the benefits and challenges for students and faculty. According to the authors, the course discussed in the chapter is considered a success by faculty, students, and the Wikimedia community, and its main goals were achieved, namely making students better consumers of information; sharpening skills; offering a new, scalable and adaptable pedagogical model; offering students a positive learning experience; and of course, creating quality online content under a free license that could be used by future learners and the general public and minimising knowledge gaps and bias, or in other words, inducing social impact

through an academic course. It was also found that while peer evaluation induced learning, considering the course workload, exploring different ways of engagement and assessment is imperative.

In the final chapter, Chap. 14, Lucas Kohnke, Dennis Foung, and Eric Ho report on the challenges and opportunities associated with developing and adopting OERs in an English for Academic Purposes (EAP) context. The authors followed an interpretative approach and interviewed EAP teachers on their perspectives. These participants believe it is essential to address students' needs by customising OERs. Yet, the participants also have concerns about accessibility, time, and skills. The chapter showed that quality, copyright, technology, and students' needs influence the development and adoption of OERs. It is proposed in this chapter that in order to promote OERs within the EAP context, multidimensional OER training activities must be provided, a course-based OER material repository must be established, and research should be done on OER design. According to the authors, these methods would allow EAP practitioners to develop and adopt OERs more efficiently and effectively. This chapter presents an interesting view of OERs within the EAP context.

1.7 Conclusion

In conclusion, the thirteen chapters that follow, and the first introductory chapter present a unique view of OERs and OEPs within the very dynamic higher education context. The combination of conceptual and empirical concepts and the variety of approaches involved shows the maturity and depth of the academic discourses around open education that are ongoing worldwide. Quite significantly, the rhizomatic interaction and global development of open education are evident as some interesting cross-boundary engagements are highlighted in these chapters.

Despite the relevance of the COVID-19 pandemic for teaching during the time of obtaining chapters for this publication, the original call for chapter proposals did not contain any references to COVID-19, because the authors felt the topic along with the use of OERs was covered in great depth by other researchers. For example, the OER4Covid, an initiative supported by the Commonwealth of Learning (CoL) and the OERu, together with the UNESCO Institute for Information Technologies in Education (IITE) and the International Council for Open and Distance Education (ICDE), have provided many resources to support learning during the pandemic.

The use of OERs will continue to rise. The cost of higher education in various parts of the world prevents people from getting a university degree because education is considered a privilege, not a right. Consequently, people without a good education will be driven into poverty without much hope for a better life. Further research in the field of OERs is necessary to exploit the full potential of what open educational resources have to offer. The chapter selection in this book provides educators, administrators, researchers, scholars, and practitioners from around the world some food for thought in terms of what is possible in the field of OERs. At the same time, the chapter selection represents only a tiny fraction of what is going on in the exciting

world of open education and resources, but the chapters also make an important contribution to carry the ideas of OERs forward.

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Chapter 2
Open Educational Resources: A Catalyst for Social Justice and Equality

Ebba Ossiannilsson

Abstract An important step toward quality education and universal access to information was taken when the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the Recommendation on Open Educational Resources (OER) in November 2019. Five areas of actions are outlined in the UNESCO OER recommendation: Capacity Building; Policy; Inclusivity, Equitable Quality OER; Sustainability Models; and the Promotion and Strengthening of International Cooperation. The OER Recommendation will contribute to and catalyse human rights, equity and social justice. Through the recommendation the United Nations (UN) Sustainable Development Goals (SDGs) can be achieved, and open and inclusive knowledge societies can be build. The Recommendation will support the development and sharing of openly licensed learning and teaching materials based on universal design for the benefit of students, educators, and researchers worldwide. Although the term OER and the concept were coined already in 2002, its implementation at all levels, e.g.-nano, micro, meso, macro, and meta-has been far too slow. The social, ethical and moral dimensions of learning and education must be seriously considered as a priority in the agenda for social justice, equality and human rights, prosperity, liberation and growth in line with major global initiatives. This conceptual chapter, focusing on OER, discusses even micro-redentials, universal markers for learning, and open pedagogical approaches to fulfil the promise of resilient, sustainable, and high-quality open education in the ecosystem of a new social contract.

Keywords Equality · Human rights · Liberation · Micro-credentials · OER · Open education · SDG · Quality and ecosystem · Social contract · Social justice

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2.1 Introduction

The concept of education as a human right means that the right to education is guaranteed by law for all without discrimination. States have a duty to protect, respect and fulfil the right to education and are accountable for violations of the right to education. The United Nation (UN), and the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Sustainable Development Goal (SDG) 4 is one of 17 SDGs set by UNESCO in 2015 (UNESCO, 2015), Education is a force for sustainable development and peace and is valued as a fundamental human right. Every goal of the 2030 Agenda requires that education equips people with the knowledge, skills, and values they need to live with dignity, shape their lives, and contribute to their societies. Therefore, education is an essential prerequisite for enjoying all other human rights and an effective tool for economically and socially excluded adults and children to lift themselves out of poverty and participate fully as citizens. Although education is recognised as a universal human right, many people worldwide lack access to essential educational opportunities.

The General Conference of UNESCO adopted the Recommendation on Open Educational Resources (OER) in November 2019, and an important step toward quality education and access to information for all was taken. The recommendation outlines five action areas: Capacity Building, and Utilization OER; Developing Supportive Policies, Publicity, Inclusivity, Equitable Quality OER, Sustainability Models, and Promoting and Strengthening International Cooperation. In addition to the five areas, recommendations were also made for monitoring and evaluation. The recommendation will contribute to and categorise human rights, equity, liberation, and social justice. The recommendation will also contribute to building open and inclusive knowledge societies and achieving the United Nations Sustainable Development Goals (UN SDG). The OER recommendation empower the development and sharing of openly licensed learning and teaching materials with universal design for the benefit of students, educators, and researchers worldwide. Although the term OER was coined in 2002, its implementation at all levels–macro, meso, micro, and nano has been too slow.

In the agenda for social justice, equality, and human rights, and for prosperity, liberation, and growth, in line with major global initiatives the social, ethical, and moral dimensions of learning and education must be given high priority (UNESCO, 2019).

The scope of this chapter is broad, as it deals with openness in education. However, it focuses on OER as a catalyst for social justice, equity, human rights, and education for all in the context of lifelong learning, where online learning serves as a vehicle for change. This chapter also discusses ways to deliver on the promise of resilient, sustainable, and high-quality open education in the context of a new social contract.

After this brief introduction, this concept paper is organised as follows. First, the research question and methodology are described, followed by a discussion of the UNESCO OER recommendation and its implementation, monitoring, and evaluation. This is followed by discussions of an ecosystem of openness and the need for

radical change to achieve the SDGs, the new social contract, and quality education for all. This is followed by a discussion of OER as a catalyst for systemic change towards a new social contract and knowledge-based action to transform education to ensure its global sustainability, which is a key concern. The conclusion provides recommendations for future steps to achieve the UN SDGs.

2.2 Research Question and Methodology

The research question for this conceptual chapter focuses on OER as a catalyst for social justice and equality.

A systematic review of the literature, including official reports from the major international organisations in this area, forms the theoretical basis of this chapter. The review is based on the author's research, experience, and perspectives gathered over almost 20 years. The review was conducted systematically to examine the processes of information gathering, assessment, and data analysis (Creswell & Creswell, 2018). The author selected examples from the ongoing international discourse on the challenges and opportunities of lifelong learning and the future of education, drawing primarily on official international sources. OER and the openness of education were particularly among the criteria for this conceptual chapter.

2.3 The OER Movement as a Catalyst for Social Justice and Human Rights

2.3.1 Human Rights and Sustainability Goals

The 1948 Universal Declaration of Human Rights (UDHR) is a landmark in the history of human rights. Education must be free, at least at the elementary and primary levels. Education must be directed toward the full development of the human personality and reinforce respect for human rights and fundamental freedoms (United Nations, n.d.). Article 19 in the UDHR includes the right to seek, receive, and disseminate information and ideas through any media and regardless of borders. Although individuals enjoy the same rights online as offline, states sometimes censor and criminalise a wide range of online content through vague or ambiguous laws, even though Article 26 states that everyone has the right to education.

The SDG Agenda 2030, adopted by all United Nations Member States (UN) in 2015, is a shared blueprint for peace and prosperity for people and the planet, now and in the future. At its heart are the 17 SDGs, which represent an urgent call to action for all countries—developed and developing—in a global partnership.They are based on recognising that eradicating poverty and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality, and spur

economic growth while combating climate change and protecting our oceans and forests (United Nations, n.d.). According to the Incheon Declaration and Framework for Action for the Implementation of the Sustainable Development Goal (SDG 4), inclusive and equitable quality education should be ensured, and lifelong learning opportunities for all should be promoted (UNESCO, 2016). SDG 4 builds on the UDHR and is one of the 17 SDGs identified by the UN in September 2015.

The goal is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all by 2030. By 2030, the goal is to ensure that all children worldwide have access to quality early childhood development, care, and preschool education to prepare them for primary education and receive free primary and secondary education. It also aims to ensure equal access to affordable vocational training and eliminate gender and wealth inequalities to achieve universal access to quality higher education. The seven results-based goals are: universal primary and secondary education, early childhood development and universal preschool education, equitable access to technical/vocational education and higher education, relevant skills for decent work, gender equality and inclusion, universal literacy for youth, and education for sustainable development and global citizenship. SDG 4 is based on four pillars: social, human, economic and environmental (UNESCO, 2016).

2.3.2 UNESCO OER Recommendation

The obligations of UN are based on the Universal Declaration of Human Rights (Article 19) and the right to education (Article 26). In addition, UNESCO's constitutional commitment to the free exchange of ideas and knowledge supports the sharing of knowledge through technology. The normative instruments of the UNESCO are conventions, recommendations and declarations. The OER recommendation makes recommendations to UNESCO Member States on actions that could be taken in a particular area and requires Member States to report regularly on these actions. A recommendation is flexible enough to be quickly adapted to ongoing technological developments. UNESCO believes that consistent access to quality education contributes to peace, sustainable social and economic development, and intercultural dialogue.

The UNESCO OER recommendation aims to contribute to the promotion of human rights, equality and social justice. The Recommendation will help build open and inclusive knowledge societies and achieve the SDGs by the UN. According to UNESCO OER provides a strategic opportunity to improve the quality of education and promote policy dialogue, knowledge exchange, and capacity building (UNESCO, 2019). The recommendation will support the development and sharing of openly licensed learning and teaching materials that benefit students, educators, and researchers worldwide (Ossiannilsson, 2021a, 2021b, 2021c, 2021d; Ossiannilsson in press).

The Recommendation on OER, unanimously adopted by the UNESCO General Conference at its 40th session in November 2019, supports the creation, use and

adaptation of inclusive and high-quality OER and facilitates international cooperation in this field, and is the result of more than a decade of efforts by a wide range of stakeholders in this field. The Recommendation is the only existing international standardisation tool for the implementation of OER. It is the result of more than a decade of efforts to bring together a wide range of stakeholders (UNESCO, 2019).

At the international level, the adoption of the recommendation represents a critical step toward building open and inclusive knowledge societies and achieving the 2030 Agenda through UN. Implementation of the Recommendation will contribute to the achievement of at least six SDGs: SDG 4 (quality education), SDG 5 (gender equality), SDG 9 (industry, innovation and infrastructure), SDG 10 (reducing inequalities within and between countries), SDG 16 (peace, justice and strong institutions), and SDG 17 (partnerships to achieve the goals) (UNESCO, 2021a, 2021b).To implement the actions identified in the recommendation, UNESCO has launched the OER Dynamic Coalition, a multi-stakeholder mechanism to facilitate international and regional collaboration UNESCO, 2019).

The following definitions of OER and Open License were revised in connection with the Recommendation on November 25, 2019 (UNESCO, 2019, p. 1):

1. Open educational resources (OER) are learning, teaching, and research materials in any format and medium that reside in the public domain or are under copyright that has been released under an open license and that permit no-cost access, reuse, repurpose, adaptation, and redistribution by others.
2. An open license is a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the right to access, reuse, repurpose, adapt, and redistribute educational materials

In addition, the use of information and communication technologies (ICTs) has been redefined to emphasise that they offer great potential for effective, equitable, and inclusive access to, use of, adaptation of, and redistribution of OER. ICTs can expand the possibility that OER is accessible to everyone, everywhere, and at all times, including people with disabilities and members of marginalised and disadvantaged groups. They can also help meet the needs of individual learners, effectively promote gender equality, and incentivize innovative pedagogical, didactic, and methodological approaches (UNESCO, 2019).

The recommendation also highlighted a large group of stakeholders in the formal, informal, and non-formal sectors (where applicable), which now include the following: Teachers, educators, learners, government agencies, parents, education providers and institutions, educational support staff, education policy makers, cultural institutions (e.g., libraries, archives, and museums) and their users, ICT providers, researchers, research institutions, civil society organisations (including professional and student associations), publishers, public and private sectors, intergovernmental organisations, copyright holders and authors, media and broadcasters, and funding agencies (UNESCO, 2019). These changes demonstrate that the recommendation is truly inclusive of stakeholders at all levels-meta, macro, meso, micro, and nano-and that each is not only advisory, but also responsible for integration, implementation, monitoring, and evaluation.

The terms open content and OER refer to any copyrightable work (traditionally excluding software, which is described by other terms such as "open source") that is licensed to grant the following rights (5Rs) (Wiley, 2014 n.p.):

- Retain-the right to make, possess, and control copies of the content (e.g., download, reproduce, store, and manage).
- Reuse-the right to use the content in a variety of ways (e.g., in class, in a study group, on a website, in a video).
- Revision-the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language).
- Remix-the right to combine the original or revised content with other material to create something new (e.g., to embed the content).
- Redistribution-the right to distribute copies of the original content, revisions, or their combination to others.

Subsequently, two additional stakeholder rights were introduced: recognition (Svetlana Knyazeva, personal communication, n.d. 2017; Ossiannilsson, 2021a, 2021b, 2021c, 2021d; Ossiannilsson in press) and recontextualisation (Ossiannilsson, 2021a, 2021b, 2021c, 2021d). One should be recognised not only for one's work, implementation, and integration in OER but also for one's professional development and contribution to one's field. Recontextualisation can be understood as using the 5Rs to contextualise them for one's own purposes and context.

In summary, the OER recommendation will achieve SDG4 for all. The recommendation is broad in scope and involves all stakeholders at all levels. In addition to the overall goals of the recommendation and the SDGs, there are the following benefits: increased access to learning by allowing students to access OER anytime, anywhere in the world, and to use materials repeatedly. In terms of scalability, OER can be widely disseminated easily and at little or no cost, and course resources can be adapted to better meet learning outcomes. However, the work on OER must be taken seriously, and it is important to consider for whom and where OER are being developed. Several issues remain unresolved, such as gender, diversity, multilingualism, geographic balance (i.e., global North versus global South), lack of face-to-face faculty-student interactions, technological issues, and language and/or cultural barriers. In addition, issues of intellectual property/copyright, sustainability, and quality are often raised (Ossiannilsson, 2021a, 2021b, 2021c, 2021d). However, these concerns and dilemmas are addressed in the UNESCO OER recommendation. In addition, how information is shared with stakeholders is critical. Narratives and values are important for developing and shaping an inclusive, equitable learning landscape. This is not just about the availability of facts and figures to the public but also about communication strategies, culture, and narratives.

The following sections contain reflections on topics related to OER, such as the dimensions of open movement, including the ecosystem of openness, universal design, and microcredentials.

2.3.3 The Ecosystem of Openness

2.3.3.1 A Systemic Approach to the Ecosystem of Openness

Openness consists of several dimensions related to different knowledge paradigms, and an ecosystem is crucial. Openness relates to innovation, knowledge, ideas, resources, communication, diversity, inclusion, culture, mindset, government, and people (Ossiannilsson, 2018; Ossiannilsson, in press).

The 2007 Cape Town Declaration on Open Education accelerated efforts to promote openness across a broad range of issues, advocating for open resources, technologies, and teaching methods, as well as an open culture in education. In honour of its 10th anniversary, a retrospective was held to launch CPT10 + , which identified ten key directions for advancing open education: open communication, empowering the next generation, connecting with other open movements, open education for development, open pedagogy, thinking outside the institution, data and analytics, beyond the textbook, opening publicly funded resources, and copyright reform for education. Even more directions can be identified (Cape Town Open Education Declaration, 10th Anniversary, 2017, p.3).

Open education is an educational movement based on openness with links to other educational movements, such as critical open pedagogy, which is based on an educational stance that advocates broader participation, democracy, and inclusion in society. The most important features of open education are free, unfettered, anytime, anywhere access to educational resources that are meaningful and useful to those who wish to use them. Open education, which began in the late 1960s with the creation of open universities and gained momentum in the first half of this century with OER and open technologies, is part of broader efforts to democratise education. Open education, focused on access, agency, ownership, participation, and experience, has the potential to become a significant global equaliser, enabling people around the world to enjoy the basic human right to education (Blessinger & Bliss, 2018).

The Joint Research Center considers open education as an umbrella term under which different conceptions of open education can be grouped. In Europe, especially in higher education, the term open education does not only refer to the opening of educational materials under an open license. Nor does it refer only to the availability of open access research in repositories. However, these two aspects can and should be included in the broad concept of open education. Open education has become increasingly important in European higher education, as digital technologies are one of the main drivers for the modernization of education. The use of digital technologies in teaching and learning is no longer limited to open or virtual universities, but has expanded to all types of institutions, both traditional and innovative (Inamorato dos Santos, 2016). Open education can provide individuals with appropriate and meaningful educational opportunities at every stage of their lives and professional development. This includes access to content, courses, support, assessment, and certification in flexible ways that meet a variety of needs. Barriers related to access or cost, for example, are reduced or eliminated. Based on this broad approach to open education,

a framework has been proposed that includes multiple uses to promote transparency and a holistic approach to practice. Open education goes beyond OER, MOOCs, and open access to encompass 10 dimensions of open education. The framework can be used as a tool for making strategic decisions about pedagogical approaches, collaboration between individuals and institutions, recognition of non-formal learning, and different ways of delivering content.

2.3.3.2 Microcredentials

Time and space have become more seamless with the Internet and the increasing use of online learning. Learning takes place more or less anywhere and in a wide variety of places. Learning options that take less time than traditional qualifications are therefore being rapidly developed around the world. Various public and private providers offer these options in response to the demand for more flexible, learner-centred forms of education and training. OER can be stand-alone learning materials or integrated into courses and course modules. Weller (2010) argued that much of the attention given to OER has focused on institutional projects that explicitly provide learning content. These can be classified as "large OER", but individually created "small OER" can also use web services. Weller highlighted some differences between these two types of OER to illuminate open education issues. These include attitudes toward reputation, intentionality of the resource, models of sustainability, the implicit capabilities of the resources, and the context of their hosting sites.

OER can be considered microlearning because they can usually be used as stand-alone modules and/or objectives. Therefore, it is also important to consider microlearning as a concept and phenomenon (Ossiannilsson, 2020). Microlearning is based on relatively small learning units and short-term learning activities. Microcredentialscertify the learning outcomes of short-term learning experiences, such as short courses or training sessions. They provide a flexible, targeted means to help people develop the knowledge, skills, and competencies they need for personal and professional development, and to be recognized for their learning achievements (European Commission, 2021a, 2021b)

People around the world need to update their knowledge, skills, and competencies to bridge the gaps between their formal education and the demands of a rapidly changing society and labour market. In addition, recovery from the COVID-19 pandemic and the need to accelerate green and digital transformation require people to continue their education or retrain. Maintaining and acquiring new skills is critical to enable active participation in society, ensure continued personal, social, and professional development, and promote employability and socioeconomic inclusion. However, without common standards that ensure quality, transparency, cross-border comparability, recognition, and transferability, microdiplomas cannot reach their full potential. Microcredentials can be particularly useful for people who want to continue their education or retrain to meet the demands of the labour market or to develop professionally after taking up employment. They offer a flexible, targeted way to help people develop the knowledge, skills, and competencies they need for personal and

professional growth. Because of their flexibility, microredentials can be developed and delivered by a wide range of providers in many different formal, non-formal, and informal learning environments.

According to the European Commission (2021b), individuals must acquire the knowledge, skills, and competencies they need to succeed in a changing labour market and society and to benefit fully from a socially just recovery and a fair transition to a green and digital economy. The European Commission's proposal aims to ensure that micro certificates are valid across institutions, companies, sectors and borders. To this end, the European Commission empower Member States to agree on (i) a common definition of microcredit cards, (ii) standard elements for their description, and (iii) key principles for their unsigning and issuance. The aim is to ensure that microcredit cards are of high quality and that they are issued in a transparent manner to build trust in what they certify. This should encourage the use of microcredentials by learners, workers, and job seekers who can benefit from microcredentials. The proposal includes recommendations for micro-credentials in education, training and labour market policies that would allow people to acquire new or additional skills in a tailored and inclusive way. The European approach to micro-credentials is an important basis for the creation of a European education area by 2025. They could be part of the learning included in individual learning accounts.

2.3.3.3 Universal Design

Although learning is universal, learning styles and pathways are individual. Learning is also subject dependent. To reduce barriers to learning, it is important to provide appropriate support and ensure that information is equally accessible to all learners by presenting the same content in different materials. Universal Design for Learning (UDL) aims to provide all learners with the same opportunities for success. UDL is an instructional approach that consists of proactively designing and using inclusive instruction, courses, materials, and content that benefit all types of learners without the need for adaptations or retrofitting and assessment strategies (Wikipedia, n.d). This process is about designing products (e.g., devices, environments, and systems) so that they can be used by people with different abilities in a variety of situations (e.g., environments, conditions, and circumstances). Universal design has evolved from the slightly older concept of accessibility, the broader accessibility movement, and adaptive and assistive technology. It also seeks to connect aesthetics to these core considerations. This approach to teaching and learning provides flexibility in how students can access the material and demonstrate their knowledge. UDL also looks for other ways to engage students. This approach provides academic access to a wide range of learners, including students with disabilities, while maintaining academic standards so that fewer remedial courses are required when a course is already in progress. UDL not only provides equal access to learning, but also equal access to information. UDL allows students to determine their own method of accessing information while the instructor monitors the learning process and introduces useful methods as

needed. It should be noted that UDL does not eliminate academic challenges, but reduces barriers to access.

According to the OER recommendation of UNESCO OER should be accessible to all without barriers (UNESCO, 2019). Therefore, the development and use of OER is not only about open licences, but also about the consistent universal design and use of accessible services. At the heart of many open education projects is access to education. So what does access mean? If the materials are not accessible to every single student, do they fulfil the mission of providing a fully open education? The open education movement has helped people in different parts of the world gain access to content that would not otherwise be available to them. OER lowers costs for students and allows teachers more flexibility. Accessibility could help promote the open movement even further. The three UDL principles are inclusion, representation, and action and expression. In most learning platforms, such as MOODLE, the tools are built into the system. Other tools include W3C, WCAG, H5P, and Ally.

The OER Accessibility Toolkit complements Universal Design and Universal Design for Learning (UDL), a set of principles for developing curriculum that provides equal learning opportunities for all. UDL provides a blueprint for developing instructional objectives, methods, materials, and assessments that are appropriate for all. It is not a one-size-fits-all solution but a flexible approach that can be customised (Open UBC, 2021). The principles of UDL can be summarised as follows:

- Information and content should be presented in a variety of ways and with the use of diversity.
- Learners should be provided with more than one way to express their knowledge.
- Interest and motivation to learn should be facilitated.

These principles are recommended for OER authors to apply, and to follow the UDL guidelines (Open UBC, 2021):

- Resources and activities should be designed so that learners can use them in different ways. For example, for a text component, offer the ability to increase the font size or change the text colour. For images and diagrams, appropriate text descriptions should always be provided. For videos, subtitles should be provided.
- Learners should always be provided with multiple opportunities to engage with the information and demonstrate their knowledge. This is especially important when designing activities and assessments.
- Activities that require specific sensory or physical skills that may be difficult or impossible to adapt to learner's needs should be identified. For example, a task that requires learners to identify objects by colour might be difficult for learners with visual impairments. For such cases, create a plan for dealing with learners who encounter obstacles.

2.4 Transformation of Education to Achieve the SDGs: The New Social Contract, the Next Normal and Quality

With 2030 less than a decade away, critical thinking and urgent action are critical to achieving the SDGs. The SDGs are a common challenge for all universities and higher education institutions and must be reflected in research, education, and outreach plans and actions. Transformation is a common thread that runs through all of the SDGs and the UN agenda for addressing the global challenges facing humanity and the planet. Putting our world on a more sustainable course requires a radical shift in current development paradigms that exacerbate inequalities and threaten our shared future. This transition depends on new knowledge, new research, and new skills that only universities, rooted in their historic role as service providers to society, can provide. Universities are uniquely positioned to contribute to the social, economic, and environmental changes needed to solve the world's most pressing problems (UNESCO, 2022, n.p). Three interrelated themes of change must be the focus of universities as they advocate for and implement the 2030 Agenda:

- The compelling need to move toward inter- and transdisciplinary forms of knowledge production and dissemination in education and research.
- The compelling need for institutions to promote openness, advance epistemic dialogue, and integrate other forms of knowledge.
- A call for a much stronger presence in society through proactive engagement, outreach, and partnerships with other societal actors to raise awareness and influence policy on environmental degradation and SDGs in general. This includes direct involvement in experimental projects that evaluate solutions involving students.

Recognising the value of life and the need for a high quality of life for all requires strengthening the human rights-based approach to education and research. Human rights for all can only be achieved through the active protection of natural resources and all forms of life. In addition, the power relations that foster inequality and all forms of violence and discrimination must be continually challenged. This includes valuing cultural diversity and recognising the contributions that different cultures can make to achieving the SDGs. The values of equality and inclusion are at the forefront of the implementation of the 2030 Agenda; the commitment to leave no one behind is critical.

The SDGs require a shift in perspectives and practices. Inter- and transdisciplinary approaches to education and research are critical, as only with a holistic approach can adaptive solutions be developed. This underscores the need for universities to become more open institutions, integrating diverse cultures and knowledge systems and adopting a more democratic approach to knowledge sharing. Universities can achieve a much stronger presence in society through awareness-raising, outreach, and partnerships. There is a need to examine the factors that prevent these institutions from contributing meaningfully to achieving the SDGs and thus to a more just, humane, democratic, inclusive, and peaceful future for all. Figuring out how to overcome

these obstacles requires thinking about what kind of knowledge is needed, whose knowledge is needed, and how higher education institutions can address these challenges and their implications both within higher education institutions and beyond in an increasingly diverse yet interdependent society.

The goal is to make sustainability a core practice reflected in structures, programmes, and activities and expose students to real-world problems and immersive experiences. Valuing the well-being of people and the planet and contributing to values that go beyond making money would excite and inspire students and faculty alike. Ultimately, the educational culture at universities and colleges must encourage students to learn through experimentation and critical thinking from diverse perspectives.

Universities and colleges must use the knowledge they produce and the training they provide to new professionals to help solve some of the world's most pressing problems addressed in the SDGs. Humanity is facing unprecedented challenges, particularly around climate change, biodiversity loss, inequality, health, economics, and a range of issues related to the 2030 Agenda. Given this new reality, where the future of humans and other species is at stake, it is time for higher education institutions and their stakeholders to systematically rethink their role and mission in society and consider how they can serve as a catalyst for a rapid, much-needed, and equitable transition to sustainability.

Given the complexity of the issues, solutions should be part of a radical agenda that requires new alliances and incentives. It is also time for higher education institutions to make sustainability and SDG literacy a basic requirement for all faculty and students. Higher education institutions, their leaders, faculty, and students have particular roles and responsibilities for social change, depending on the nature of the institution and the issues at hand. To this end, the structure and culture of higher education institutions must change, and the barriers to necessary change within higher education institutions must be identified and progressively removed. The roles of higher education institutions include knowledge transfer and de-democratisation, as well as raising awareness of the consequences of unsustainable modes of production and consumption, the problems of inequality and exclusion, and the need to make progress in implementing the 2030 Agenda. Education for sustainability should expose students to real problems and immerse them in real issues. Valuing the well-being of people and the planet and contributing to values beyond financial profit will excite and inspire students and teachers alike.

Ultimately, the educational culture at universities and colleges must encourage students to learn through experimentation and critical thinking from diverse perspectives (UNESCO, 2022). It is important to recognise that the SDGs will be phased out in 2030. Although universities are part of this agenda, they should also look to the future and not only to the implementation of the SDGs but also to the development of steps and goals beyond 2030. A long-term perspective is needed for both activities and policies. Universities should critically examine their own practices, curricula, and research and consider how they can motivate their staff, students, and society to do the same. UNESCO states in general terms that universities should strive for equitable representation of all segments of society, both in the student body and in the

faculty, in addition to strengthening lifelong learning activities. The recommendation addresses education, research, outreach, and community engagement.

Specifically, it recommends that government-sponsored quality assurance mechanisms should give due recognition to what is being done at universities to advance the SDGs in the three areas of education, research, and outreach, rather than a ranking system that creates a top-down competition in which the highest recognition is given to those that holistically address a large number of SDGs in all their activities. It is important to remember that the UNESCO report was completed at a time when many countries were experiencing a new wave of COVID -19 that has affected many aspects of humanity since 2020. COVID -19 is a serious consequence of an unsustainable way of dealing with nature. The impact of this pandemic on poverty, inequality, and the environment underscores the call for higher education institutions to strengthen their commitment to the 2030 Agenda to achieve a healthier, more sustainable, and more inclusive world. Higher education institutions are uniquely positioned to contribute to the social, economic, and environmental changes needed to solve the world's most pressing problems (UNESCO, 2022).

The European Commission believes that universities in Europe occupy a unique position at the crossroads of education, research, and innovation at the service of society and the economy. They play a crucial role in realising the European Education Area (EEA) and the European Research Area (ERA) in synergy with the European Higher Education Area. By fostering strong partnerships in the EU and globally and leveraging the cumulative advantage of education systems and research networks, they are key actors in promoting the European model in line with EU interests and values: the rule of law, human rights, and international norms and standards (EC, 2022a, 2022b). Diversity, inclusion, and equity in higher education are more important than ever. Students, academics, administrators, and researchers from disadvantaged backgrounds are still underrepresented in higher education. A gender gap persists in some areas of study, research, and decision-making positions in higher education.

The gender balance decreases significantly with increasing seniority in the management of higher education institutions. In European Union (EU27) countries, only 24% of these positions are held by women. Achieving the EEA by 2025 means creating a European learning space that benefits all learners, academics, and other education personnel who can move freely within the EU to study and work. European higher education institutions must be able to work closely and intensively together to achieve this. The further realisation of the European Research Area requires strengthening the mobility of researchers and the flow of knowledge, incentivising investment in research and innovation, and enhancing transnational collaboration between universities, businesses, and other research and innovation actors in their ecosystems. Transnational cooperation will strengthen the integration, excellence, diversity, attractiveness, and global competitiveness of European higher education. It will contribute to equal opportunities and non-discrimination, addressing European challenges related to climate change, digital transformation, and ageing populations, equipping learners with relevant skills and knowledge, and building resilience and supporting recovery. It will strengthen the role of higher education institutions on the

global stage and help Europe address global challenges effectively and efficiently. The transnational collaboration will create a global source of inspiration for students, academics and researchers.

In times of crisis, profound questions arise. For many people, it is important to be alive, to feel connected, to feel that we matter and that our lives have meaning. We share an innate longing for justice, dignity, compassion, and love. Education and training, like all other sectors, must take action to respond to the climate crisis. Learners of all ages must have the opportunity to develop the knowledge, skills, and attitudes to live more sustainably, adopt healthier lifestyles, and contribute-both individually and collectively-to the green transition. Acquiring sustainability skills can help children, youth, and adults understand the challenges related to climate change and the environment, rethink their behaviour, and work toward a sustainable future.

The European Competence Framework for Sustainability (GreenComp) can be used in education and training programmes and activities in formal, non-formal and informal settings. The framework defines four groups of competencies that learners of all ages should acquire in the context of sustainability. Each competency has three strands (Environment EC, 2022a, 2002b, 2002c, n-p.):

- Embodying sustainability values: Valuing sustainability, supporting fairness, encouraging nature.
- Acknowledging the complexity of sustainability: Systems thinking, critical thinking, problem-solving.
- Acting for sustainability political action: Collective action and self-initiative.
- Imagining a sustainable future: Future literacy, adaptability, and exploratory thinking.

2.5 Discussion and Conclusion

This conceptual chapter examined OER as a catalyst for social justice and equity. The focus is on quality education for all and education as a human right and a means to promote social justice. The chapter draws on global initiatives for sustainability, particularly the SDGs. The 2030 Agenda focuses on five critical dimensions: People, Prosperity, Planet, Partnership, and Peace, which is also known as the 5Ps framework. The chapter focused on the UNESCO OER recommendation and its implementation, monitoring and evaluation. In addition, the chapter addressed recent initiatives from UNESCO, such as the Futures of Education and the Transformation of Education to Achieve the SDGs, as well as the Lifelong Learning Initiative. European perspectives on the future of education were also discussed in this chapter.

To meet the demands of global challenges, there is an urgent need for a radical transformation of education in all forms, at all levels, and in all subjects, as well as in terms of openness of all educational means, innovations, methods, and formats. There is an urgent call for a so-called new or next normal, but this normal is not only a universe but also a "pluriverse." There is also a need for a new quality agenda.

Open education, OER, and other parallel open movements such as open science, open innovation, next-generation empowerment, open communication, open partnership, and open ecosystem will be catalysts for systemic change toward a new social contract and knowledge-based action to transform education for global sustainability.

The new normal raises the question of what is considered normal. What is considered normal in one context may not be considered normal in other contexts. What is normal? Who has the power to define what is normal or the next or best normal? Similar to the concept of quality, it is in the eye of the beholder. A new quality agenda for education goes beyond quality and focuses on values, culture, well-being, and what really matters to individuals and society, as well as addressing global challenges. This can be achieved through the five critical dimensions at the core of the 2030 Agenda: People, Prosperity, Planet, Partnership and Peace, also known as the 5P framework.

A new quality agenda is based on a new social contract in the educational landscape that must consider plurality, equity, and diversity in all contexts and time periods. Therefore, it is important to renew the "why", the "what", the "who", the "when", and the "what" as well as the "how" in order to reshape our future together.

This chapter also addressed how to fulfil the promise of resilient, sustainable, and high-quality open education in the new normal and the next normal after COVID -19. Leadership is critical to change and transformation because it begins with culture. Courage and creativity are needed to challenge old patterns, systems, and paradigms. It is important to be a values-based leader who can activate people's agency and potential to develop transformative solutions. Resilient leaders must strengthen the socio-ethical dimensions and well-being of learners. To secure the future of education, the SDGs, OECD and European Commission initiatives must be central.

The UNESCO recommendation on OER and Open Science have clear implications for the core values of openness regarding equity, justice, the new social contract, human rights, and social justice. Some points are obvious: the educational landscape must become open and flexible in every way, and given global challenges, online education is the way forward. The ecosystem is critical. It is also clear that universities, the labour market, and business—the triple helix—must work together. Because education is relevant, society should drive curricula and work with high-quality open resources and open science. Because their narratives have an impact, individuals matter more than previously thought. Therefore, the futures of sustainability lies in design, problem-solving, changing cultures and systems, and adhering to collective values. It is important to use common, powerful language to change disempowering conversations and narratives and to build a network of deep, values-based partnerships to achieve desired outcomes. It is also important to implement solutions in ways that create and support new patterns to ensure a thriving future.

The ecosystem of openness and the need for systemic change were also discussed in this chapter. Such an ecosystem includes openness to people, places, networks, ideas, things, materials, innovations, and practices. To integrate, implement, monitor, and evaluate an ecosystem of openness, 21st-century pedagogical approaches are needed, such as open pedagogy, which has been practised for some time and in which students are creators of information rather than consumers. Online teaching

and learning, cooperative learning, collaborative learning, problem-based learning, project-based learning, peer-to-peer learning, inquiry-based learning, and team-based learning are also examples of innovative, reform-oriented, student-centred pedagogies. To fully translate UDL into quality and learner engagement, open pedagogical approaches are needed, such as rhizome learning and seamless learning, as well as empathetic and socioemotional pedagogical approaches.

Education and lifelong learning are essential components of everyday urban life so that urban communities can create sustainable and harmonious societies that embody the principles of resilience, social justice, environmental sustainability, economic productivity, political participation, and cultural diversity. In many education systems, education for sustainability (EfS) (UNESCO, 2009) is considered an integrative approach to environmental education, where social and economic dimensions complement the ecological dimension of environmental education. EfS develops the knowledge, skills, values, and worldviews people need to contribute to more sustainable lifestyles. It empowers individuals and communities to think about how they interpret and interact with the world. Education for sustainable development empowers learners to make informed choices and act responsibly to ensure environmental integrity, economic viability, and just society for present and future generations while respecting cultural diversity.

Technology combined with political, economic, cultural, and humanistic spheres has paved the way for the fourth industrial revolution, which is in line with the SDGs, learning in the digital age, and the future of education. The recommendation OER also notes that there are multiple dimensions and perspectives, such as the political, existential, economic, cultural, legal, technical, social, and didactic. This complexity highlights the need for a holistic ecosystem that provides a framework for implementing a culture of change related to social justice and human rights, including open education and OER.

In times of crisis, most people need to feel alive and connected, and that they matter and that their lives have meaning. People share an innate longing for justice, dignity, compassion, and love. People's relationships to concepts and ideas and the stories they tell are important, especially in the context of open education. However, we must recognise that entangled quantum systems are never completely separable. We need to be aware of the intertwined relationships, how to respond to them, and that we are creating and recognising a shared potential to create alternatives. Value concepts are woven into the patterns that structure our relationships with each other and our environment. Therefore, the quality of our relationships creates new patterns and possibilities. Change that promotes a just and prosperous world is not achieved through wishful thinking and hope. Action and influence are essential to achieve the desired results and manifest the quality and depth of change needed in times of crisis. Not only action but also the quality of action is important to achieve transformative change. Action is a complex phenomenon, and the results of intentions and actions affect us all, whether we are aware of it or not. Actions based on universal values represent a shift from "us vs them" to "me/us," which is critical for changing cultures and systems. When we embody universal values such as justice and integrity, we

experience that we are connected. This is the foundation for creating a just and sustainable world.

Transformative perspectives include diversity, flexibility, innovation, risk, value, engagement, outreach, accountability, flexibility by any means, relevance, trust, education, retraining, de-democratisation, culture, collaboration, socialisation, and well-being. This paradigm shift leads not only to new values but also to tensions and dilemmas. Open education to ensure the human right to social justice should be part of the new social contract for education. Learning should be social, pervasive, seamless, and rhizomatic. The ecosystem of openness must leverage OER as part of the infrastructure for health and well-being.

In summary, if we are to take knowledge-based action for global sustainability, we must create and lead change. Moreover, we must create effects to change cultures and systems to achieve truly sustainable change for the future of human rights and social justice. The openness agenda cannot address quality without addressing equity, human rights and social justice.

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Chapter 3
Developing Supportive Policies and Strategies for Their Implementation: Student Experience with Real-World Cases

Tanja Urbančič, Dominic Orr, Mitja Jermol, and Tel Amiel

Abstract One of the principal recommendations of the UNESCO OER Recommendation (2019) is the development of supportive policies, including regulatory frameworks and strategies. In this chapter, we describe a novel approach to the development of such policies and strategies for their implementation. The process involves using two resources: the UNESCO Guidelines for OER Policy as a framework and the Open Education Policy Game as a method for eliciting gaps and defining priorities in open policy and strategy design. Both instruments have shown to be a powerful mechanism to analyse and create a road map for OER and open education policy for organisations and groups. We will describe this methodology, developed and implemented as part of the Leadership in Open Education Master's course entitled Open Education Strategies. We begin with an overall perspective on the importance of developing leadership in open education by describing the Master's programme, its conception and its objectives. We highlight the importance of policy to promote the adoption of Open Educational Resources (OER) and Open Education (OE) more broadly. We

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then present the course rationale, followed by a description of the open practices and tools used to support a group of 10 students as they engaged in real-world open policy design.

Keywords Open policy · Open strategies · Leadership · Professional development · Open educational resources

3.1 Introduction

The Open Education (OE) movement has seen renewed interest and substantial activity globally for at least two decades. A central component and a catalyst of OE has been the push for Open Educational Resources (OER):

> Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others. (UNESCO, 2019)

The provision and use of OER have been directly connected to developing the Sustainable Development Goals (SDG), particularly Goal 4 (Quality Education). As such, a reoccurring question is how to ensure that the potential approaches involving OER for improving learning opportunities for all are fully explored. There is a strong argument that two key measures can play a significant role here—ensuring that organisational leadership fully supports OER and that appropriate policies and strategies are developed to provide supportive frameworks for conducive practices. This is because fully benefiting from the potential of OER requires significant change, and change occurs when routine processes are adapted and when the mindset, expectations and behaviours of actors are reorientated to new methods of achieving their objectives (Inbar, 1996).

A key change, for instance, in the case of OER, is the context of reusing and processes that allow for the improvement of educational materials. While educational materials are designed and implemented through curation of existing knowledge and arguments from other authors (scientists, engineers, business and political leaders), they are seldom designed in such a way that the next person (e.g. teacher) using them can also adapt and improve them (Amiel et al., 2009, 2011). The principle of continuous improvement (remix, reuse, adaptation) is a central tenet of OER, but often "open" resources are confused with those that are simply offered for "free" online. Of course, this is not the case for the OER evangelists and important pockets of innovation (e.g. through projects).

One critical voice from education asked in 2018:

> So will we ever get to a Wikipedia-type model of teaching resources, with teachers freely giving and taking textbooks, lesson plans, and tests, refining and improving them, and sharing their improvements? There's no clear path right now to achieving that model—you can't will the proper ecosystem into existence, and overburdened teachers haven't built it up from the grassroots. Should we even want them to? (Berger, 2018)

For reasons related to priorities, resource scarcities and frameworks defining expected behaviours, only leadership, organisational policies and strategies can help mainstream such change (Atenas et al., 2019). The prize of increasing mainstreaming of OER is making a significant contribution to SDG4, i.e. improving the quality of education for all. Perhaps, for this reason, the UNESCO OER Recommendation (2019) singles out supportive policies as one of its key objectives. Governments should "develop or update legal or policy frameworks to stimulate the creation, access, reuse, repurpose, adaptation and redistribution of quality OER by educators and learners". Furthermore, they should encourage "… mechanisms to create communities of practice, promote teacher professional development using OER, create networks of experts of OER and properly recognise OER creation as a professional or academic merit" (p. 5).

The Master Programme on Leadership in Open Education, hosted by the University of Nova Gorica, Slovenia, has taken up the gauntlet of training a new generation of open education leaders who can fulfil these expectations. As part of this programme, two courses, Open Education Strategies (OES) and Open Education Policies (OEP), are of specific interest. Students are introduced to key concepts and case studies on policy and strategy for openness in education. In the sense of scaffolding and professional cognitive apprenticeship, students are provided with the tools and the opportunity to develop and critique their own strategies through frameworks, mentoring and exchange with external experts from the field. They are reminded of the UNESCO Guidelines for OER in that a specific OER policy may not be the best or only solution to ensure mainstream OER practice and, ultimately, the achievement of better quality learning opportunities for all. At times an OER policy should be (and is) integrated into other educational or digital policies to ensure that it makes a key contribution and does not remain a proverbial solution seeking a problem.

In this article, we will provide an overview of the Master's programme and a review of its development so far, in its second year. It will specifically highlight the methods used to support students on their journey towards becoming the next generation of open education leaders in the hope that this work can be expanded to cover more students and perhaps replicated and adapted in other settings worldwide. The chapter aims to present the (open) tools and strategies used in a specific course as a way to highlight the overall goals of the Master's programme. As such, it is aimed at university staff and educators who hope to incorporate principles of openness into programmes and teaching.

3.2 Leadership in Open Education

The Leadership in Open Education (LOE) study programme has been developed by the University of Nova Gorica in cooperation with the UNESCO Chair on Open Technologies for Open Education Resources and Open Learning at the Jožef Stefan Institute and an international team of experts, with all authors of this chapter being

involved. The main motivation was to support the implementation of the UNESCO OER Recommendation by building the capacities needed to meet its goals.

The programme development is rooted in experiences with the Open Education for a Better World (OE4BW[1]) global online mentoring programme (Urbančič et al., 2019).[2] The OE4BW programme connects developers of OER with OE experts volunteering as mentors, guiding developers from their idea to the implementation of OER. The response to the calls for developers and mentors to be included in the programme was global and exceeded all expectations, from 14 projects being developed in the first year, 35 in the second, 80 in the third and 104 in the fourth year, with more than 200 mentors actively involved. The programme's growth clearly proved the need for capacity building for OER development.

As required by the OE4BW calls, the contents of all projects are bound to topics supporting at least one of the 17 SDGs. Besides helping developers to achieve their projects (many of them talked about how their dream project became a reality), the programme is raising awareness and knowledge about numerous aspects of sustainable development, as thousands of users were exposed to the resulting Massive Open Online Courses (MOOCs), Open Textbooks and other materials covering specific themes related to peace and justice, quality education for all, public health issues, clean and affordable energy and more.

Last but not least, an important result of the OE4BW programme is also a growing network of OE experts and developers, fostered by coordinators, hub-coordinators and mentors, with developers taking increasingly responsible roles as they gain new skills, experience and professional connections through the programme and numerous collaborations that came out of it.

The approach in the OE4BW programme is pragmatic and has successfully achieved concrete results, namely, leading developers from their ideas to concrete OER. This is very important for spreading the use of OER and for moving away from the "starting from scratch" approach. Beginners often design resources without verifying the potential of reusing, combining or improving existing materials to contribute to needed adaptations, advancements and sustainability rather than multiplications of similar resources.

Despite the results of the OE4BW, the programme has some limitations regarding capacity building for OE. Namely, it has been designed to support developers wanting to learn and improve practical skills needed to implement OER. Although it is important, it is not sufficient to enhance the development of open education more systematically and on a larger scale. To this end, much more in-depth, interdisciplinary and holistic knowledge is needed, this is what we offer with the new Master's programme, Leadership in Open Education.

The Leadership in Open Education programme aims to prepare its graduates for the role of leaders that will shape the future open education ecosystem. In their professional work, they must consider strategic, pedagogical, technological, social

[1] See: https://oe4bw.org.

[2] The programme was launched and coordinated by two of the authors, Tanja Urbančič and Mitja Jermol, in 2017.

and managerial aspects. Moreover, they will have to understand how these aspects are interconnected. Only in this way will they acquire the competencies needed for a future managerial role in open education at the level of projects, institutions or communities. They will be prepared to work in formal or non-formal education at the national or international level—in all contexts where ecosystems of open education are to be developed, including strategies and policies for establishing or improving open education solutions. The graduates of this programme will also have the interdisciplinary knowledge needed for implementing these strategies, contributing to the progress of an inclusive knowledge society as mindful and skilled leaders.

The main three characteristics of the Leadership in Open Education programme are as follows:

(1) *Global*. It is truly an international programme with a team of professors and mentors from different backgrounds and parts of the world. The same holds for students as well. This provides a perfect setting for experiencing and practising learning and working with care and attention to different contexts, different viewpoints and needs in an inclusive and supportive way.
(2) *Holistic*. It does not favour technical, pedagogical, economical or any other specific strand but rather combines them into a meaningful whole. It does not matter if graduates focus on management, teaching or production of OER. They will have a holistic perspective in line with the role and the needs of other co-workers and stakeholders.
(3) *Leadership*. The programme's success will be measured by the success of its graduates in terms of their impact and contribution to positive developments through open education, especially to the achievement of SDGs.

In (1), the LOE programme very naturally connects with the OE4BW programme as both communities have some intersections and coexist with excellent opportunities to meet. However, the LOE goes far beyond the OE4BW scope in (2) and (3) and substantially contributes to the capacity building for open education.

Much emphasis is placed on critical understanding and development of the ability to select appropriate methods and technologies that are to be meaningfully used to solve current professional and practical as well as research issues in the field of open education. The aim of wider interdisciplinary integration is achieved mainly through teamwork and individual project work of students. Teaching is highly interactive, and discussions about current problems and trends are a vital part of it. Individuals and companies from a wider participating network are regularly invited to participate in the process and share their expertise with the students, providing them with additional information to help them build their competencies and future professional network.

The programme started in the academic year 2020/21, and the second cohort of students was enrolled in the academic year 2021/22. As it is a two-year programme, the programme still does not have graduates. As part of this programme, a specific course, Open Education Strategies, brings students a novel approach to thinking early on about policy-making and strategy-building for openness, which will be presented below.

3.3 Open Education Strategies Course

Following Mintzberg et al. (2009), strategy concerns itself with bridging the gap between goals for the future and the current situation. Common to all definitions and interpretations of the concept is that strategy (p. 16–18):

- sets direction
- focusses efforts
- defines the organisation
- provides consistency.

Strategy is, in other words, the general framework that expresses a commitment by a government or an institution to change and sets the direction for actions to be taken. It consists of a means-ends rationale, which considers the past and present situation, assesses the important forces affecting the situation and lays down success factors for achieving future changes through specific interventions. The framework provides consistency of purpose while defining the scope and scale of the collective activities and the expected changes. In the LOE programme, we utilise three main resources to help our students to develop and evaluate open education strategies.

Firstly, the UNESCO Guidelines on the Development of Open Educational Resources (OER) Policies (Miao et al., 2019) provide a blueprint that can be used to develop such strategies for open education.[3] It is set up to provide a toolkit approach to take the reader through steps and specific questions that will eventually lead to the drafting of a full strategy for open education. One of the key resources used in the LOE programme, it provides the students with a way of thinking about open educational initiatives in a structured and strategic way.

Still, strategic developments do not happen in a vacuum. Here, Minzberg et al. (2009) talks about "crafting" a strategy, as it must both link to the current situation and current practices and provide a vision for the future while offering stepping stones (measures, training, support, incentives) to help those involved in the space which should be changing to enact such change. This is very important, as people's daily lives are often characterised by a kind of balancing act between coping with current challenges and trying to keep an eye on how to reach future goals.

Secondly, we utilise the Open Policy Game in our learning programme, developed by the Brazilian Iniciativa Educação Aberta[4] (Open Education Initiative[5]), to help members of educational institutions and their leadership diagnose the current status of their practices using an open education framework. Key stakeholders can play this game in the strategy process to help them better assess the current situation and identify collective priorities. This can be used particularly well in the strategy

[3] One of the authors of this paper, Dominic Orr, was a lead author of this work.

[4] See: https://aberta.org.br.

[5] Co-lead by one of authors of this paper, Tel Amiel. The game can be found at: https://aberta.org.br/oe-game. The game is based on a guidebook, available at: https://guiaea.educadigital.org.br/o-guia/

design *gap analysis* phase *and* helps identify the key measures that become part of the strategic master plan.

As part of our course, we ask students to decide on a concrete open education policy they would like to evaluate and/or develop. Students usually select scenarios important to them: proposing a new policy for an institution, improving existing policy on a project they coordinate and the like. After making some first decisions on the scope and scale of their strategy, they use the policy game to work with stakeholders on assessing the gaps and identifying priority areas for action.

Thirdly, we have a further key resource, which is necessary to help us conceptualise, evaluate and design open education strategies. These are our students. The Master's programme specifically recruits internationally and encourages students who already have some expertise in elements associated with open education to apply. While some have specific knowledge and work in the field, others have connections to themes like distance education, free and open-source software and the like).

Since the purpose of the Master's programme is to nurture a new generation of open education leaders, our strategy programme also focusses on encouraging our students to fully utilise their own experiences and their own networks while building new ones from peer exchange both in the course and with experts from the field. We utilise a microblogging tool, which is an open-source platform in the Fediverse[6] environment, to achieve this goal. We want to encourage our students to exchange *publicly* on what resources and discussions they find in their networks while using a tool that follows free and open-source software principles.

3.3.1 Open Education Policy Game

The Open Education Policy game is designed as a board game to elicit discussion among invested stakeholders to identify gaps and priorities in their path to a viable open education strategy or policy. The game is available in three languages (Portuguese, English and Spanish) and has been used in diverse scenarios: from working and activist groups to state and federal governments.[7] The game is played with a small group of participants and a facilitator.

The game includes two types of cards: diagnostic and challenge cards. Diagnostic cards are used to elicit discussion on three important pillars of a viable open education strategy/policy: *legal, technical* and *pedagogical*. Each card exhibits a statement, questioning if a particularly important aspect of open education policy is in place (Fig. 3.1). One example of a legal theme would be: "tenders and contracts always include provisions for open licensing for various educational materials, including

[6] See: https://fediverse.party.

[7] As an example, the Game was used as part of the process which led to the implementation of the State Secretariat of Education OER policy for the State of São Paulo, in Brazil, one of the largest school systems in the world. See: http://www.educacao.sp.gov.br/lise/sislegis/detresol.asp?strAto=202107220063.

Fig. 3.1 Diagnostic card

publications". On the technical front, an example would be: "we have a privacy policy page on our digital platforms". Finally, in terms of pedagogical concerns, a discussion should surface around: "our educational policies are designed with the participation of the community".

Since the terminology in these cards can sometimes be complex for novice participants, a set of three challenge cards are included for each diagnostic card (Fig. 3.2). So, in the example above, "privacy policy" would be highlighted to signal a glossary card with three possible answers. Participants must first correctly guess and understand this term to answer the question ("do we have a privacy policy?"). For each diagnostic card, the group of participants has to vote (a simple yes/no), but if no consensus is reached, a discussion should ensue in order to understand the nuances and pertinence of the arguments. As consensus is built around these topics, the cards are positioned on a board (Fig. 3.3): if the card is on top, it signals a "yes" (this exists or is well implemented already); if it is at the bottom, it signals a "no" (needs to be addressed). The game then offers mechanisms to prioritise the challenges and help the group move forward in designing their policy.

Students were introduced to the game in an online session, where the teacher acted as a facilitator. Each card is shown on the screen in a presentation format, and the facilitator is responsible for tallying up votes and facilitating the conversation. A specific scenario that is common to all students is selected for joint analysis. In this case, they analysed their own Master's programme.

Fig. 3.2 Challenge card

Fig. 3.3 Open education policy game board

After this trial run, students are then asked to conduct the game with their specific audiences as part of the gap analysis phase in policy design. These results are then brought back for discussion with the whole group.[8] Having to conduct the game presents a series of challenges for students. First, as they are learning and grappling with the concepts, it provides them with a hands-on opportunity to challenge their knowledge of these issues. Second, conducting the game online demands that students plan and organise a session in a format that is conducive to conversation and exchange.

The pandemic made organising the game with representative participants a bigger challenge for students. Some invited a large number of participants, which made conversation and exchange more difficult. Others were only able to engage a certain subsection of parties (e.g. mostly administrative staff but no technical staff). Still, this "trial run" provides students with insights on how policy design can (and should) be conducted in a participatory fashion, improving the facilitator's understanding of the context while also bringing in potential future collaborators to policy design.

3.3.2 Public Exchanges Through Mastodon

During this course, 10 students interacted on a social network called Mastodon,[9] a microblogging platform. The selection of social media for this course was based on specific principles and provided challenges to students which were aligned with the competencies of the course and ethics of the programme. First, our goal was for students to professionally interact in an open and public space to publish reflections and thoughts on open education. This was meant to encourage students to identify how to engage publicly (as opposed to the existing safer space of the course chat system) but also develop a public figure within the field. Contrary to closed platforms such as Twitter, Mastodon can be seen as a more "safe" space to interact, as it has a substantially reduced base of users and provides less exposure to confrontation and conflict. Second, as part of open practice (Bali et al., 2020), the network provided channels for student–student interaction and ways for students to engage in specific-topic debates and bring on other readings and references, including news. Third, it is based on free and open-source software (Free Software Foundation, n.d.), which is an important aspect of open education and education in general. If we aim to educate students about the importance of free and open-source software as part of the design of their policy, we must also engage them in the challenge of experiencing new platforms and services and help reduce any stigma associated with free software. Students can then understand its robustness and possibilities by using a free, open communications platform. Finally, Mastodon allows for data extraction,[10] which allowed us to run simple but useful analytics on student posting and interaction.

[8] Examples of this process can be seen in reports published in our community. An example from a previous year can be seen in: https://zenodo.org/record/4728828.

[9] See: https://mastodon.online.

[10] Through an API, see: https://docs.joinmastodon.org/client/intro/.

For this purpose, one of the teachers in the course developed a free and open-source Python-based script[11] to extract, analyse and periodically present data on student posting and interaction. The script extracts all posts based on a single hashtag used by the students for every post (#oesloe).

The results were published over intervals online. They were available publicly with an open license. As explained to the students, the analytics were not primarily meant to provide an individual evaluation of engagement but to help understand how interactions were happening and track overall student engagement over time—opening up avenues for dialogue between students and teachers. Individual data on posting and replies are useful to identify if students are disproportionately unengaged in the course (e.g. if students post far less than others), which could signal a problem (difficulty or resistance in using the platform, lack of connections, hesitancy to exposure) and can lead to a personal contact by the teachers and student support. Once framed as such from the initial stages, analytics can become an interesting tool for finding novel forms of engagement and dialogue.

We were able to track the number of postings and replies by each student over time, as well as their interactions.[12] The data presented below is publicly available on the Mastodon instance and available for extraction by the public.

Figures 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10 and 3.11 show the number of original posts (a post using the #oesloe tag, indicating who submitted it); it also indicates, as a subset of these messages, who *replied* to others the most, indicating some form of engagement or conversation. First and foremost, there is an increasing number of posts and replies overall. There is also a larger number of original posts than replies, though the difference between them is not substantial as we reach the final stages of the course. When analysing original posts, both teachers (tamiel/dominicorr) are more engaged overall, but students greatly increase the number of posts over time. For example, once we began showing and discussing engagement graphs with students, which demonstrated that teachers posted the most, we encouraged students to spend more time engaging with each other and providing feedback on their comments and their work. In regards to replies, where student participation grows more slowly, there is a positive reversal—more students than professors engage.

Though students are generally familiar with common features of social networking (hashtags, mentions), we find that there is still a need to provide guidance on the profitable use of these platforms. This includes the targeted use of mentions (@) when necessary, and using the hashtag in every post so that the script can perform and everyone can zoom in on the conversation through a search or a bookmark.

The analysis of network interactions (Figs. 3.12, 3.13, 3.14 and 3.15) counts mentions (through @*username*) in each post, showing that a user mentioned/connected to another. The lines indicate a connection; arrows indicate the origin and destination, and stronger lines indicate a larger number of messages. The graphs above indicate substantial growth in interactions between students over

[11] See: https://gitlab.com/tamiel/mastodon-counter/.

[12] This instance of the course developed over a 13 week period.

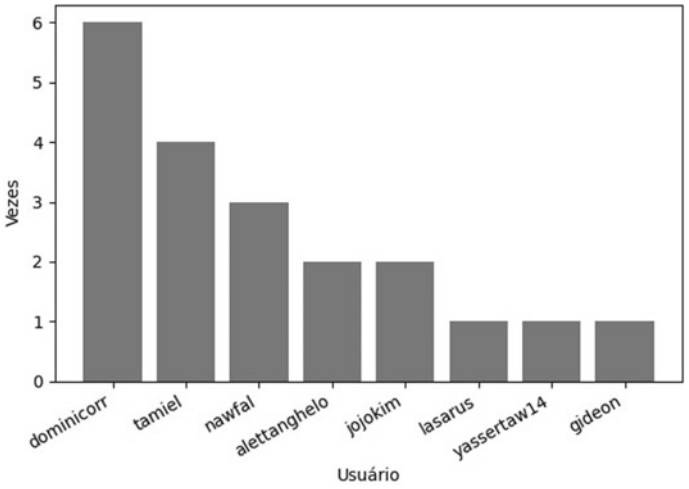
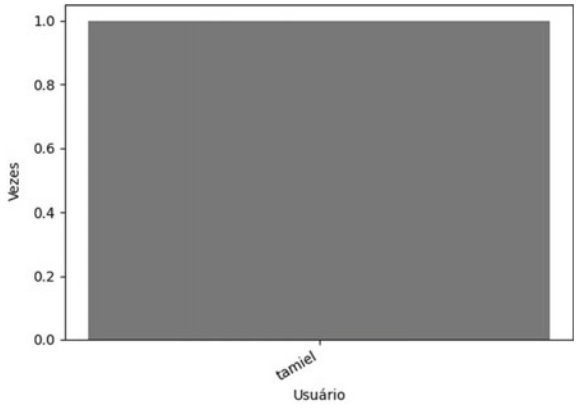


Fig. 3.4 Original posts after one week

Fig. 3.5 Replies to posts after one week



time. It shows how interactions are also less centred on mentions directed solely at teachers and shows a growth in mentions between students.

Some evidence of this can be seen in many posts towards the end of the course, where students began mentioning *all* participants in their messages. While this is unnecessary, given the use of the #oesloe tag to aggregate all user posts, it is a formal "direct" way to elicit a response. After eleven weeks of the course, the final graph (Fig. 3.15) indicates where these interactions were more fruitful. This happens between a few students where lines are stronger and bi-directional, showing some form of sustained dialogue. In other words, though some students posted messages mentioning (@*username*), the graphic helped us see where conversations seem to be most sustained.

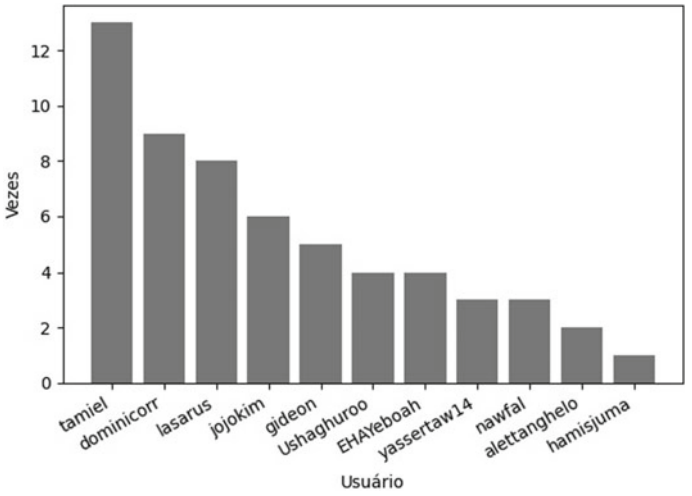
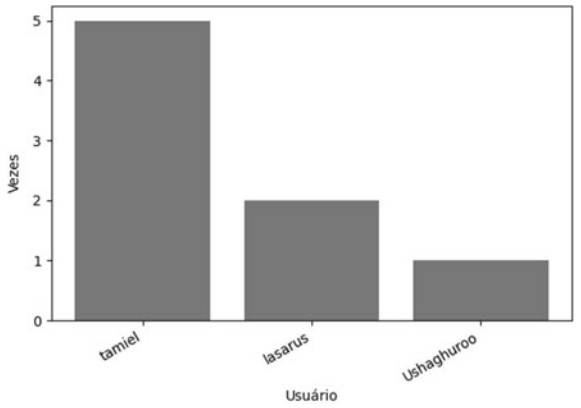


Fig. 3.6 Original posts after four weeks

Fig. 3.7 Replies to posts after four weeks



The graphs provide a limited but easy form to gather information regarding course postings and replies. When used as a regularly updated, open dataset, it can provide a quick and interesting snapshot into conversations and help provide insights into course dynamics.

3.4 Discussion and Conclusion

Social network analysis is a rich field of inquiry, and the goal of this paper was not to specifically address the content and quality of the interactions. Analysis of the

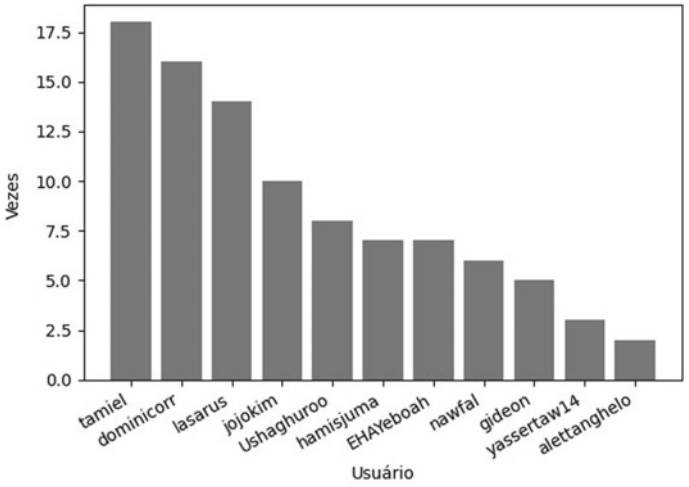


Fig. 3.8 Original posts after eight weeks

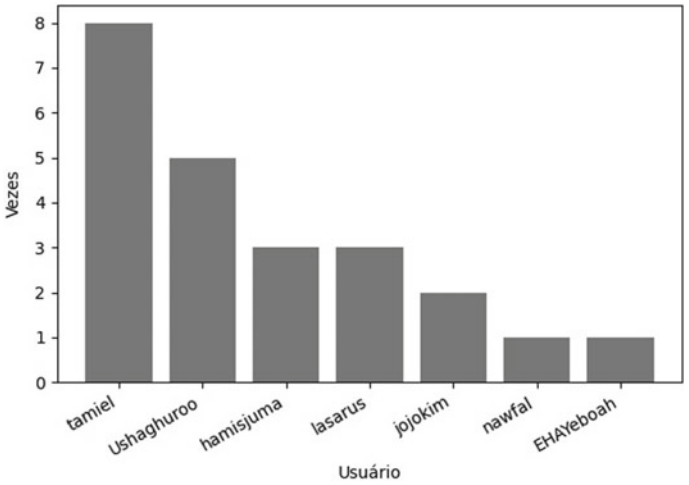


Fig. 3.9 Replies to posts after eight weeks

conversation can be achieved through automatic means to indicate, for example, if students are asking questions (Neto et al., 2020). The script used for the quantitative analysis also extracts the full content of the posts, and this data provides valuable content for future research.

The LOE programme is a pioneering example of professional development focussed on addressing the need for leadership in the open education space. It is a strong international programme with a holistic approach to open education. At the same time, it is an evolving laboratory for open practices. Here, we presented an

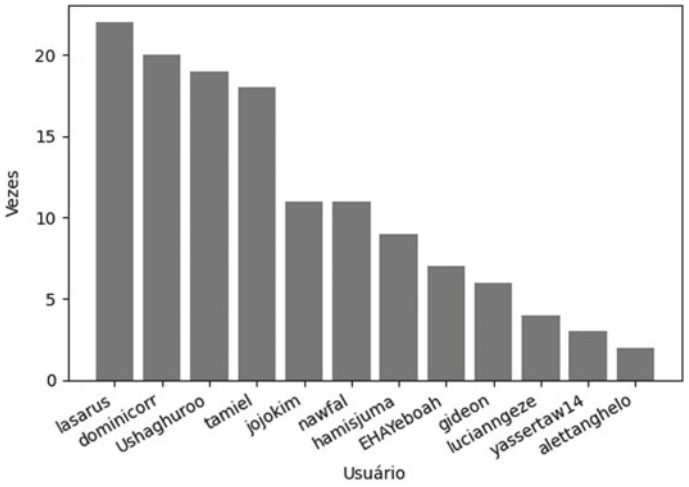


Fig. 3.10 Original posts after eleven weeks

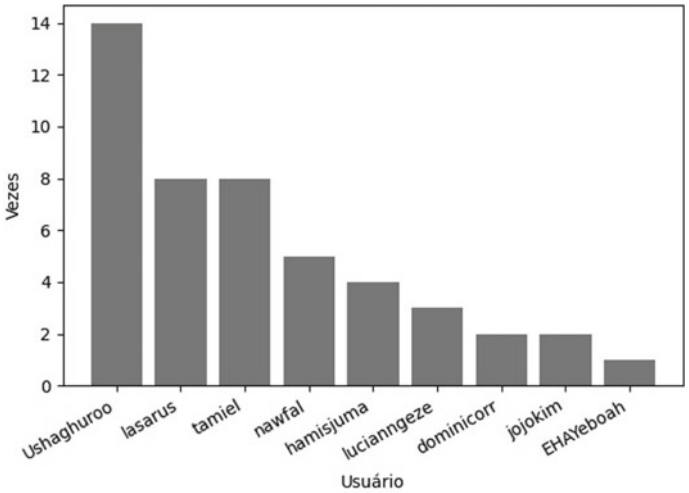


Fig. 3.11 Replies to posts after eleven weeks

attempt to make use of open practices through the implementation of the Open Policy Game and the use of free and open-source systems, including simple analytics, in a course dedicated to the design of an open policy document. The reports produced by the students also demand that they make their work publicly available with an open license in an open repository.[13]

[13] See: https://zenodo.org/communities/loe.

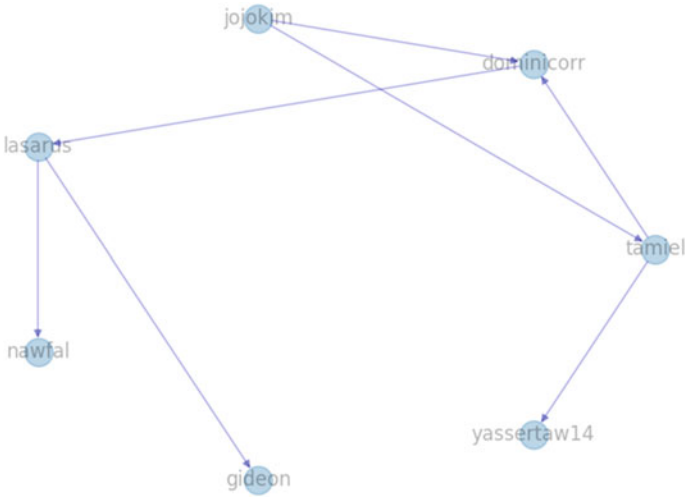


Fig. 3.12 Interaction graphs after one week

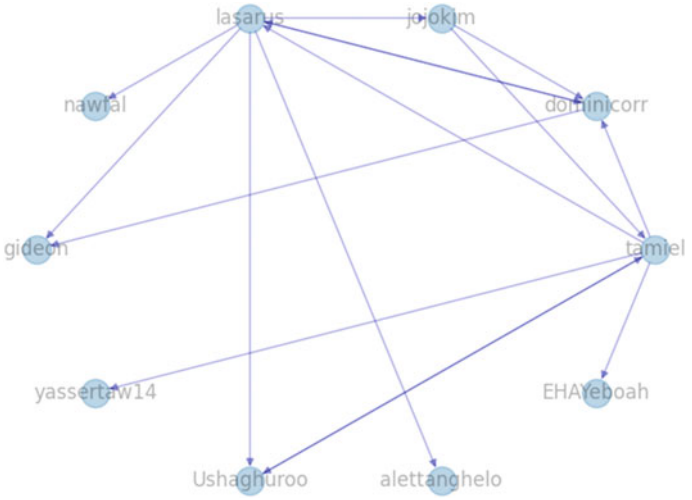


Fig. 3.13 Interaction graphs after four weeks

Regarding the Game, work is underway to use dedicated online systems for gameplay,[14] particularly as the COVID-19 pandemic demands more hybrid forms of engagement. Regarding the script, future work can be done to automate data collection, provide a timeline to see changes in engagement and improve and provide

[14] See a draft implementation in: https://tabletopia.com/playground/openeducation-uurt7v/play-now.

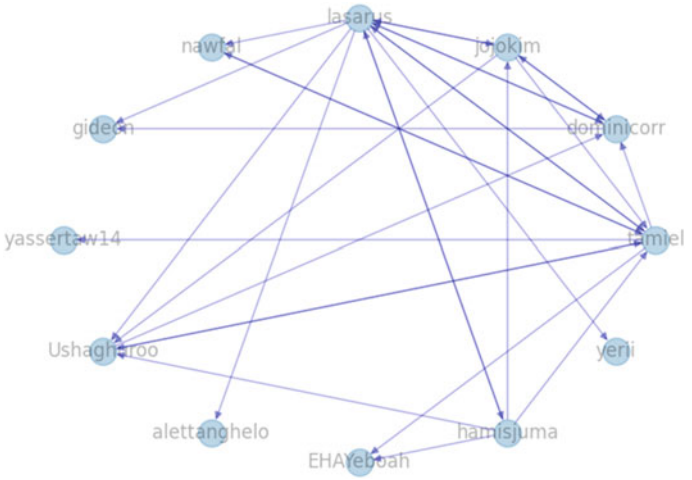


Fig. 3.14 Interaction graphs after eight weeks

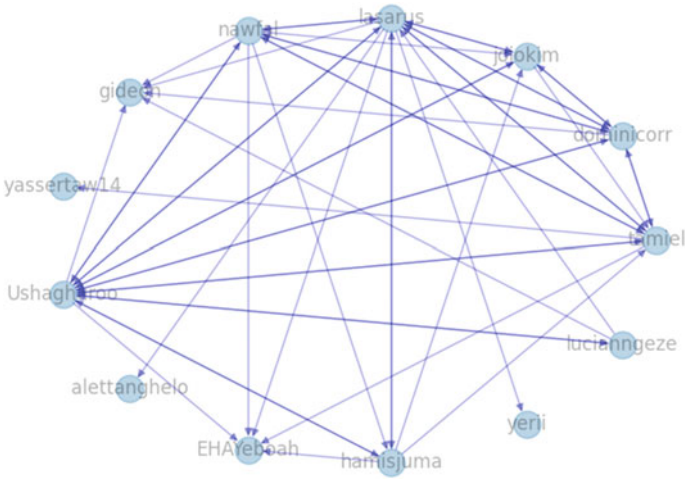


Fig. 3.15 Interaction graphs after eleven weeks

further analytics. Also, a best practices tutorial or simple guide on making productive use of the Mastodon for educational purposes seems to be warranted to improve student engagement (which could be done by the students themselves).

The programme is still in its initial stages and there is much more to be learned (and modified) as new cohorts join and new iterations of courses occur. This is especially relevant given the novelty of formal graduate-level programmes in the field of open education. As the programme and courses evolve, the community of teachers and students continuously reflect on this experience in an attempt to conduct small-scale

investigations for improvement, as is the case here (Adams, 2007). We hope that with this, the LOE programme can continue to sustainably implement open practices as it also helps contribute to their meaning and significance in higher education.

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Chapter 4
Open Educational Resources: The Promise, Practice, and Problems in Tertiary and Post-secondary Education

Deborah Anne Banker and Dana Kay Manning

Abstract Prior to the 2020 and the COVID-19 pandemic, the use of open educational resources (OERs), a term coined by UNESCO in 2002, was steadily increasing in popularity among instructional designers and instructors in academia (Lim, Wee, Teo, & Ng, 2017). The pivot to online instruction because of the pandemic clearly highlighted the largely forgotten inequity issues created by the digital divide (Education Connection, 2020). With a clear focus on inequity in access to education, designers and instructors were made aware that OERs would greatly benefit their students in face-to-face, hybrid, and online courses (Chakchouk & Giannini, 2019). However, using OERs has presented unique challenges and solutions (Penn State, 2021). The purpose of this narrative review is to explore the perceived promises of OERs, examine current practices in the use of OERs, and identify how the problems and solutions associated with the use of OERs could be used to inform policy decisions at varying levels of higher education.

Keywords Open educational resources · OERs · Digital divide · Equity access · Educational resources

4.1 Introduction

Prior to the 2020 and the COVID-19 pandemic, the use of open educational resources (OERs), a term coined by UNESCO in 2002, was steadily increasing in popularity with instructional designers and instructors in academia (Lim et al., 2017). According to UNESCO (2021), OERs are teaching, learning, and research materials in any medium—digital or otherwise—that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation, and redistribution by others with no or limited restrictions.

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One of the earliest providers of OERs was Project Gutenberg, which was established in 1971 by Michael Hart (Project Gutenberg, 1992). Project Gutenberg's mission statement is "to encourage the creation and distribution of eBooks" (para. 2), and, as of this date, it has over 60,000 free eBooks, as well as projects in Australia, Canada, and Germany. In Europe, the European Network for Catalysing Open Resources in Education (ENCORE) project has undertaken the task of defragmenting the different OER stakeholders in Europe (ENCORE, 2020).

Another early source of OERs is the Internet Archive, which was established in 1996 with a mission statement of providing "universal access to all knowledge" (Internet Archive, n.d.). The Internet Archive provides users access to free books, movies, software, music, websites, and other materials.

In 2008, OER Africa was established by the South African Institute for Distance Education (SAIDE) (OER Africa, 2022). Furthermore, UNESCO reports that the Institute for Information Technologies in Education (IITE) has other projects involving OERs in Armenia, Azerbaijan, Belarus, Kazakhstan, Moldova, and the Russian Federation, Uzbekistan, Latvia, and Lithuania. They have also expanded their OER projects to include Japan, the People's Republic of China, Brazil, Turkey, and Vietnam (Wang & Zhao, 2011).

The overall benefit of global OER initiatives is that these materials are, by and large, digital and accessible without cost by anyone anywhere in the world via the internet. Through the OER pipeline, users can copy, share, enhance, or even modify the resources when their purpose is disseminating knowledge for education (Roncevic, 2021).

Worldwide, there has been an increase in the number of college online degrees and courses. In Canada, approximately two-thirds of colleges offer online programmes and degrees (Ubell, 2022). Mexico has greatly expanded its online course and degree offerings in Mexico and Central America (Lloyd, 2010).

The United Kingdom, Europe, the United States, and Russia also have demonstrated robust and burgeoning expansion of their online degrees and courses (Elagina, 2021; Gaebel, 2021; Hughes, 2018). Africa has launched a mobile technology initiative to deliver education and tutoring through social networking services (Hughes, 2018). According to a market research report on the general global population, 23% believe that higher education in their respective countries will be entirely online, and 49% believe it will be delivered online and in person (Buchholz, 2020). It follows that with ever-increasing access to the internet and the push for equity in learning, educational materials, and resources being offered in an open delivery modality offer the promise of OERs to alleviate the skills and training needs of individuals seeking higher, tertiary, or post-secondary education in a global economy.

The pivot to online instruction because of the pandemic brought into clear focus the almost forgotten inequity created by the digital divide (Education Connection, 2020). The sudden shift from supplementing traditional education with OERs to using them to support fully online teaching further highlighted the vast inequity in access to education and educational resources. As a result, designers and instructors were suddenly reminded that OERs would greatly benefit their students in face-to-face, hybrid, and online courses (Chakchouk & Giannini, 2019).

The financial toll higher education students faced from the pandemic was, and still is, tremendous in that many "students have faced a distressing change in their employment status" (Chhabra, 2020, para. 3). This change has resulted in students having less money to spend on learning resources, such as textbooks, and other materials, such as internet subscriptions. In a survey conducted in the United States by Safier (2020), researchers found that 81% of college students faced financial struggles due to the COVID-19 pandemic. More than a quarter of these students could not pay bills or purchase food, let alone pay for learning resources. Therefore, OERs became the solution to providing students with the resources they needed to master the content of the courses they were taking without additional expenditure.

Simply shifting from blended instructional delivery modalities to primarily online modalities created challenges and solutions for implementing the use of OERs in a multitude of educational environments and at all levels (Penn State, 2021). The following will be a more in-depth exploration of the promise of OERs that will be viewed and contextualised with current practices in their use and applications in the United States. Finally, the problems associated with using OERs will be balanced against solutions for those problems to inform policy decisions from a narrative review perspective (Fig. 4.1).

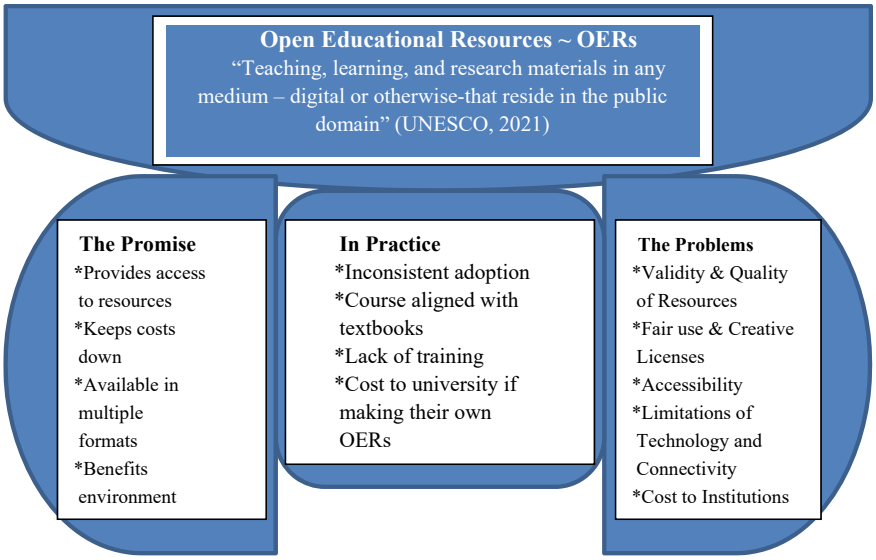

Fig. 4.1 The promise, practice, and problems with OERs

4.2 The Promise

The ideology behind OERs is that they serve students by providing access to the resources necessary to learn. Specifically, by using OERs, students can keep educational costs down and, more importantly, have on-demand access to videos, texts, subscriptions, platforms, and other commonly used classroom resources at no cost to themselves or the instructor. With the delivery modality of the internet, OERs are widely and universally available. According to Roncevic (2021):

- technology has made the cost of sharing OERs practically non-existent;
- given their digital nature, OERs can be modified to fit various needs;
- OERs help accelerate the advancement of human knowledge;
- due to ongoing technological improvements, OERs can reach learners faster than print textbooks;
- OERs allow students and parents to save money at a significant level;
- OERs promote self-directed learning;
- OERs reach large numbers of learners at the same time, regardless of their location;
- OERs have revolutionised the way remote students or long-distance learners approach education; and
- OERs allow for a more extensive peer review process (para. 6).

The impact of OERs cannot be understated, especially for first-generation college students. For example, Nusbaum et al. (2020) found four major effects for first-generation college students due to the high costs of textbooks alone. Most importantly, first-generation college students take fewer classes to offset the cost of textbooks and materials; second, they will not register for specific classes requiring the purchase of textbooks and materials; third, they will drop a class once registered because of the cost of the textbooks and materials; and fourth, they will earn a lower grade or even fail a course because they could not afford the textbooks and materials. Therefore, the promises of OERs concerning first-generation college student retention is an important consideration in that students and families can save a great deal of money on college costs, particularly regarding textbooks and materials. More importantly, the use of OERs could alleviate equity issues and better support students toward persistence to graduation.

While the use of OERs has been addressed at the university level, it remains relatively new in other tertiary or post-secondary education, particularly in the United States. While many countries worldwide offer tertiary education (educational programmes beyond secondary or high school; see The World Bank, 2021), the United States has yet another level of education; the community or junior college. Specifically, tertiary courses in many countries (except Canada and the United States) focus on trade or technical education to prepare students to enter or advance in the workplace. In the United States, this additional level of community or junior college serves as a two-year alternative route to formal university studies or a stand-alone

programme for career preparation or advancement. Students entering a community college immediately following high school graduation usually work on state-mandated college-level core curriculum classes or enter a formal trade programme. Those students who intend to transfer to a university or baccalaureate programme often use the two years of studies at the community college level to pay for those state-mandated core curriculum courses at a reduced rate, which allows them to focus on the selected course of study or major once they begin university while saving on tuition costs. Those entering the trade programme often earn their certification through courses provided at the community college.

According to the Community College Research Center, community college enrolment accounts for approximately 32% of all students enrolled in undergraduate programmes in the United States (Teacher's College, Columbia University, n.d.). In 2019, there were 16.6 million students enrolled in post-secondary education (NCES, 2020), and in the spring of 2021, approximately "4.5 million students were enrolled in public two-year colleges". Importantly, community colleges "remain the most affected sector of higher education by COVID-19, down 9.5% from a year ago, the same rate of decline as the fall" (National Student Clearinghouse Research Center, 2021).

The largest of the community college systems in the United States is the California Community Colleges System, which has 115 different campuses (https://www.cccco.edu/). Statistically, this system represents approximately 1.8 million of the 4.5 million students enrolled in community colleges across the United States (California Community Colleges, 2021). Ten other community college systems account for the majority of the remaining 2.7 million students, with the State of Texas holding the largest number of enrolled students at 332,000 (College Evaluator, 2021; National Center for Education Statistics, 2020; Petrova, 2019).

Unlike tertiary programmes around the globe, community college is not free in most states or communities in the United States. Many students must apply for scholarships and grants to pay for college tuition and housing (community or university), in addition to paying the costs of textbooks and other local fees, which are often hundreds of dollars (Wang, 2013). To combat challenges to student enrolment and participation in community college due to textbook costs, the State of California initiated a grant programme whereby campuses in each region of the state could apply for planning grants and implementation grants to institute a formal OER programme; this represented a positive shift towards improving accessibility to college for all students (California Community Colleges Chancellor's Office Educational Services and Support, 2021). While important to improving access and making college more affordable for all students, initiatives and grants such as these do not account for or address students who enter tertiary programmes through yet another avenue, the dual credit or dual enrolment college path.

Dual credit and dual enrolment programmes allow high school or secondary students to enrol in college courses while still completing their high school (secondary) education. Depending on the state and community, programmes such as these may be limited to those students in their last two years of high school, or they may limit the number of courses and credit hours a student may attempt while

in high school. Many programmes tout the potential for high school students to earn their associate of arts degree before graduating from high school.

Dual enrolment refers to students taking courses concurrently at both their high school and a college, while dual credit usually refers to students taking a course for which they earn both college and high school credit (see also greatschoolspartnership.org, 2014). The purpose and benefits of such programmes for high school students have been widely studied (see Fink et al., 2017; Grubb et al., 2017), but ultimately pare down to finances and creating opportunities for students who typically do not view college as an option (Hooker et al., 2020).

There are usually three delivery formats for dual credit courses. In no particular order, the first is when the college course is taught at the high school by a college instructor; the second is when a college course is taught at the high school by a regular classroom teacher who also meets the requirements of a college instructor, and the third approach is when the student travels to or takes online courses at the college.

It is important to note that instructors in the community college system are typically not required to hold terminal degrees in their field; rather, they are usually required to have at least 18 graduate-level hours in the content for which they are teaching if it is a class that is considered a core of each state's post-secondary curriculum requirements. Additionally, instructors of career and technical education (CTE) programmes must have a certain number of hours or years working in a field or profession to teach at the community college; however, requirements may vary from programme to programme and state to state.

Dual credit and dual enrolment courses are often subsidised by the state or county and provided to the student at a reduced cost per unit, if they charge anything at all, provided that the student meets a myriad of requirements. These fee reductions are not free and come at a cost to at least one of the partnering programmes. For example, when tuition was waived for students in Texas, "community colleges bore 77% of the cost compared with averages of 11% for districts and 12% for students" (Miller et al., 2018, p. 140). On the other hand, when a school district was required to pay the tuition for dual credit students, "community colleges paid, on average, 41% of costs, school districts paid 47%, and students paid 12%" (Miller et al., 2018, p. 157). It is in those student costs, especially textbook-related ones, where fees could be minimised by using OER (Hilton, 2020). This is particularly important for dual credit and dual enrolment students since they are ineligible to apply for or receive federal financial aid (those aid packages require students to have already earned their high school diploma). The use of OER in state-mandated core curriculum courses or CTE certification programmes for dual credit and dual enrolment high school students could create more opportunities for participation in post-secondary education, especially for underrepresented groups, including ESL learners, rural, and African–American students (see Hooker et al., for a discussion on ESL learners' access to dual enrolment courses, Lawrence & Lester, 2018 for a perspective on the effectiveness of OER in an introductory government course, which would be required in a state core curriculum, and Giani et al., 2014, relating to the potential of dual enrolment to help low-income and first-generation students).

Another promise and impact of OERs is their benefit to the environment over the use of print materials. Having multiple content resources available on a single student's electronic device can significantly reduce the individual's negative impact on the environment (Rivier University, 2019). In addition, content materials can be easily updated in digital format compared to the amounts of chemicals, air pollution, and paper that must be created and used to print updated versions of educational materials.

With these "promises", students and families can better budget for college costs and financing and easily access the required materials; however, has this ideology led to a fundamental change in the way colleges and other systems of higher education conduct business?

4.3 The Practice

Globally, post-secondary education is structured in many different configurations. Post-secondary refers to any education beyond the compulsory schooling required by the laws of national or regional governments for children between certain ages (Dulger, 2020). Post-secondary education can also be referred to as tertiary education or higher education. The following is an overview of the current practices in higher education and other tertiary educational institutions.

4.3.1 Higher Education

Even before the COVID-19 pandemic, policy trends in higher education were focused on rethinking what education needed to look like to meet the demands of the rapidly changing global economies and student demand (Soto & Lee, 2019; Alquézar-Sabadie et al., 2014). There is consensus about the importance of post-secondary education. For example, in the United States, degrees and certifications allow those in the workforce to compete for higher-skilled and higher-paying jobs. However, the industry contends that workers are not adequately prepared to meet those needed higher skills. In other words, traditional post-secondary education has not changed enough to meet the demands of a global and technical economy, particularly in the United States.

Globally, the progress in adopting OERs is uneven (Tlili et al., 2020a). Hylén (2006) offered an overview of the international use of OERs in higher education:

- Over 150 universities in China participate in the China Open Resources for Education initiative, with over 450 courses online.
- In France, 11 top universities formed the ParisTech OCW project, which offered over 150 courses (Wiley, 2007).

- Nine of the most prestigious universities in Japan are engaged in the Japanese OCW Alliance, which offers over 250 courses in Japanese and an additional 100 in English.
- Seven universities in the United States have large-scale OER programmes (MIT, Rice, Johns Hopkins, UMGC, Tufts, Carnegie Mellon, and Utah State University).
- Altogether, there are over 2,000 freely available university courses currently online.

Furthermore, additional OER projects are emerging at universities in Australia, Brazil, Canada, Hungary, India, Iran, Ireland, the Netherlands, Portugal, Russia, South Africa, Spain, Thailand, the UK, the US, and Vietnam (pgs. 3, 4). In addition, Tlili et al. (2020a, b) found that two countries in the Middle East, namely Bahrain and Saudi Arabia, also have OER initiatives.

Even though academia is gradually adopting some forms of OERs around the globe, there are impediments to this progress. For example, many instructors and professors prefer to have a curriculum and course guide based on a textbook selected by the instructor or the department. Innovative teaching practices examine scaffolding methodologies from basic to the more complex concepts to be learned in a dynamic learning environment for which many instructors and professors have little to no training. They miss the opportunity to embed OERs into their courses by relying solely on a textbook. Not only do they not have dynamic learning environment training, but they also do not have digital pedagogic skills (Alquézar-Sabadie et al., 2014).

4.3.2 OERs in Other Tertiary or Post-Secondary Education—An Example from the State of Texas, United States

Of the ten largest US community college systems (excluding the California system), six are in the state of Texas. Systems must improve how they provide these opportunities to students to improve the use of OER in community college systems and encourage more high school student participation in early college programmes such as dual credit and dual enrolment across the United States. Using posted information found on each system's website, it appears that even colleges in the same state have distinct differences in costs related to dual credit and dual enrolment tuition and textbook fees. For example, in the Dallas College System, which is the largest in the state of Texas, with nearly 75,000 students (National Center for Education Statistics, 2020), books and materials are automatically included in the course fees, but the student is still required to pay for the textbooks, even when somebody else pays the tuition. This approach, referred to as "IncludEd," allows the system to include the books as part of the fees for each course, but it also commits the student to pay the textbook cost as dictated by the textbook publisher or IncludEd participant. Sometimes these costs are higher than what the student would pay on the open market.

Thus, many dual credit students and traditional students opt out of this programme when registering for courses each semester. However, if they opt out of the IncludEd programme, these young dual credit high school students must be mature enough to scour the internet or local bookstores to find less expensive copies of the required textbooks, which could impact their success in the course and programme, especially if they wait until the course begins before searching for the required resources. For first-generation students, this is especially problematic (Nusbaum et al., 2020).

In the Lone Star College System, dual credit students pay reduced tuition, but must order and pay for their own textbooks. This is similar to what dual credit students in the Houston Community College system must also face. Regardless of residency (in-county dual credit students do not pay tuition, but out-of-county students do), all dual credit students must pay for their own textbooks. Tarrant County, located near the Dallas metropolitan area, requires dual credit students to pay for tuition, textbooks, and fees; however, many school districts subsidise those costs for their students unless they are part of a formal early college programme in partnership with the college (Tarrant County College, n.d.). Collin College dual credit and dual enrolment students must pay for their tuition and textbook costs unless they are eligible to receive free and reduced lunches through the federal government. If the student participates in this programme, most tuition and campus fees are waived but not the cost of the textbooks. Lastly, San Jacinto Community College, with nearly 31,000 students, charges dual credit students only 25% of tuition, which may be covered in full by the student's high school campus.

According to the National Center for Education Statistics (2020), outside of Texas and California, the states that comprise the majority of community college post-secondary and tertiary enrolment, three other community college systems enrol a large number of students: Ivy Tec Community College (Indiana, enrolment 63,809), Northern Virginia Community College or NOVA (includes the tri-state areas of Virginia, Maryland, and Washington, District of Columbia, enrolment 52,873), and Eastern Gateway Community College (Ohio, enrolment 40,036). Interestingly, Ivy Tech has moved to free textbooks and free class tuition for all students after the student pays for the first 12 h, which equates to about four courses. However, dual credit courses taught at the student's high school are free. Conversely, NOVA Community College requires dual enrolment students to pay for their tuition and their textbooks. Finally, Eastern Gateway Community College in Ohio does not charge dual credit students for tuition, fees, or textbooks.

Dual credit and dual enrolment data are difficult to evaluate since each state reports student enrolment, participation, and completion according to individual state guidelines. Federal reporting requirements do not always align with state reporting, which leaves a large gap in knowledge regarding student involvement and access to such courses (see Zinth et al., 2019). However, current research suggests that, especially during the global pandemic, large numbers of students are not participating in dual credit and dual enrolment programmes (Zinth et al., 2019; Fink et al., 2017).

4.4 Problems Encountered and Viable Solutions

No programme, initiative, course of action, policy, or regulation is immune from problems, challenges, and issues. So, it is with OERs as well. Below are the most common problems encountered with OERs from the current research literature balanced with viable solutions. These challenges are validity and quality of resources, fair use and creative commons licenses, discoverability and usability (accessibility), and limitations of technology and connectivity.

4.4.1 Validity and Quality of Resources

The thought of finding open educational resources and the freedom with which they can be used, reused, and repurposed without cost to the learner can be overwhelming (Camilleri et al., 2014). However, with so much information freely available on the internet, there is no guarantee that the information found can be trusted in terms of validity and quality (Yuan & Recker, 2015). It will be up to the discretion of the instructor or the course designer, in conjunction with a content expert, to evaluate the OERs. The library at Victoria University in Australia offers its instructors an authority, accuracy, currency, and relevance (AACR) protocol for OER validation. Authority refers to who the author of the OER is. For example, are they an individual expert in the field who has published extensively on the topic? Are they a publisher? What is their reason for publishing the information? Is the OER located on a reputable website from a reputable organisation? Accuracy refers to whether the information contained in the OER is accurate; currency tells the user of the OER if the information is up to date for the topic; relevance tells the user if the information will be useful for the subject being taught.

Another author, Veletsianos (2021), suggests three questions to ask about an OER to ensure no structural inequities inherent in their use. First, who has created the OER? This is similar to the authority criterion used by Victoria University. To provide a more diverse look at a content area of an OER, is the author from an underrepresented group? Second, who is represented in the OER and who is not? Are the people represented in the OER representative of all peoples, and are they represented in an unbiased and empowering way? Third, which individuals or organisations are cited in the OER? Are they biased in some way that would lead to inequity in representation? All these questions must be addressed to achieve inclusion and equity.

Several other checklists and rubrics are available online to guide OER users in selecting criteria to help ensure the validity and quality of the OERs they wish to embed in their courses. The University of British Columbia in Canada (n.d.) offers a quick checklist for faculty users of OERs that is available through a Creative Commons Attribution 4.0 International License. Achieve (2021) is a US-based organisation created by a group of bipartisan governors and business leaders that offers OER rubrics and training materials for evaluating OERs. Further, iRubric (2022)

offers an "evaluating OER rubric" that is customisable for the user and is freely available online.

4.4.2 Fair Use and Creative Common Licenses

According to Atkins et al. (2007), "intellectual property issues are at the heart of OER[s]" (p. 27). Specifically, a lack of understanding of fair use and Creative Commons Licenses may cause many instructors and creators to hesitate to use OERs because they do not understand what can and cannot be used and what credit needs to be given. Without a clear understanding of fair or acceptable use and Creative Commons Licenses, many instructors miss the opportunity to embed free resources in their courses that could support student learning and success.

As a brief and concise definition, "fair use" is a term that means permitting the use of copyrighted-protected works in specified situations or circumstances (US Copyright Office, 2021). There are approximately 200 countries that are members of the Berne Convention, which is the international copyright treaty that has similar limitations to copyright use, albeit to varying degrees. The Berne Convention is for the protection of literary and artistic works (World IP Registration House, 2022). In most instances, using copyrighted works by educational institutions and noncommercial entities for educational purposes is considered fair; however, limits can be placed on how much of the work can be used and in what context. Those limits are defined in copyright law, but the lines often can be blurred and require an expert in the field of regulations to interpret those uses. Creative Commons licensing refers to materials "where those who wish to share their works can do so easily, and where those who wish to build upon the works of others can readily locate free and open resources" (McGinnis, 2021). McGinnis (2021) further explained that there are six types of Creative Commons Licenses from which the creator of the work must choose one to assign to their work. The type of license will then stipulate what can and cannot be used from the work and under what circumstances. Again, the rules for each license can be confusing and, in many instances, may need an expert in the field of creative commons licensing to assist the creator of the work and the user of the work to correctly interpret the intent of the license and the work.

There is a possible solution for higher education institutions regarding fair use laws and the Creative Commons licensing involving human capital. The higher education institutions would need to employ experts in those fields who could be a part of the library staff or the office of legal oversight. If experts are not easily found for employment, then the educational institutions could secure training for current employees to become experts in fair use laws and Creative Commons licensing. It is to be noted here that locating, training, and employing such individuals would depend upon the respective government regulations of the countries where the educational institutions are located.

4.4.3 Discoverability and Usability (Accessibility)

A great deal of time is required to locate, adapt, or modify OERs, ensure they are accessible and correctly copied or linked into the educational institution's learning management system (LMS), and determine whether copyright issues exist (University of Maryland, 2021). Solutions to such concerns include the use of instructional designers and librarians who specialise in assisting educators to "find, adopt, adapt, and create OER[s]" (Penn State, 2021, para. 2). In addition, many academic libraries, and other institutions, such as the National Archives (in the United States), are curating and preserving digital repositories (Atkins et al., 2007). It will ultimately be the individual instructor's responsibility to locate the archives, instructional designers, or librarians who could assist them with locating and adapting the materials for their courses.

In the largest study done to date (in 2020) by the American organisation Achieving the Dream, it was found that students who completed multiple OER courses earned more college credits than students who took no OER courses. It was also found that the students who took OER courses had very comparable cumulative GPAs to the students who took non-OER courses (Achieving the Dream, 2020). It could, therefore, be assumed that the benefits of OERs for students demand that they be used. An adjustment to the time requirements of instructors outside the classroom for research, publications, service, and committee work should be made to give instructors the time to discover OERs for their courses and classes and adapt them for use.

4.4.4 Limitations of Technology and Connectivity

Unstable or slow internet connections can hinder the availability of digital OERs for many students. These resources may also be published in digital formats that are difficult to "download, access, and modify" (University of Maryland, 2021, para. 2). To provide some solutions to the technology issues students may face, Miller (2020) offers the following suggestions:

- For video files, record them in a lower resolution. Hi-resolution videos take a great deal of time and space to buffer for delivery and downloading.
- If you are speaking to students and do not need to film yourself, use an audio recording. Audio-recorded files are much small than video files.
- If what you are trying to communicate can be done in text, or text with images, use this instead of videos.
- To communicate visually, use images or infographics.
- Have students create files offline using programmes that will allow them to create documents, spreadsheets, slides, and so on; they will only need the internet briefly to submit them.

- Provide students with templates, graphs, graphic organisers, or other documents that they can download and use offline. When the items are completed, the student can then submit them through brief use of the internet.

A more difficult issue to resolve is the availability of the internet to all who desire to use it. Connectivity can be an individual user's, an institution's, or a community's problem. Solutions for each of the aforementioned can be complex and can rely upon local, regional, or national politics, as well as government regulations and policies for their citizenry (Abbate, 2022).

Individual user connectivity issues can be resolved in several ways. On an individual level, if the problem is a lack of a computer or funding for computers, various solutions are possible. Computer scientists in India have lent their time to develop "simple, low-cost, low-energy computers that would provide a multilingual interface and could be shared among the residents of a village" (Abbate, 2022). In addition, Abbate (2022) describes another computer scientist, Mary Lou Jepsen, who "invented an inexpensive, power-efficient screen readable in outdoor light" (para. 32). One-to-one initiatives (e.g., one laptop for every student), where educational facilities provide computers to students free of charge, should also be considered.

Regional solutions have been very innovative during the pandemic. In the United States, some rural teachers and schools either had complete lessons packed up for individual students and had the schools deliver them to individual homes or opted to put all lessons on flash drives and had those delivered to students' homes every two weeks (Levin, 2020). Levin (2020) explained that in other areas, school districts with idle school buses converted them into mobile Wi-Fi hotspots so that bus drivers could move the mobile hotspot from neighbourhood to neighbourhood or small town to small town, enabling students to log into classes. In Peru, the Ministry of Education used television channels to reach up to 85% of its students. They also partnered with local radio stations to reach students in the country's more remote areas (Muñoz-Najar et al., 2021). In other countries, such as Botswana, Mozambique, and Zambia, educators used mobile phone platforms for educational content, whereas in Azerbaijan, Egypt, and Poland, they used telephone landlines (Muñoz-Najar et al., 2021). Whether or not these solutions are sustainable beyond the pandemic is yet to be discovered.

National solutions will require work among policymakers and ministers at the national level in individual countries. Technology infrastructure and access for the citizens of the various world states are the separate domains of those states (Freedom House, 2021). There are many issues to be decided and resolved by individual governments that are beyond the scope of this chapter.

4.4.5 Costs to Institutions

The pivot to fully online instructional delivery became a global reality in the spring of 2020 due to the COVID-19 pandemic; however, instructors and professors were

given minimal to no training when moving all their courses online. Universities and other educational institutions adjusted by using or purchasing learning management systems, introducing video platforms, and providing training on how to use both. However, during the introduction of these platforms, training was minimal in terms of how to teach online, hybrid, hyflex, synchronous, or asynchronous courses or how to design courses for these formats. In addition to this, providing printed educational resource materials such as textbooks to students remained a challenge. In the United States, once instructors and professors were reminded about OERs and their potential, especially during a pandemic, their use increased due to the long delays for students waiting to receive non-digital educational materials because of the supply chain slowdowns experienced during the pandemic (McKenzie, 2020).

The economic sustainability of OERs remains an issue in higher education because, even though they address an important need for students (lowering costs, improving accessibility, and so forth), the educational institution has to shoulder the cost of the "production, maintenance and dissemination of OERs" (Tlili et al., 2020b, Abstract). Additionally, Tlili et al. (2020a, b) stated that OERs sustainability models are currently under investigation by higher educational institutions to discover the best and most appropriate models to support the use of OERs for an institution's particular set of circumstances. The researchers completed a Delphi study to determine what educational institutions were doing in terms of supporting OERs and found that to best guarantee sustainability, educational facilities need to use a "flexible combination of models that can cater for external opportunities beyond funding" (p. 17).

4.4.6 Implications for Policy

Policymakers and ministers at the national or regional government levels in individual countries will need to make decisions that best serve their constituents. However, with the increase in internet use in education and more open access to heretofore restricted knowledge in content areas, OER implementation on a broad scale is a logical next step in their educational systems.

4.4.6.1 Higher Education

Higher education institutions will need to recognise that strategic planning will be an essential element to the successful innovative structures required for OER implementation on a broad scale which may even require a different business model than they are currently using (Jung et al., 2017). In addition, depending on how those institutions are funded at their regional or national level, funding will need to be acquired for the necessary technical infrastructure to successfully use OERs. This will require policy decisions from legislative bodies to provide that funding and strategic planning on the part of the institution. At the institution level, internal policies will need to be

developed as to what their OER initiative will look like. Will it be institution-wide? Will it be by department or discipline? Will it be by the individual instructor? At all the previously mentioned tiers, some common components exist for successful OER implementation.

As part of its institutional policies, the higher education entity will first need to examine its current campus culture and mindset. The culture and mindset will need to be innovative, student-centred, and technology-enhanced for affordable and lifelong learning (Jung et al., 2017). If it is not, how will it become so? Faculty resistance to change is usually led by how they are involved (or not involved) in the decision to change or the actual change to a new process (Mitchell et al., 2015). The new process in this instance would be using or creating OERs.

The institution must also recognise and allow for the additional time and expertise required to create or locate OERs. Not only would recognition that OERs require additional time and expertise, but compensation for the individuals for their time and effort in either creating or locating OER resources should also be a consideration and could be in the form of either money or in-kind (Center for Media & Social Impact, 2021).

An extremely important part of the strategic plan would be the need to ensure professional development is given to all who will be involved in any OER initiative, not just the instructors who will be delivering the courses. Administrators, instructional designers, librarians, and instructors will all need to be trained. Competency capacity in the higher education institutions' human capital in this endeavour will need to be developed and enhanced. The lack of training is one of the main barriers to implementing OERs (The Learning Accelerator, n.d.).

4.4.6.2 Other Tertiary or Post-Secondary Education

Community colleges and systems must address the financial needs of all students to improve high school student participation in such programmes throughout the United States. One approach to lowering costs for school districts and students would be to develop a formal OER programme. For example, the Austin Community College system in Austin, Texas, spearheaded an OER programme that includes hosting links to OER resources for core curriculum courses. While this has certainly been impactful for their community and students, other systems have not followed suit. Programmes such as Ivy Tech's, where tuition and books are free, also represent excellent approaches to reducing the cost of college; however, in Ivy Tech's case, students must first pay for the first 12 h or four college courses. For rural students and those in urban areas where poverty is highest, these fees may put college out of reach, thereby reducing the goal of providing students with an early college experience and relegating it to just another challenge for students to overcome.

According to Lynch (2020, p. 189), the pandemic highlighted the "unequal access to the technologies necessary to be successful either as an online learner or as an instructor", which should have had an immediate and broad impact on policy at the tertiary education level. Specifically, many of the instructors in tertiary programmes

are hired as adjunct instructors or professors. This means that adjunct instructors in the United States, in particular, typically teach one or two courses per semester at a lower rate of pay than their tenure-track or full-time peers. They are often brought in last minute and provide little support in terms of resources and textbooks or input into course curriculum design. As a result, the adjuncts rely upon sources required by the last person to teach the course or the texts that were used when they were students. The problem with this approach is that it does not account for publicly available resources through OER, which impacts the affordability of tertiary education. Through campus or system-level policy, departments that utilise the services of adjunct professors should provide those instructors with a list of OERs that support each course they teach. This gives the adjunct instructor at least one OER resource that supports teaching and learning while encouraging the instructor to seek other appropriate resources at no cost to students. This approach would balance both the instructor's academic freedom and the student's financial abilities to participate in courses.

Another implication for policy relates to sharing information regarding specific tertiary programmes in the United States, such as dual credit and dual enrolment, with course instructors. For example, students in a Texas programme opted out of the IncludEd system that automatically orders student textbooks and rolls the cost of the text(s) into the course fees upon registration. By opting out of the programme, these students must wait until the first day of class to review the syllabus and obtain information about the required course texts they must now purchase (after the course has begun). However, in one instance, the campus did not have a process for notifying the instructor about the students' IncludEd status. Therefore, the instructor assumed the students had all received the textbooks from the college bookstore prior to the first day of class. From the instructor's perspective, the students would have completed all assigned reading and writing tasks before the first meeting. In this example, once the instructor posted the syllabus, students struggled with finding the exact version of the textbook, which was also unaffordable for most students. If a campus-level process identifies and shares with all instructors (full and part-time) whether students participate in a textbook programme such as the IncludEd programme, this situation could be avoided. From a policy position, each department would be responsible for ensuring that all instructors (full and part-time) were aware of how to access programme-level information related to participation in such textbook programmes. However, more importantly, if OERs were required, situations like these could be avoided completely.

Finally, some of the programmes in this review required students to purchase their own textbooks either for some or all of the duration of their dual credit programme. While intended to encourage responsibility and keep the district's own outlay of money lower, it comes at a time when young high school students do not have jobs of any kind. A better approach would be to require students to enrol in foundational courses that utilise only OERs for instruction, thereby allowing the students to focus on learning and not working to earn money for textbooks and keeping overall programme costs down. Further, this approach would also account for and allow for various instructors (full-time and adjunct) to teach the courses.

4.5 Conclusion

This narrative review of the OERs on tertiary and post-secondary education was a broad exploration of the current OER promises, practices, and problems, with suggestions for policy. However, there remains a great deal of unanswered problems, and much needed additional and formal research is needed.

The use of OERs needs to become a top-down priority for all institutions of higher education around the globe. Often, departments and individual instructors operate in silos, where the same material is used each time the courses are taught. Without a priority on accessibility and innovation in our courses, the challenge of finding textbooks and resources becomes the students' priority instead of learning.

As students around the globe become more mobile, future innovation and research should include prioritising accessibility to OERs in courses through the development of mobile OER applications accessible by whatever technology the student uses, including tablets and cell phones. When higher education institutions design and commit to a variety of learning management systems, they must evaluate the system's ability to disseminate OER content in the multitude of formats in which it is shared and intended for use, be it through cell phones, tablets, or computers. This same research and development should also target other post-secondary education platforms, particularly those that target students following a career and technology path, including trade schools. If students in trade schools were provided access to well-designed OER content, they too could keep down the cost of trade school while increasing their ability to earn money and establish a career.

The question of the economic sustainability of OERs needs further study and implementation by each educational institution. Tlili et al. (2020a, b) offered ten models for sustainability through their Delphi study: internal funding, OER networks, public funding, endowments and donations, sponsorship and advertisement, offering services to learners, offering learning-related data to companies, producing OERs on-demand, incentivising OER authors, and community-based model stakeholders. All the models had limitations regarding the willingness of persons or organisations (public or private) to provide the funding to create and maintain the OERs and the infrastructure necessary for learner access. Thus, a combination of the models may be required for any educational institution to sustain its OER initiatives.

The promise of OERs remains intact and valuable to all learners worldwide. Not only do the global economic conditions require an increasingly trained workforce beyond secondary schooling, OERs promise equity in learning for marginalised global citizens. As the practice of OERs continues to be accepted and evolve, the sustainability and challenging issues of OERs stand to be resolved with innovation, cooperation, and flexibility.

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Chapter 5
The Collaborative Picture Book Format as an Open Educational Resource for Socialisation, Learning, Teaching and Assessment in Higher Education

Chrissi Nerantzi and Paola Corti

Abstract This chapter explores the use of the open-licensed collaborative picture book format in the context of learning, teaching and assessment in higher education. It illustrates how it has the power to refresh approaches currently used across disciplines and professional areas to foster community and authentic engagement in learning and assessment, utilising the power of story. The authors report on three different open picture book projects, the process and products through which openly licensed collaborative picture books were co-created in Higher Education (HE) and what has been learned through these cases. The journeys of the development of these open picture book cases are shared with lessons learned. These provide insights into the specific projects and help educators consider the open and collaborative picture book format for further pedagogical applications in their teaching practice. Educators are invited to consider the use and co-creation of picture book activities as a tool and strategy to foster creative expression, community building, well-being and cross-cultural learning, as well as assessment and feedback as a process and product to engage students deeply in the learning process and boost creativity and belonging through relational pedagogy. The suggested activities provide food for thought to HE practitioners. They aim to help them set up their own open, collaborative picture book activities with educators and/or students.

Keywords Open picture book · Socialisation · Learning · Assessment · OER · Community · Collaboration · Co-creation

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5.1 Introduction

Picture books are short stories that combine written and visual language that coexist in harmony on the pages, complement and extend each other and enable the imagination to wander and wonder. Picture book stories are traditionally written for children between five and eight. A picture book may be written and illustrated by an author–illustrator or written by an author and illustrated by an illustrator who rarely work together as it is claimed that such collaboration may negatively influence the outcome and restrict or direct creative interpretation (Whitford Paul, 2018). However, some examples illustrate the value of creating collaborative picture books, and such practices can be observed in open picture book publishers. Bookdash in South Africa and Storyweaver in India are such examples. Both harness the power of the collective and the wider community to co-create openly licensed picture books that travel further, even across multiple languages. Their community-based approach to co-creating open picture books demonstrates that an alternative model to picture book creation is not just possible but also impactful.

Beyond the imaginative awakening they enable, picture books also empower young minds (Whitford Paul, 2018) and engage readers and listeners emotionally (Nikolajeva, 2013). And while adults buy picture books, they are read together, cross-generationally (Salisbury & Styles, 2012).

Whitford Paul (2018) notes that picture books are also increasingly written and published for adults.

The cross-generational nature of picture books brings young and more experienced readers and grown-ups together to explore and imagine, making them valuable communication bridges, allowing stories and messages to travel further and reach wider audiences than, for example, an academic publication. This combination of pictures and text in picture books may make them attractive to spreading the message of open education beyond higher education. The picture book format could be considered to engage learners and educators in creative learning, teaching and assessment tasks, harnessing the power of story and image. Aulich and Ikoniadou (2020, p. 3), in their study around pictures in conflict and war, highlight the following: “On one hand, the image through the imagination dispenses political power; on the other, the picture engages the bodily and the personal in terms of expressive power and empathetic response”.

Humans are familiar with the story and story structure (Bruner, 1986). Humans have created and used stories long before we could write them down, inspired by experiences and mixed with imagination and fantasy. King (2003, p. 2) even claims that “the truth about stories, is that’s all we are”, while Wagamese (2011, p. 2) notes that “we are all stories”. Moon (2010) recognises the human need for story and its potential for critical and creative learning and teaching in higher education. It enables the listener to be transported into the story world, experience a different reality, connect emotionally and consider alternative perspectives. A story makes the experience memorable and thus makes learning stick more than a pure information session ever would be able to. In a study exploring memory and understanding in

narrative and non-narrative texts, Mar et al. (2021) discovered that the story format makes information better understood.

While stories and storytelling are increasingly used in different forms in the higher education classroom, picture books are still much less common. They can easily be dismissed by educators who are not teaching in Primary Education as they are often seen as simplistic, childish and inappropriate (Drinkhouse, 2018). However, their cross-generational nature and the complexity of topics they explore, the sensitivity and inclusive, often philosophical nature they approach these topics with, and their artistic value contradict this claim (Haynes & Murris, 2012; Whitford Paul, 2018).

Generally, picture books seem more attractive, especially in the Primary School classroom. Drinkhouse's (2018) study illustrates how picture books were used in the secondary curriculum to teach American literature, the positive impact on students' engagement and learning, and the scaffold they provided to understand complex ideas better.

However, to further extend their use even there and use them to introduce complex topics and develop intercultural literacy, for example, Moriarty (2014) acknowledges that their employment needs to be modelled in Teacher Education programmes. In this way, new teachers become familiar with this genre and the possibilities picture books present for their practice and become confident in using them. The same could be said about integrating picture books across teacher education programmes, including higher education.

Our inquiry about picture book applications in higher education illuminated specific practice examples from different parts of the world. These seem to focus on the potential and value of picture books in developing criticality, creativity and social skills. For example, Kuo (2009) reports on a picture book activity at a university in Taiwan. This made a real difference in developing critical literacy among students and was also socially beneficial as it was done in groups. Similarly, Miller (2021, online) acknowledges that she regularly uses picture books in her teaching in the US with her undergraduate students. They help students immerse themselves into the story and better understand the meaning of critical reading and rhetorical analysis in her teaching in the English classroom. Yomo et al. (2014) conducted a study in Japan and found that picture books can provide an effective strategy in the Modern Foreign Language classroom to learn grammar and raise cross-cultural awareness.

While these examples from some years ago illustrate that there are educators in higher education who are making use of picture books in their teaching, no contemporary practice cases or literature could be located beyond the ones mentioned in this chapter that refer to the co-creation of open picture book activities in higher education beyond those in Creative Writing, Illustration and Design courses at higher education institutions. The study by Lin (2012) in Taiwan is such an example. However, the focus on creating the picture seemed to be more directed to creative thinking linked to the design and visual language and less on the story itself, as the findings indicated.

Open education has at its heart values such as sharing and collaboration. The movement itself is not new. It goes back to antiquity and Plato's Academy (Nerantzi, 2017). More recently, the Open Source Movement has been an inspiration and illustrated open sharing and collaboration in digital networks (Winn, 2015). Reusable

Learning Objects (RLO), as they were called initially (IEEE, 2002), and later Open Educational Resources (OER), as well as open licensing, brought new possibilities for wider sharing and joined up practices, too, using networked digital technologies and platforms (Peters & Britez, 2008). According to UNESCO (2019, pp. 2–3), "Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that has been released under an open license that permits no-cost access, re-use, re-purpose, adaptation and redistribution by others". Based on this definition, OER can be used in ways defined by the specific license under the condition that the originator also needs to be acknowledged.

Open textbooks are OER in book format that has been used—for some years now—in some countries (such as the US and Canada, for example) to reduce the cost of textbooks for students studying at the university level (Pitt, 2015), also in South Africa as a potential strategy to reduce social injustice (Cox et al., 2020). While open textbooks are less used in the UK, they present a valuable opportunity to widen access and bring about pedagogic innovations, including opportunities for collaboration and co-authoring (Pitt et al., 2020).

While the developments mentioned above are encouraging, it needs to be acknowledged that English seems to dominate the world of OER, and while it is used as a *lingua franca*, it seems to be the most used language across the open education landscape and the internet more generally (Ou, 2012). Our world is colourful, multilingual and multicultural. It will be important to acknowledge this to embrace different languages that are diverse and lesser-heard voices in open education to avoid losing the specificity and cultural richness that is deeply connected with each local language's typical words and expressions.

The following section explores three open and collaborative picture book projects in higher education contexts. The projects are presented as case studies in which one or both authors of this chapter were involved. These cases offer insights into still novel open picture book practices as learning, teaching and development approaches in a higher education context. They could be considered more widely across disciplines and professional areas for active, collaborative and authentic learning with educators and students.

5.2 Cases

In this section, three open picture book projects completed in recent years by one or both authors of this chapter are shared to illustrate how such activities have been undertaken in different higher education contexts. Experimentation with the co-creation of open picture books as learning activities within academic development had begun earlier to capture student and staff voices on learning and teaching (Nerantzi, 2012).

Table 5.1 Summary data for case 1, case 2 and case 3

	Case 1	Case 2	Case 3
Title	What will today bring?	The invisible king	Together
Year	2018	2020	2020–2021
Author(s)	1	1	6
Illustrator(s)	1	10	2
Further collaborators	n/a	n/a	Open Education Community
Roles	Educators	Educators, foundation year art students and a primary school girl	Educators, artist and sixth-form college student
Nature of collaboration	UK	UK	UK, Australia, Canada, Italy, South Africa
Mode of collaboration (tools and platforms)	Face-to-face	Remote (Zoom, Facebook group, Google Drive, email)	Remote (Skype, Group DM on Twitter, Google Drive, email)
Original language	English	English	English
Translations	6	0	Over 20
Open license	CC-BY	CC-BY-NC-SA	CC-BY-NC
Publication platform(s)	Storyweaver	Zenodo	Zenodo, Google Drive slides
Link	https://storyweaver.org.in/stories/28132-what-will-today-bring	https://zenodo.org/record/3924437#.YOF3XOhKg2x	https://zenodo.org/record/4703978#.YOF3S-hKg2w

Specific open access publications linked to the making of each picture book included are available and have been referenced within the cases that follow. In Table 5.1, you will find summary data for each case.

5.2.1 Case 1—What Will Today Bring?

In 2018 the first author of this chapter participated in an online discussion, "Creativity in the Making", organised by Professor Norman Jackson as part of a #creativeHE event. The #creativeHE community brings together educators and students from higher education who are interested in creative learning and teaching. The community has over 600 members, and the team comes from 15 different institutions in the UK, Greece and Canada.

The focus was on exploring the making of a picture book using the story "What will today bring" she had written about refugee children (Fig. 5.1). She wanted to make the picture book a collaborative undertaking. She reached out to an artist

Fig. 5.1 "What will today bring" picture book, cover page

from her own institution, Manchester Metropolitan University, who was part of the #creativeHE community and had participated in and led a series of creative tasks for staff development (Nerantzi & Spencer, 2018a). The aim was to create an openly licensed picture book to raise awareness of refugee children and translate it into various languages to extend its reach.

They also wanted to experiment with the picture book format and if this could be used for collaborative learning through making and storytelling with students in higher education. They worked together in a studio on campus. Evidence suggests that the author and the artist worked together in harmony to visualise the story and found the collaborative process of making a stimulating, fun and rich learning experience (Nerantzi & Spencer, 2018b). The author and artist felt that they gave each other space and were open to each other's ideas and suggestions. When the illustrations were completed, the makers decided to publish the story online using the open picture book publisher Storyweaver at https://storyweaver.org.in/, based in India. This publisher lets members upload their stories and illustrations and make a picture book using simple-to-use templates under a creative commons license. Creating an account is free. Sharing on Storyweaver enables wide reading, and members can also create versions of the story in different languages.

In July 2021, there were over 35,000 stories available on the platform in almost 300 languages, which have been read over 12 million times (July 2021). So far, "What will today bring" has been translated into seven further languages and has been read over 1000 times. This project provided valuable food for thought for further explorations and illustrated the potential picture books have for higher education, as the following case studies show.

5.2.2 Case 2—The Invisible King

When the COVID-19 pandemic broke out in 2020, the first author of this chapter wanted to create an opportunity to work with other educators and students at her university on a creative project. The aim was to bring hope, develop new skills and capacities and engage the wider community in storytelling and problem solving while raising funds and supporting the Manchester Major Charity for those in need during these challenging times. Crawford (2020, online) says characteristically, "…the creative vaccine can work its magic on all our minds at this dreadful time…" This project wanted to harness the power of creativity and collaboration and create a picture book with an open ending that could be shared widely and engage young and older readers alike through reading, storytelling and adding to it in the form of text and illustrations to weave the end of the story themselves.

The story was very much linked to the pandemic as it was about the virus and how it threatens everybody's life on earth. *The invisible king* (Nerantzi et al., 2020) is the title of the story illustrated by 10 Art and Design Foundation year students at Manchester Metropolitan University, supported by two academics teaching on the programme and a schoolgirl remotely (Fig. 5.2). Traditionally, a picture book is illustrated by one artist. In this case, there were 10. Students and the academic team were introduced to open educational resources and open licensing. For those students, it was the first time they worked on a live brief and collaborated with their peers on a picture book. After inviting students to create sketches of the main character and draft different scenes based on visualisations provided by the author, the academic team decided which students would do a specific scene and who would draw the story's main character throughout the book. One of the scenes in the book brings illustrations from different students together. The collaboration was conducted via Zoom calls, a Facebook Group, a Messenger community and email communication due to social distancing and the emergency move from campus-based to fully online provision. The feedback from students suggests that they found it a valuable activity that allowed them to work on a creative task with other students for a good cause. They also noted that they learned about themselves and that the project helped build their confidence (Nerantzi, 2020).

So far, this picture book has been accessed over 1500 times, and it is unknown if translations have been made. This collaboration has also led to further live creative projects with students and their lecturers in the same higher education institution and provided the seed for another collaborative picture book project with a distributed team, which follows under case 3.

5.2.3 Case 3—Together

The picture book *Together* (Nerantzi et al., 2021) was born out of a Global OER Graduate Network (GO-GN) Fellowship project awarded in 2020. It brought together

Fig. 5.2 "The invisible king" picture book, cover page

six open educators and researchers in different higher education institutions as co-authors from different parts of the world (Fig. 5.3). A Sixth-Form student joined the team in digital art as a co-illustrator and book designer and an artist as a mentor for the illustrations.

Together is a picture book about the values of open education that aims to reach readers of all ages, raise awareness of open education, and illuminate how we can all contribute to creating a better, more inclusive world.

The team worked remotely from their home locations, across the globe, and across different continents, time zones and countries. They knew each other in advance of the project through GO-GN as most of them are GO-GN students or alumni and had all met at the OEGlobal Conference in Delft in 2018. They used Skype and Teams for live meetings, a group DM space on Twitter for quick communications, email and a Google Drive project folder.

The wider open community was consulted in providing ideas for the story, which were considered during the collaborative writing process of the story itself. Animal metaphors about open strongly featured in the way views and perspectives about open education and open practitioners and researchers were expressed. The team wanted to model remixes of open educational resources and did this by using details of exhibits of the Rijksmuseum in Amsterdam that is openly licensed. The story that emerged through the collaborative process also incorporates features of existing

Fig. 5.3 "Together" picture book, cover page

stories that some readers may recognise and uses the metaphor of open education as a river.

The creative process was open and multidirectional. The team started from a blank canvas; progressively, through discussion and debate, a story emerged, shaped and reshaped with the team's input and feedback from the early stages. Team members felt that they could openly share their thoughts, ideas and reservations and that they were listened to (Pulker et al., 2021). They worked together with significant commitment and managed to complete the project within six months. With the help of the wider community and many volunteers from different parts of the world, the team translated the story into over 20 languages. So far, this picture book has been accessed over 1300 times via Zenodo and has recently been shared via the National Teaching Repository as well to extend its reach. The picture book has also been used to create activities, for example, during the Global Culture Jam. This programme explored community, creativity, curriculum and sustainability through cross-cultural learning using creative approaches, including storytelling and making. Educators developed it at Manchester Metropolitan University in partnership with undergraduate, postgraduate and doctoral students. It was offered over five days in June 2021 to a global audience, attracting educators and students from over 1400 participants from 20 countries (Nerantzi et al., in print).

5.2.4 Synoptic Reflection on the Three Open Picture Books Cases

While the three above cases are very different, they also have similarities. They are all open education projects conducted in higher education settings and collaborative in nature. The open picture book outputs have been openly licensed to enable wider use and adaptation. They also show how one idea can lead to more ambitious ideas and how we can build on and re-use other open projects and ideas. The open picture book projects presented here seem to have become progressively more ambitious and involved larger and more diverse teams that were also distributed in different geographical locations. While in cases 1 and 2, collaboration was more clearly defined and had followed a brief, case 3 followed a more organic approach to co-creation and collaboration that was perhaps more seamless than the two earlier projects and involved the wider open education community.

Social media tools were used to enable and foster remote collaboration in cases 2 and 3, with more developed approaches used in case 3 documenting the collaboration process in great detail and with dissemination built-in during the creative process and after completion. All three project teams produced an open picture book and therefore met their goal. The final outputs were shared on open platforms. However, only case 1 was added to a dedicated social media space, particularly for picture books. This enabled wider use and also a translation of the story by others who were not part of the team. All teams who participated in cases 1, 2 and 3 reported that they found the collaboration valuable and educational and that it was a positive experience.

5.2.5 Lessons Learned

Within this section, key lessons learned from the above three cases are shared that are considered going forward in articulating the broader use of open picture books in learning and teaching in higher education, which forms the second part of this chapter.

Starting small with individuals already known to the originator of the picture book idea was helpful to test ideas, trial, experiment and identify what was possible, how collaboration could work and what could be achieved.

Progressively becoming more ambitious in the idea and involving more educators and students showed how such a project could be of value to colleagues and students and the potential it has to: create community; boost confidence; co-create something that can be shared more widely; engage in authentic creative learning experiences; model open education practice and open education resources; exploit their potential for learning and teaching and academic development.

A democratic approach through developing and nurturing diverse relationships, acknowledging what everyone brings to the collaboration, and utilising existing skills

and capabilities, but also developing new areas and expertise, was important and led to positivity and a sense of achievement.

Digital synchronous and asynchronous **collaboration tools and platforms** are valuable during the creative process to create a seamless, flexible and transparent experience for all. They also enable wider sharing, open peer review and translation of open education resources, which is of value for the quality of any output and their wider reach.

5.3 Designing Open Picture Book Activities: Applications, Ideas and Rationale

What follows are ideas generated and based on lessons learned through the above three openly licensed picture books cases and the opportunities open picture book storytelling and story-making activities seem to present for higher education, and specifically for:

- Community building for social learning
- Assessment and feedback as a process and a product.

The authors present these for consideration to higher education practitioners when rethinking and spicing up their practice, aiming to create engaging, deep and stimulating learning, teaching and assessment experiences.

5.3.1 Community Building for Social Learning

Universities are vibrant hubs for knowledge creation and knowledge dissemination. They also have a social responsibility and mission. Therefore, openness and collaboration are fundamental to the university's mission as an institution and is a diverse community committed to change and transformation. Carey (2015) recognises the challenge large higher education institutions have in creating authentic communities at the organisational level and states that the institutions of the future will be smaller, while Ehlers (2020, p. 171) agrees that things need to change in higher education he sees universities of the future more as a part of the fabric of an educational society ("Bildungsgesellschaft"). Community and a sense of belonging in the context of learning and teaching, a programme or course has been recognised as an important enabling factor that can boost well-being, as Lister et al. (2021), a narrative inquiry conducted with distance students and tutors at the Open University in the UK showed. Furthermore, the community plays an important role in bringing students together to engage in social learning.

The importance and value of learning with others came out strongly, especially during the pandemic, as something that in many cases seems to be missing largely

from the student experience. Students often felt loneliness, had limited connections to their peers and didn't seem to feel part of a community (Dunbar-Morris et al., 2021). Over the years, multiple evidence-based conceptual and empirical pedagogic frameworks illuminate the power community can play for social learning supported by digital technologies in a wide range of educational settings, including higher education. An example is the Community of Inquiry Framework (Garrison et al., 2000). Cognitive, teacher and social presence are recognised as key factors boosting engagement and learning within this framework. In more recent years, the special role social presence plays in building and sustaining a Community of Inquiry has been recognised (Armellini & De Stefani, 2016) and the role collaborative learning (Gilpin, 2020) can play within such environments. However, it must be acknowledged that challenges are often reported in creating such learning communities, and students often note that they don't feel a sense of belonging or part of a community and that collaborative activities are under-used (Killen & Langer-Crame, 2020). Furthermore, students may be part of a community that sits outside their course and therefore seem less engaged or interested in being part of a course community, which was illuminated through a phenomenographic study around collaborative open learning within academic development, something educators need to be mindful of (Nerantzi, 2017).

The diversity of individuals, in terms of background, culture, disciplines and openness to otherness, provide valuable ingredients for inclusive designs and can create the foundations to foster not only cross-cultural but also cross-boundary learning that stretches beyond the academic community, staff and students, and embraces industry and the wider public, as well as a phenomenographic study in which the lived collaborative learning experience of educators within open courses for professional development was studied (Nerantzi, 2017). Furthermore, it seems to be the diversity of voices and perspectives through which individuals also generate novel ideas and boost creativity (Bateson & Martin, 2013).

Siemens (2006, p. 112) defines community as a "connection-forming space". Connections to peers, and educators, the subject that progressively leads to autonomy, something that Palmer (2007) also highlights as good teaching practice when educators achieve this. These connections are enabled through learning relationships built on trust. Particularly, during the COVID-19 pandemic, Chatzidamianos and Nerantzi (2020) observed a shift in practice and, based on this, defined the PPE for higher education as People, Positivity and Emotions, illuminating further the important role of relationships, social and emotional connections seem to play in learning and teaching. While Pedler and Willis (2021) mixed-methods study with Australian undergraduate students ($n = 578$) to explore student retention and reasons for dropping out indicates that belongingness to the university community increases students' motivation and enjoyment of the course and is a key factor for continuing their studies, Armellini et al. (2021) evaluative study linked to an institution-wide implementation of Active Blended Learning in a UK institution and the associated students' experience, illustrates that such belongingness and learning can be boosted through positive relationships between educators and students.

Relational pedagogy is a valuable strategy for educators to consider when creating a sense of belonging and community (Felten & Lambert, 2020) and creating trusting relationships to boost collaborations (Heard-Lauréote & Buckley, 2021). Therefore, Community is important for social learning and well-being in higher education. Specific frameworks can show us how to build and foster community. What could help students and higher education practitioners open up, connect at a humane level and lay the foundations of a learning community? Judson (2019, online) states: "We imagine ideas, stories and images that unite us and help us evolve within communities". The cases of the three open picture books presented in this chapter show that story has a place in higher education: it could be used in a range of higher education settings to foster well-being, and cross-cultural, and social learning.

5.3.1.1 Example Activity for Community Building to Boost Social Learning

Let's say you are teaching a new group of undergraduate/postgraduate students who may not know each other and they are from different countries, cultures or backgrounds. You would like to come up with a new way to help your students start interacting and building relationships to learn with and from each other and value what each individual brings.

Guidelines

- Think of a topic that would be of interest and relevant to the course.
- Define with clarity what you would like your students to achieve as a result of this activity and communicate this clearly. As we are talking here about building community for social learning, it will be something around enabling students to get to know each other and their worlds and reality.
- Select an existing picture book story and explore if this would be useful as a starting point for a new story to be co-created by your students. You may find such a story on the Storyweaver platform or in your local bookshop or library.
- Think about the criteria for forming small groups of students (up to four in each group) and be mindful that diverse groups are richer. However, they can also present challenges. You could also consider students working in pairs or individually at the beginning and then start working with another student. There will be richer exchanges when students are diverse. Avoid groups that are too large.
- Define and share with your students a timeline for the activity and expectations.
- Students will be invited to come up with their own scenario, characters and adventure based on the brief and what they bring to it. Their values and beliefs, experiences and journey through life. Encourage them to share only what they feel comfortable sharing. Each story will need a beginning, a middle and an end and communicate a clear message directly related to who they are as individuals and as a group.
- Be mindful that guidelines with examples can help and inspire students. After you have used this activity for the first time, you could make the stories your students

created available to the next cohort of students. Exemplars can be really helpful. Ask your students to consider making their stories available under a Creative Commons license.

- Some students may prefer to visualise their story first; others may start with words. Remind them that you are inviting them to create a picture book with only a limited number of words. Metaphors and other forms of visual language will be useful and provide depth of expression. Picture book stories are usually up to 500 words and are accompanied by 12 illustrations.
- Encourage creativity and experimentation to help students open up and share what they want to share about themselves.
- Share the story with another group (and, according to the tools and licence you choose, with the greater community) and provide peer feedback. The story can also be shared via Storyweaver and made available more widely.
- Remember to ask students to reflect on this activity and what they have learned about themselves and others.
- What does this mean for learning with their peers, and how can they take what they have learned forward when working with others?

5.3.2 Assessment and Feedback as a Process and Product

Wiley (2013) talks about the opportunities OER presents as renewable assignments that extend the life of an assignment; learning from it can make it valuable for other learners too. Boud and Soler (2016) also highlight the importance of assessment to be of value to students who completed a specific assignment beyond a model or course. These perspectives refer to the added value of assessment for others and self. Therefore, flexibility and choice may be important for assessment (Elingkton, 2021). The authenticity of the assessment can make a real difference and engage students more deeply in their learning (Gulikers et al., 2004). Sambell and Brown (2021, p. 13) state that such assessment is "perceived by students as somehow more 'real' or 'authentic', have integral value in themselves and can change the orientation of learners when approaching assessment significantly".

Furthermore, McLoughlin (2001) notes that authentic assessment also helps students develop cross-cultural competencies and engage in solving real problems, something that is also highlighted by Jopp (2020). Authenticity brings the idea of assessment as a process, not just a product. Digital portfolios present such opportunities (Roberts & DeWaard, 2021; Smith & Nerantzi, 2013).

Earl (2003) defines assessment as learning as an alternative practice that places the student at the heart of their own learning and assessment through active and critical engagement in the learning process and feedback mechanisms. It is gaining momentum globally and across disciplines and professional areas, especially in more recent years, as the book publication by Yan and Yang (2022) evidences and in which it is acknowledged that assessment as learning is a strategy that facilitates rich learning. Such an assessment as a learning strategy relating to a digital portfolio case

study at a UK higher education institution by Smith and Nerantzi (2013) in the context of academic development showed that assessment as learning using blogs requires active engagement, fosters an interactive approach and creates ongoing opportunities for self-, peer- and tutor feedback.

Similar findings were illuminated in a more recent study by DeWaard and Roberts (2021), which focused on open assessment using blogs. For us, assessment and feedback go hand in hand. However, often feedback is viewed as something that students receive passively. And while feedback is increasingly framed as forward-facing to enable further learning beyond the boundaries of a specific assessment task, engagement with assessment feedback, provided after an assessment has been marked, seems to be limited as it is provided at the end and together with the grade for an assignment. Over the years, there have been challenges in engaging students in this type of summative feedback. Injecting feedback opportunities based on self- and peer-to-peer feedback during the learning process and turning it into a dialogic and active learning experience could help and have an impact on student's engagement with the feedback and their learning (Nerantzi & Chatzidamianos, 2018; Pitt & Quinlan, 2021). Enabling mechanisms for students to activate their inner feedback and building opportunities for meaningful engagement with feedback in the learning process can help (Nicol, 2021).

Sambell and Brown (2021, p. 19) state characteristically, "Breaking the traditional cycle of written assignments followed by post hoc feedback to largely passive students can radically change the nature of learning itself, with inner feedback providing a vehicle for self-development, personal growth and a sense of community, with students progressively constructing knowledge paradigms during the process of undertaking and collectively discussing the incremental tasks". We feel that co-creating a picture book can break this cycle and transform how we assess and use peer-to-peer feedback and self-evaluation for learning.

5.3.2.1 Example Activity for Assessment and Feedback

A picture book can be a stimulating alternative to a more traditional formative or even summative assessment and feedback strategy.

Examples could be linked to establishing how collaborative learning worked for your students and their reflections on the collaboration through a picture book case or inviting students in small groups to work on an assessment brief and present their responses in picture book format. These tasks may form part of the assessment. Consider if a picture book-based assessment and feedback approach could help your students reflect on how they have worked with their peers in new and refreshing ways and reveal deeper insights into the experience and learning through this? And if a picture book format would be a new way of responding to a particular assessment brief linked to a case study or scenario in which students need to evidence critical and creative problem solving and ideas generation.

Guidelines

- Define with clarity what you would like your students to achieve as a result of this activity and communicate this clearly.
- Co-create the assessment rubric with your students based on the learning outcomes, the task and what you want them to take away.
- If you ask your students to reflect on their collaboration, consider the following questions: What strengths do they identify in their collaborative work? Where are the areas for development? What could they do differently next time they work within a group? The answers to these questions will form the basis for their stories.
- If you are asking students to articulate their response to a specific case study or scenario, they will need to make sure they capture in their story all the important elements they discovered, their journey, their critical and creative thinking, their ideas and present their solution.
- Invite students to put their stories together. They will come up with their own scenario, characters and adventure linked to the brief and their inquiry. Each story will need a beginning, a middle and an end and needs to communicate a clear message.
- Some students may prefer to visualise their story first; others may start with words. Remind them that you invite them to create a picture book with only a limited number of words. These days, usually up to 500 words are accompanied by 12 illustrations.
- Check if it would be useful for your students to re-use parts of an existing picture book and invite them to make modifications to the story so that it is a response to the brief.
- You may find stories on the Storyweaver platform. You can also use other picture book stories from your local bookshop or library. Suggest to students to think about the message they want to communicate through their story.
- Remember that the title page and the title itself are key in the story-making process and help them communicate their key message.
- Ask students to draft their story and share it with one of their peers from another group using the rubric that was created. This means you will now have students working in pairs or smaller groups.
- Be mindful that guidelines with examples can help and inspire them. After you have used this activity for the first time, you could make the stories your students created available as exemplars to the next cohort of students. Ask them to consider making them available under a Creative Commons license.
- Invite groups to discuss their story with another group's story and provide feedback.
- Ask students to reflect on this activity and what they have learned by working collaboratively on the picture book stories and how this experience and what they have learned from this experience.

5.3.3 A Way Forward

The following suggestions may help deepen your understanding of picture books and their potential for learning and teaching in higher education:

- Consult some of the picture book practice references in this chapter to study related practices and findings more deeply.
- Consider joining the open course Picture books in Childhood Development—Online Education Course—at FutureLearn (https://www.futurelearn.com/courses/picturebooks) which is a valuable introduction to this genre.
- Read some of the well-known and newer picture books from different parts of the world before embarking on creating picture books with your students and others.
- Invite your students to select and share a picture book they can relate to and discuss their books as a warm-up activity.
- Access the Storyweaver (https://storyweaver.org.in/) platform and Book Dash (https://bookdash.org/), which are two open picture book publishers for inspiration for your picture book activities.

5.4 Conclusion

This chapter has shared experiences and case studies of creating open picture books in higher education contexts in different settings as collaborative and open co-creation projects with educators in educational development, with researchers to communicate findings and as a live student project.

While our inquiry seems to indicate that picture books are currently not widely used across disciplines and professional areas in higher education, and further research into this will increase the evidence base, we recognise their potential and explored the use of open, collaborative picture books as a strategy to build a community for social learning and alternative assessment and feedback within higher education practice. We provided guidelines to practitioners who are interested in setting up such activities with their own students in learning, teaching and assessment, as well as socialisation and community building among higher education students and/or educators.

And while picture book activities will not be appropriate in all situations and circumstances, and we recognise that a variety of active learning approaches is key, they can create stimulating learning opportunities and diversify engagement. We know that stories connect us as human beings and help individuals open up, share and understand each other but also learn with and from each other. Picture books have a lot to offer for higher education across disciplines as they can be an "effective catalyst" for learning (Miller, 2021, online). Engaging individuals in pairs or small groups to co-create stories with an educational purpose can be a powerful and insightful experience that boosts collaboration, openness and creativity.

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Chapter 6
Reflections on Remixing Open Access Content into Open Educational Resources: A New Paradigm for Sustainable Data-Driven Language Learning Systems Design in Higher Education

Alannah Fitzgerald, Shaoqun Wu, Jemma König, Steven Shaw, and Ian H. Witten

Abstract This chapter presents a new paradigm for sustainable data-driven language learning systems design in higher education that draws on qualitative reflections spanning a decade (2012–2022) with stakeholders from an ongoing global research study with the FLAX (Flexible Language Acquisition) and F-Lingo projects at the University of Waikato in Aotearoa New Zealand (Fitzgerald (2019) A new paradigm for open data-driven language learning systems design in higher education; König et al. (2022) *Smart CALL*). Design considerations are presented for remixing domain-specific open access content into Open Educational Resources (OER) for academic English language provision across formal and non-formal higher education contexts. Primary stakeholders in the research collaboration include the following three groups: (1) Knowledge organisations that provide open access to academic content—libraries

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and archives, including the British Library and the Oxford Text Archive, universities in collaboration with MOOC providers and the CORE (COnnecting REpositories) open access aggregation service at the UK Open University; (2) Researchers who mine and remix academic content into corpora and open data-driven language learning systems—converging from the fields of open education, computer science and applied corpus linguistics; (3) Knowledge users who re-use and remix academic content into OER—English for Academic Purposes (EAP) practitioners from university language centres. Automated content analysis was carried out on a corpus of interview and focus discussion data with the three stakeholder groups in this research. We discuss themes arising from the research data that reflect the different stakeholders' experiences of remixing open access research content that has been produced within the academy for re-use as open educational content for teaching and learning features of academic language within open data-driven language learning systems. These open learning systems have been specifically designed to scale with OER expansion and traction in mind for their sustainable uptake both within and beyond the brick and mortar of the traditional university. The new paradigm presented in this chapter challenges, as the OER movement must, established business models and deeply embedded cultural or institutional norms that present obstacles to OER expansion and traction and the sustainability of the movement. One persistent challenge concerns the lack of open education policy across the higher education sector for full open access (for use, modification, adaptation) via Creative Commons licensing to content produced within the academy. Thus, while this research has theoretical and practical implications in applied linguistics, computer science, language teaching and learning and open education, more generally, it also has significant cultural, business model and policy implications for higher education.

Keywords Data-driven learning · Design-based research · English for academic purposes (EAP) · Higher education · Massive open online courses (MOOCs) · Open access · Open educational practices · Open educational resources (OER) · Systems design

6.1 Introduction

In this chapter section, we present a new research paradigm for sustainable data-driven language learning systems design in higher education. This research paradigm provides a theoretical and conceptual framework supported by a review of the relevant literature from intersecting fields in this research. As we progress through the chapter, the paradigm will be unpacked in greater detail in the subsequent sections as we drill down into the specifics of the research contexts, materials and methods that have been employed in the research with the three stakeholder groups. Reflections on remixing open access content into OER for teaching and learning features of academic English, along with the affordances and challenges encountered by the stakeholder groups, will be presented in the final discussion section of this chapter.

6.1.1 Research Paradigm

A basic premise underpinning the new research paradigm presented in this chapter is that open data-driven language learning systems design as an approach is learner-centric and operates with the interface to the learner. Whether the learner is operating fully online in non-formal or informal learning mode or in a blended modality that is based both within and beyond the formal university language classroom, this approach requires that the tools and interfaces, and indeed the academic language corpora, be openly accessible and remixable for development or adaptation to meet this specific learner requirement. This method is different from existing Data-Driven Learning (DDL) approaches which assume specialised knowledge or experience with DDL tools, interfaces and strategies, operating on mostly inaccessible corpora in terms of cost or design, or assuming training to, hopefully, compensate for this lack of knowledge and experience (Fitzgerald, 2019; Pérez-Paredes et al., 2018).

The term DDL was coined by corpus linguistics and EAP pioneer, Tim Johns, to refer to a computer-driven language learning support approach with linguistic content that has been automatically analysed, enriched and transformed into a data-mined resource that learners can browse and query (Johns, 1991a). Johns envisioned every language learner as "a Sherlock Holmes" with direct access to the evidence of real-world language data (Johns, 2002, p. 108). In a similar vein to contemporary advocates for using and developing a broad spectrum of data literacies with open data in higher education (Atenas et al., 2015), Johns also envisioned DDL as developing data literacies for understanding and interpreting linguistic data for direct applications in language learning, specifically in the context of higher education (Johns, 2002; Pérez-Paredes et al., 2018).

From a research and development (R&D) standpoint, the paradigm presented here also operates with the interface to knowledge organisations (universities, libraries, archives) and researchers who are engaging with open educational practices to push at the parameters of open policy for the non-commercial re-use and remix of authentic research and pedagogic content that is increasingly abundant in digital open access format for text and data mining (TDM) purposes. This open access content is highly relevant to learning features of specialist varieties of English from across the academy but is otherwise off-limits for development into proprietary learning materials by the commercial education publishing industry (Fitzgerald et al., 2015, 2017; Wu et al., 2018). Indeed, the open corpus development work presented in this chapter would not have been possible had it not been for the campaigners for copyright reform, the Internet activists, the open policymakers, the open-source software developers and the advocates for open access, open data and open education that have made these resources available for re-use and remix.

This paradigm leads down several paths, including research into understanding how users actually perceive, appropriate and use the approach based on the open tools and resources provided. This inquiry informs their design and development in an R&D process that is presented here through the methodological lens of design-based research (Fitzgerald, 2019). This approach will be fundamentally different than if we

assume the user is actually a DDL or linguistics expert or that such an expert will be the learner's interface to the system by preparing output for the learner to experience and learn from (Johns, 1991b). This approach will necessarily also be different than if we assume the user is always a formally registered student at a university with access to EAP support that may or may not offer DDL or linguistics expertise for learning the language features of specific discourse communities from across the academy. The assumption behind this new paradigm that the right tools and resources can allow the end-learner to drive the processes autonomously is fundamentally revolutionary. This premise goes to the original contribution to the knowledge of this research but also challenges and directs researchers and practitioners in the field to consider and take up this new direction with open data-driven language learning systems design for applications that can be scaled in higher education to meet the increasing numbers of learners who are coming online in increasingly uncertain times (Fitzgerald, 2019; König et al., 2022).

The focus on domain-specific language learning support via data-driven approaches is, of course, also decidedly different from the current English for Academic Purposes (EAP) paradigm, which in mainstream practice has been steadily evolving away from its roots in English for Specific Purposes (ESP), domain specificity and DDL processes towards the generic skills and knowledge programs currently in vogue that are arguably being steered by generic EAP coursebook publications from the commercial education publishing industry (Gillett, 2018). Thus, this is also a new paradigm based on DDL approaches, driving domain-specific language learning support for EAP across formal, non-formal and informal learning modalities in higher education. It will transform, potentially, the focus of DDL systems design developments in language support and learning in general towards the non-specialist end-learner but also hopefully help re-establish the centrality of language specificity to the field of EAP (Anthony, 2018).

This new paradigm is necessarily rooted in greater multi- or trans-disciplinarity (Colpaert, 2004, 2018). Given the goal of facilitating, in particular, the increasing number of learners who are coming online in these uncertain times, and users of large-scale MOOC platforms who are trying to function in domain-specific subject areas that are invariably offered in the English language, the approach requires collaboration and cooperation among platform providers, subject academics and instructors, educational technologists, software developers, educational researchers, EAP practitioners, linguists with expertise in corpus-based and DDL approaches and policymakers in knowledge organisations (libraries, universities, archives). It has to be remarked, also, that the value and significance of this multi-disciplinary work is amplified by our current situation in higher education with the pandemic, which has seen a massive, urgent push to move learning online with an accompanying impetus to identify, adapt and leverage learning content worldwide and to exploit open educational resources, in particular.

6.2 Research Context

The open access movement in research and higher education has bolstered unprecedented access to artefacts of the academy in the form of published research articles, in addition to online platforms and services for accessing unpublished theses and pedagogic materials. One example is open access to transcribed video lectures and course reading content from the world's leading universities and institutions with an expanding provision in MOOCs. A further example is an open access to a growing corpus of over half a million PhD theses from universities across the UK with the British Library's Electronic Theses Online Service (EThOS). Both of these examples will feature for discussion in this chapter with respect to the nuanced meanings of openness and the tensions around human and machine re-use of content; the latter of which involves computational processes whereby texts and data are crawled and mined by software to build on and create new knowledge and derivative resources. Specifically, the research presented in this chapter is concerned with stakeholder reflections on a new paradigm for the co-design and co-development of data-driven language learning systems derived from open access content.

A definition for open access appeared for the first time in the declaration of the Budapest Open Access Initiative (BOAI):

> By "open access" to [peer-reviewed research literature], we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited (BOAI, 2002).

Colpaert (2016) from the field of Computer Assisted Language Learning (CALL) divides uses for data in language education into two main categories depending on divergent goals for re-use: data as content and data as information. The former data category includes authentic content found on the Web, including open access content that makes up the primary focus of this chapter. In contrast, the latter category includes information about data, otherwise known as metadata, which we also make use of in our research and refer to in this chapter.

Corpus linguistics researchers have demonstrated the importance of viewing language as data (Anthony, 2014; Hunston, 2002; McEnery et al., 2006; Sinclair, 2004). By way of extension, DDL can be viewed as a means for language teachers and learners to obtain, organise and study authentic language data derived from corpora in language education (Boulton & Cobb, 2017; Boulton & Pérez-Paredes, 2014; Boulton & Thomas, 2012; Chang, 2014; Cobb & Boulton, 2015; Vyatkina, 2016). There remains a persistent lack of exposure to and use of corpus-based systems and Natural Language Processing (NLP) tools by language practitioners in mainstream language education, however:

> Many of the 15 million English teachers in the world today, according to the British Council Annual Report (2010), have never heard of corpora, while many who are familiar with their use by lexicographers and grammarians are not aware that they can use them themselves, as could their students. (Thomas, 2017, p. 17)

For this R&D project, we identified a range of open, authentic domain-specific text and data sources that are of perceived value to the EAP community yet are off-limits for commercial re-use and development by the English language content publishing industry. In this chapter, we will share reflections on our work with representatives from knowledge organisations that manage and curate digital open access content, such as the British Library, who are working at the cutting edge of reforms in UK copyright law to create open access policy within their Research and Reuse Committee. In line with the Fair Use Doctrine, which is a limitation to US copyright law, an important exception and limitation to UK copyright law for TDM was introduced in 2014, whereby permissions were established for the non-commercial re-use of digital research content following an independent government report (Hargreaves, 2011).

One of the aims of this research has been to bring corpus linguistics researchers and EAP practitioners to the interface of data-driven language learning systems design for higher education through open initiatives in software development, research, education and publishing that support the co-design, co-creation and distribution of such systems. A further aim of this research has been to explore the potential of working with open, authentic academic texts that afford language specificity (Hyland, 2002; Strevens, 1988) in the development of teaching and learning resources for EAP that reflect the specific language and discourse features from target academic communities.

We will discuss the perceived value that EAP researchers, teachers and managers place on the efficacy of utilising authentic open access academic texts and corpora in data-driven approaches for blended learning. These perceived educational values will be weighed against the perceived risks held by knowledge organisations and the individuals working therein, such as curators, subject academics and educational technologists, regarding the remix and re-use of digital open access content and collections for non-commercial research and education purposes. For the scope of this chapter, we will explore the following research questions:

(1) To what extent can open access content foster open educational practices among academic English language stakeholders for designing, developing and evaluating data-driven language learning resources?
(2) What impact do the underlying business models and cultural practices of institutions and organisations have on open educational practices for remixing open access content in the design, development, implementation and dissemination of resources for EAP in higher education?

6.2.1 Research Materials

With this research, we have placed particular emphasis on co-designing and co-creating language learning systems for pedagogic purposes rather than for corpus linguistics research purposes. Drawing on the concept of knowledge mobilisation (Levin, 2011), our goal is to engage relevant stakeholders in moving available knowledge from research in corpus linguistics, open education and computer science (NLP and TDM) towards knowledge users, namely EAP practitioners and learners. The goal is for knowledge users to not only benefit from the research but to collaborate directly in an iterative design-based research process. Intermediaries working in knowledge organisations have acted as brokers and open education champions in this research by creating access to knowledge artefacts that are valued for re-use in EAP via initiatives in open access policy and reforms in copyright law.

Although the findings from this research are tied to issues with designing and developing open access content into data-driven learning systems, wider issues vis-à-vis the re-use and remix of open access content in language materials development practices will also be discussed as they apply to both classroom teaching and online learning. The Appendix at the end of this chapter provides an overview of our work to date. It identifies the knowledge organisations, researchers and knowledge users who have collaborated on the design and development of open data-driven systems for learning aspects of academic English in formal and non-formal higher education contexts with the FLAX[1] and F-Lingo[2] projects.

6.3 Research Methods and Results

Methods for collecting data from different participant groups in different locations over a period of years included: focus discussions, face-2-face and Skype interviews and email exchanges stemming from project meetings on observations and evaluations shared in this situated research. Three knowledge organisations have participated in the research (The British Library, The Oxford Text Archive and the Connected Repositories research group at the UK Open University). Eight researchers working in the area of corpus and computational linguistics and open education have participated in the research from higher education institutions in Aotearoa, New Zealand, Spain, Canada and the United Kingdom. Seven knowledge users working in EAP teaching and management from two UK universities have also participated in the research. Automated content analysis (ACA) was carried out on the complete corpus employing the Leximancer software version 4.5, and then on sub-corpora corresponding to data from the three stakeholder groups engaged in this research—knowledge organisations, researchers and knowledge users. Results from the ACA in this study were checked and then triangulated with participants

[1] http://flax.nzdl.org/greenstone3/flax.

[2] https://chrome.google.com/webstore/search/flingo.

in this qualitative research to create opportunities for participants to comment on transcripts and emerging findings. Thematic and conceptual findings in the datasets were then confirmed with participants as they pertain to reflections on the iterative design processes for designing open data-driven systems for academic English. The complete corpus and ACA visualisation maps of key themes and concepts from this R&D project are available for viewing on the Open Science Foundation[3] data platform.

6.3.1 Design-Based Research

Action research is a widely employed methodology in English language education research and teacher training programmes (Burns, 2009) and shares many of the same principles as design-based research (DBR). Pragmatism is central to both approaches, often employing mixed methods of inquiry to arrive at tangible solutions to educational problems. Within action research cycles, individual teaching practitioners carry out classroom teaching interventions to observe, record and reflect on the impact of these interventions over time to inform and improve their classroom and online teaching practice (Reason & Bradbury, 2007). In design-based research, another layer exists that requires educational practitioners to collaborate with research and design teams (Anderson & Shattuck, 2012).

Although DBR has sustained great interest from researchers and practitioners within the instructional design and educational technology milieu, it is nevertheless a long-term and very resource-intensive exploratory research method with goals and outcomes that are difficult to define. The literature on DBR attests to "a series of approaches, with the intent of producing new theories, artefacts, and practices" (Barab & Squire, 2004, p. 2). More specifically, these approaches have been defined as multiple research cycles that include numerous iterations of analysis, design, development, evaluation and revision (Walker, 2006; Amiel & Reeves, 2008; Hakkarainen, 2009; McKenney & Reeves, 2012). Data are collected over a minimum of several weeks but, in most cases, are collected over several months or years (Herrington et al., 2007) as has been the case with our research, which has been ongoing for over a decade now (Fitzgerald, 2019).

6.3.2 Automated Content Analysis

Automated Content Analysis (ACA) is situated within the framework of computational social sciences. It refers to a range of algorithms that employ probabilistic models, namely topic models and concept mapping models (Blei, 2012a, b), that iteratively infer the themes and concepts present within a corpus. ACA can be traced back

[3] https://osf.io/gbkzp/.

to the theoretical underpinnings of Latent Semantic Indexing (LSI; Papadimitriou et al., 1998), leading to the three-level Bayesian model of Latent Dirichlet Allocation (LDA; Blei et al., 2003). The current state of the art with ACA models involves the identification and analysis of higher levels of complexity found within thematic structures (Blei, 2012b). Current ACA systems include features for analysing "syntax, concept hierarchies, document networks and temporal trends in themes, furthering our ability to visualize and explore the literature" (Nunez-Mir et al., 2016). ACA is primarily used to automatically analyse text in digital format but also, increasingly, media content, e.g., images (Boumans & Trilling, 2016).

In this section, we look through the analytical lens offered by ACA at the different themes and concepts from each of the three participant groups in this study: knowledge organisations, researchers and knowledge users. Due to the limited scope of this publication, we will only be looking at the results of the top four themes in each sub-dataset for the three participant groups in this research. Where we present a summary and discussion of results from all three sub-datasets, themes and concepts from the data will be italicised.

Our reasons for employing the Leximancer ACA software to analyse the qualitative datasets were two-fold: to increase validity and to determine the lexical co-occurrence of information extracted from natural language into semantic or conceptual patterns using automated methods. Leximancer has been designed to mitigate subjectivity and researcher bias in the traditional content analysis processes of manual text analysis, coding and intercoder reliability testing. Through powerful automated methods, Leximancer is devised to make the human analyst aware of "the global context and significance of concepts and to help avoid fixation on particular anecdotal evidence" (Smith & Humphreys, 2006, p. 262). Leximancer performs two types of analysis on a ranked list of lexical terms found in a unified body of text or corpus: conceptual analysis and relational analysis. The conceptual analysis measures the presence and frequency of concepts in a document set by extracting words, phrases, or collections of words that represent a concept. The relational analysis is concerned with measuring the co-occurrence of concepts within a document set, extracting these co-occurring concepts to show their relationship.

The design principles that underpin the Leximancer software are founded on observations from the fields of corpus linguistics, computational linguistics and psycholinguistics, resulting in the development of the semantic and relational Leximancer algorithms that are employed in both stages of the software's co-occurrence information extraction technique (see Smith, 2000a, b, 2003). Leximancer was employed to mine the total qualitative dataset and sub-datasets for each participant group, resulting in a thesaurus of words identified within each corpus analysed along with their related meanings and surrounding words or collocates. The complete corpus and ACA visualisation maps of key themes and concepts from this R&D project are available for viewing on the Open Science Foundation[4] data platform.

As shown in Fig. 6.1, closely related words from the complete qualitative dataset in this study are identified by the ACA software as concepts and are represented as dots

[4] https://osf.io/gbkzp/.

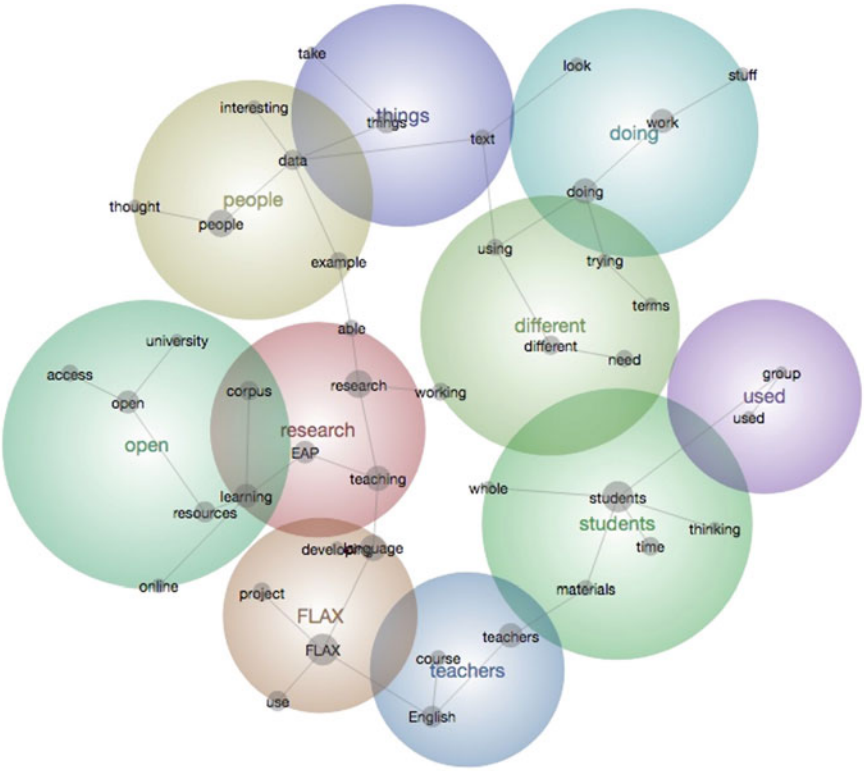
within thematic circles of interrelated concepts on a concept map. The key below the map indicates how many times the central themes occurred in the corpus. Important themes are mapped with warm colours. For example, *research* and FLAX appear in red and brown on the concept map (Angus et al., 2013). These two dominant themes are represented as tightly packed circles containing concept dots in close proximity to one another. The spatial alignment of these dots indicates how closely related concepts are within each key theme (Smith & Humphreys, 2006). For instance, *research*, *corpus*, *able*, *EAP*, *teaching* and *learning* are closely related concepts within the dominant *research* theme. Thematic circles are sometimes shown as overlapping with one another when concepts occur close to or across neighbouring themes, such as the concepts for *corpus* and *learning* within the *open* and *research* themes, which are central to this ongoing design-based research with the FLAX project and will provide a basis for the discussion section of this chapter.

6.3.2.1 Knowledge Organisations

The Leximancer analysis of data from the knowledge organisations group reveals *text* as the major theme. The concepts within this key theme of *text* emphasise *experiment*ation with *corpora* and *stuff*, with one frequent example in the dataset being the *EThOS* (Electronic Thesis Online Service) PhD thesis content at the British Library, in addition to the *terms* around *re-use*, and what you are *able* to do when *using* texts with *text* and *data mining*. The second most prominent theme is *work* with concepts reflecting the importance of *doing work* in the *open* as central to this design-based research with knowledge organisations. In close orbit to the *text* theme are the overlapping themes of *trying* and *example,* representing the third and fourth most frequent themes in the dataset, coming in closely behind the *work* theme. Of note in the *trying* theme are the connected concepts of *people trying* to do *things. Re-use* is the concept shared between the overlapping *text* and *example* themes. Also apparent in the *theme are the key interlinked concepts of example, collections and metadata for what can probably be looked at with respect* to research and development that focus on the *re-use* of *text* and their *metadata* from digital *collections*. In the discussion section, we will explore these themes and concepts further with reference to the terms and conditions around open access content re-use in this research with knowledge organisations.

6.3.2.2 Researchers

We now turn to interview data with education researchers who have worked with the FLAX project. The first researcher interviewed was Researcher 4, a legal English corpus researcher at the University of Murcia in Spain who developed the British Law Reports Corpus (BLaRC) with judicial hearings from around the world that subscribe to the English common law system. The corpus was made available with an open access government licence from the British and Irish Legal Institute (BAILI).



Theme	Hits
research	363
FLAX	359
people	276
doing	249
students	245
teachers	194
open	137
different	125
things	108
used	42

Fig. 6.1 Concept map and key derived from automated content analysis of the complete qualitative dataset

Researcher 6 also conducted doctoral research into lexical bundles with the FLAX project, focusing on the Chinese and New Zealand EAP contexts.

When we look at the Leximancer conceptual analysis for the researchers' group, of note are four prominent and overlapping themes: *FLAX, students, teachers* and *time.* Moreover, the concepts of *access, different, research, online, language* and *learning* appear in the overlapping foci areas of these top four central themes. In this section, we will summarise the findings from these concepts, which will form the basis for the discussion section of this researcher participant group later in the chapter. The *access* concept in particular, which appears in the overlap between the *FLAX* and *students* themes in the ACA, is expressed in the data as issues related to conducting *research* that provides students with *access* to and *use* of *different corpora, data* and *systems* in *FLAX* that can support their *online language learning* with formal language *courses* and non-formal *MOOCs.* Of interest, the *access* concept is also expressed in the data in relation to the issue of gaining *access* to *students* through *working* with *language teachers* to conduct *research* into the *use* of the *FLAX system.* This last point on *access* is further extended into the sixth most frequent theme in the dataset, *study*, with concepts expressing the *need* for *user studies* on the uptake of *FLAX*. In addition, the issue of *access* is further expressed by how *teachers* may be *interested* in *working* with the *FLAX project* but are limited in terms of the fourth most frequent theme, *time,* due to the heavy emphasis placed on *teaching* and *learning* and not on conducting *research* at their institutions.

6.3.2.3 Knowledge Users

Of the seven EAP practitioners who participated in the research, only one (Knowledge User 1) from Queen Mary University of London (hereafter referred to as QMUL), had extensive experience with using corpus tools in his classroom teaching, namely the Sketch Engine[5] suite of tools for querying and sketching corpora. The three other participants at QMUL (Knowledge User 2, Knowledge User 3 and Knowledge User 4) all had a background in CALL for developing online EAP resources, most notably Academic English Online.[6] The three EAP teachers at Durham University who are former EAP teaching colleagues of Researcher 1 (Knowledge User 5, Knowledge User 6 and Knowledge User 7), were early adopters and advocates for using open-source software and OERs in their classroom teaching as a means of ensuring that their students had access to high-quality free and open online teaching and learning resources during and after their courses had finished. The EAP practitioners in this study expressed that the motivation to adopt open educational practices as they apply to academic practice in higher education was a motivating factor for participating in the research with the FLAX project.

The dominant themes arising from the Leximancer analysis of interviews and focus discussions from project meetings with knowledge users—EAP teachers and

[5] https://www.sketchengine.eu/.

[6] http://aeo.sllf.qmul.ac.uk/.

course managers—are *EAP* followed closely by *students, things* and *people*. In summary, results from the ACA of this sub-dataset point to issues concerned with the concepts of *EAP* and the *teaching* of *academic English language* from the largest theme, *EAP*. The second-largest theme in the data, *students*, reveals issues around *materials* for *teaching students* that *teachers* are developing themselves or those *materials* that have been developed by commercial publishers and reflections on what does and does not *work* in practice. The third most frequent theme in the dataset, *things*, is representative of concepts related to what *needs* to be done with *research* using *things* and *materials*. In the fourth most frequent theme, *people*, an interesting interplay of concepts are revealed in reference to *people* as being those EAP teachers working in universities who do or do not create *access* to *open resources* for *education*, and also in reference to *people* outside of the university who can and cannot *access open resources* for education. The themes and concepts outlined here in this section will be explored in more depth in the corresponding discussion section of this paper on knowledge users.

The work at Durham University took the form of an OER cascade training project with the participating EAP practitioners and their students that introduced them to four online data-driven text analysis language learning systems: Lextutor,[7] AntConc,[8] Word and Phrase[9] and FLAX. This OER cascade training work led to collaborative evaluations and further development iterations of the Learning Collocations collection in FLAX with the addition of the open access British Academic Written English (BAWE) corpus managed by the Oxford Text Archive for a specific focus on academic English collocations. It was written up as a case study for the UK Higher Education Academy (Fitzgerald, 2013). This work at Durham also resulted in the development of the full-text BAWE collections in FLAX that focused on novel ways to search and browse augmented academic texts that represented different genre types from across the disciplines of the arts and humanities, the social sciences, the physical sciences and the life sciences (Wu & Witten, 2016).

The work at QMUL focused on design collaborations with open access PhD thesis abstract content managed by the British Library for the development of domain-specific micro-corpora and interactive games with Android mobile apps for uptake on QMUL's pre-sessional EAP programmes (Fitzgerald et al., 2014). The work with QMUL led to a further design iteration with the development of the much larger PhD Abstract collections in FLAX of 9.8 million words (Wu et al., 2018).

6.4 Discussion

This section discusses prominent themes and interrelated concepts from the ACA of the qualitative datasets. We drill further down into the data that captured reflections

[7] https://www.lextutor.ca/.

[8] http://www.laurenceanthony.net/software.html.

[9] https://www.wordandphrase.info/.

from participants in the research to present relevant themes and concepts identified in transcriptions. Where we refer to actual data for discussion, themes and concepts will be italicised.

6.4.1 The Four Pillars of Re-Use in Knowledge Organisations

Our research with knowledge organisations in developing open corpora for EAP shows that it often comes down to those individuals working on the inside who are reasonably au fait with copyright law as it pertains to open access and open educational practices and who are willing to champion the re-use of resources and encourage the development of open policies within their organisations. We have seen this type of open access policy championship with the EThOS service team manager and the British Library Labs project manager. The progress with policy development for open access and re-use that enable TDM approaches with digital collections at public knowledge organisations such as the British Library is contrasted with the absence of open education policy in higher education institutions, where there has been less progress made with the re-use of educational content. Open access, in most cases, to read-only research publications and, in lesser cases, to pedagogic content has become the default re-use position of most universities and mainstream MOOC providers.

Once again, those individuals who are already open education practitioners who have openly licensed their educational resources with Creative Commons licenses have enabled the FLAX team to develop derivative language learning collections. Open licensing supports their wider practices in open digital scholarship (Weller, 2011)—via blogs, public lectures, MOOCs, networked courses etcetera—to widely promote the subjects they are passionate about. Notably, Professor Fisher of the CopyrightX micro-networked course has deliberately applied his expertise in understanding the ins and outs of copyright law by licensing his teaching and learning content as CC-BY with Creative Commons. His goal was to maximise the number of possibilities in educational projects.

The participating knowledge organisations in this research differ regarding policies and practices around re-use. British Library Labs (BL Labs) is an Andrew Mellon Foundation-funded initiative that supports the remix and re-use of the British Library's digital collections and data for research and educational purposes. In an interview with the project manager of BL Labs (Knowledge Organisation Representative 1 in the transcript corpus), we discussed the FLAX project research with the EThOS PhD theses dataset for the development of the PhD Abstract collections, wherein he identified four pillars for the re-use of this dataset that can be broadly applied to the re-use of other digital collections at the British Library:

(1) "Do we have an expert with curatorial knowledge of a particular *collection* who is on board with *re-use*? Some curators are not concerned about that at all. All they care about is the preservation and not about who *uses* it.

(2) Do we know where it, the collection, is? A description of something is one thing but who actually has the digital files? Can they be accessed?
(3) Is there any *metadata*? That obviously helps enormously because it means that you can then release the *metadata*, normally. But even *metadata* has licenses as well… so, who owns that *metadata*?
(4) Is the *collection* close to being copyright-cleared? And what I mean by that, I actually mean, is it, could it potentially, easily, be available under an *open* licence?"

(Interview with BL Labs Manager, British Library, London, UK)

With the harvested PhD theses in EThOS at the British Library, the provenance is very mixed, whereby there is no one set of terms and conditions for re-use of the open access content found therein. This phenomenon is largely a reflection of the different universities where the research was carried out and is dependent on whether or not there were industry investments in the research, for example, which would result in copyright stakes. Due to this mixed provenance, the British Library has undertaken measures to balance any possible research instances of re-use with any identifiable potential risks such as mass copying, misrepresenting and misquoting of the EThOS dataset. As with the Oxford Text Archive, a cautious approach has been adopted at the British Library with respect to TDM, whereby collections are only available for non-commercial re-use purposes on a request-only basis. The BL Labs manager does, however, acknowledge the iterative nature of research and encourages the practice of "dogfooding" at the British Library, whereby collections management teams, such as the EThOS team, engage in internal research on the re-use and remix of collections to anticipate affordances and hindrances with conducting research:

> Knowledge Organisation Rep 1: First, to *work* with a collection it's important to ensure that there's a human being who can tell you the story of that collection because you don't know what may be lurking in there and it may not be about legal issues. It could be political. It could be financial. But that information isn't always documented.
>
> Researcher 1: Sorry to interrupt you there, but were there any issues around *EThOS*?
>
> Knowledge Organisation Rep 1: Well, I think there are still issues really because the problem of *doing* this work is because the intellectual property is going to be dependent on the institution and their relationship with their students. It seems that that is not straightforward with all the different institutions. So, if you do a PhD at an institution, you're under the IPR for that *work*, and I think that different universities have different views and policies.
>
> Researcher 1: So, it's not always automatically the student's *work*? I thought it was.
>
> Knowledge Organisation Rep 1: All I know is that some *work*, some PhD *work*, is embargoed because it has commercial sensitivities in there. So, for *example*, somebody might…
>
> Researcher 1: Because they've been funded by…?
>
> Knowledge Organisation Rep 1: Yeah, because they've been funded by Panasonic, for *example*.
>
> Researcher 1: Yeah, I get that.

Knowledge Organisation Rep 1: There could be, depending on the PhD and the funding stream, so it could not only be the university, it could be the funder, the funder might have certain requirements. It could be commercial. It could be a funding council. What you're getting is a harvested bunch of stuff in *EThOS* where the provenance is very mixed, and I think the team have decided to take a very cautious approach in terms of being *able* to do things like *text* and *text* and *data mining*, so, you know, it's on a request only basis. Because, especially, you know, about the possibility that there could be commercial *re-use.*

Researcher 1: Yes, I think that's getting back to your original point about the library wanting to know what your research questions were before *doing* the *work*.

Knowledge Organisation Rep 1: Exactly.

Researcher 1: And that's when somebody puts in a request, for *example.* We want to *re-use* these *text*s for these purposes, and this is what the end result will *look* like kind of.

Knowledge Organisation Rep 1: Yeah, but the problem with that is, in our experience, is that research doesn't *work* like that. With research you don't know what you're going to get. You might know your research questions, but the whole point and nature of research is that it's iterative. You know, you *experiment*.

Researcher 1: I'm glad to hear you say that because, you know, that was our experience with the Oxford Text Archive when we requested the BAWE *corpus*. Because we didn't know in advance that we'd be Wikifying whole *text*s but then we had the technology to do it. In particular, I mean, all the prior *work* we had done with Wikipedia *mining* at the Digital Library Lab at Waikato. And, we thought, well, Wikification may well be useful for language learning so let's add this functionality for learners. So, the BAWE *collections* became our first Wikified *collections*, and you can see this feature in our subsequent *collections*, including the PhD Abstract *collections* with *EThOS metadata.* But this *work* with Wikification wasn't in our initial request to the OTA, which was instead very general in terms of what we were proposing to do.

Knowledge Organisation Rep 1: Yeah, I think in general, I understand why there needs to be this clarity but unfortunately, it's a complete misunderstanding of the whole scholarly process. The scholarly process is actually incredibly creative, and you know, you don't know by the very nature of research, that you don't know what you're going to find. And, you know, it's surprising what comes along the way. Ideas will come along the way, and that's just the nature of research. So, we have found that really challenging. And, what we've decided to do, I think, is to be *work*ing on research questions where they can be sort of dealt with on a case-by-case basis, and also to agree on what the outcomes are going to be. So that, like, if *people* want to publish *work*, what actually can be published, and what can't be published because of the sensitivities at the moment. We're also having quite a lot of requests to do *text* and *data mining work* with our non-print legal deposit *stuff*.

(Interview excerpt with BL Labs Manager, British Library, London, UK)

6.4.2 Issues of Access in DDL Research

The automated content analysis of the entire qualitative dataset reveals a direct link between the knowledge organisations and researchers' sub-groups with overlapping themes of *access*. Put simply, access to digital collections that can be re-used by researchers, in this case, corpus linguistics and open education researchers, is due in

no small part to the open access and open education policies adopted by knowledge organisations and the gatekeepers working within those organisations who implement these policies to promote open access and re-use.

We turn first to a discussion with Researcher 4 in this study on the perceived affordances of re-using and remixing open access publications for open data-driven learning in DDL research with reference to the BLaRC of 8.85 million words (Marín et al., 2014), which is derived from open access judicial hearings licensed with a government license and available from the BAILII online service. Marín developed the BLaRC due to the lack of relevant, authentic materials for teaching the specific area of legal English in EAP. We invited her to include her corpus on the FLAX website so that it would be openly accessible for data-driven language learning in addition to corpus linguistics research. Researcher 4 was interviewed about the making of the BLaRC, which highlights the affordance of the *access* concept as a prominent concept in the interview data with applied corpus linguistics researchers, and how this had enabled the development of legal English resources from open access content in comparison with proprietary legal content services that require licence subscriptions:

> Researcher 1: You know, my next question: Could you even have built the BLaRC without those open government licenses on all of those documents, those judicial hearings in the BAILII (British and Irish Legal Information Institute)?
>
> Researcher 4: No, that's the thing, that's the thing. The amazing discovery was the BAILII […] I was *thinking* about buying a licence for LexisNexis, I think it's called. There are a couple of them, which cost a fortune, a fortune. I'm not sure but I think law firms, they pay, I don't know, four or five thousand pounds a year for having that kind of *thing*, which is amazing […]
>
> Researcher 4: Actually, the University of Murcia doesn't have *access* to that database because one of my colleagues was in Madrid, she was a visiting researcher there, and she downloaded like a hundred thousand texts from LexisNexis because she didn't know that the BAILII existed. So, when she came here, and we were talking, and I said, *look* there's this site [the BAILII] and they have added a lot of overseas legal documents, including United States documents. They have the whole planet in there. It's amazing how much stuff you can find. So, to me it was a huge, huge discovery. That was the best thing that could have happened to me. That's why I started my *research* on legal *corpora.* I mean that was one of the reasons.
>
> Researcher 1: *Access* is so key, isn't it? And I'm sure that's a big part of why the BAILII exists as well because they knew people couldn't *access* LexisNexis.
>
> (Interview excerpt with Researcher 4, via Skype from Murcia, Spain)

The experience of Researcher 6 in this study regarding attempts to carry out DDL research with language teachers and learners in China highlights another aspect of the *access* concept as it intercepts with the dominant themes for *FLAX, students* and *teachers* within the qualitative dataset. Her greatest challenges were with securing *access* to research sites with *students* and *teachers* in China to test out the efficacy of the Learning Collocations collection in the FLAX system. She and Researcher 1, both of whom come from the field of education, discussed the role of *use* or user *studies*—prevalent concepts within the data—with tools and projects like FLAX that

stem from computer science as they are applied to the *students* theme for educational researchers:

> Researcher 1: They talk a lot about *user studies* in computer science, don't they?
>
> Researcher 6: Yeah, but those *user studies* are only to prove that the tool works.
>
> Researcher 1: Right, the focus is not to prove that *learning* has occurred with use of the tool.
>
> Researcher 6: No, the purpose of such *user studies* in computer science is not to promote the application of the tool. So, for them the end of their *project* is that the tool has been developed successfully but for *English teachers* with *English language learning* tools, that is the beginning. But between the end of computer scientists completing the development of a *learning* tool and the beginning of *English language teachers* adopting a *learning* tool in their *teaching* there is a gap.
>
> (Interview excerpt with Researcher 6, University of Waikato NZ)

The importance of user studies in this design-based research leads into our final section of analysis on the data collected with knowledge users, EAP teachers and managers at two UK universities, Durham and Queen Mary.

6.4.3 Barriers to Remixing Texts in Data-Driven EAP Materials Development

Collaborative work with Durham and Queen Mary revealed that data-driven approaches are not embedded within materials development and classroom teaching practices at these two UK universities. However, online corpus-based resources have a valued place as supplementary EAP materials. Most DDL tools and corpus-based systems were viewed by the majority of participants at Durham and QMUL as stand-alone web-based reference resources for students to explore outside of classroom teaching time.

Issues stemming from the design-based research carried out with Durham and QMUL include the limited amount of time EAP teachers have in the classroom with students to focus on discrete language items and the infeasibility of shepherding large groups of students in developing and mining personalised domain-specific corpora for focused help with dissertation and thesis writing, for example. This is despite some promising findings from research into DDL approaches with smaller, more tailored EAP classes for building Do-It-Yourself digital corpora with students to help with PhD thesis writing (Charles, 2012, 2015).

The focus-group discussions with managers at QMUL on the increased availability of open access content point to what EAP practitioners are now *able* to do with *academic things*, *resources* and *materials* for *use/using* with *students* as they emerge in this sub-dataset for the top four themes related to knowledge users: *EAP, students, things* and *people.* Knowledge User 2, manager of multimedia language support at QMUL, describes the approach of developing transferable skills in EAP materials

development with revising and repurposing open access research publications as being one that is closer to traditional approaches with the re-use of authentic language content for classroom teaching purposes:

> Knowledge User 2: You know, I think the thing about *open* educational *resources*, the question here, or part of the question here, which we discovered in this *project*, for example, is if you *take* a text, a raw text, which is not adapted for *teaching* like an article, it has *EAP* potential because it's an authentic *academic* article. Then the *ability* to use that and to put it into *materials*, or adapt it, modify it, or change it under the Creative Commons thing is the revelation. Because we've all been doing it for years anyway, from copying it from a book or something when we've not supposed to have been adapting it, changing it, or whatever.
>
> (Knowledge User 2, focus-group discussion excerpt, Queen Mary University of London UK)

From the same focus discussion, the pre-sessional course director at QMUL, Knowledge User 3, talks about the barriers to people working in universities from openly sharing EAP materials across institutions and how they are tied to each university's business model with the aim of promoting their particular brand of EAP courses and materials as a unique selling feature. He also discusses the rise in influence of commercially produced EAP publications and the re-use of third-party materials from these publications as seeping into university EAP course materials development practices, which in turn creates a further barrier to sharing due to copyright infringement:

> Knowledge User 3: There is a certain degree of *open*ness but there is also this desire for everything to be branded, and a certain amount of clutching to your chest, especially about pre-sessional *materials.* […] This is Queen Mary *material*, this is Southampton *material*, this is Durham *material*. But I think when you get back to the institutional level, those are where the real barriers lie because *people* are, and that comes down to the cut n paste culture that means a lot of third-party *materials* end up in our *materials* and are branded as being in-house but a lot of them are not really. You know, the ideas come from published *materials* and they're probably not properly acknowledged anyway because they're only being used internally. And part of that barrier to sharing more *open*ly is raising an awareness of our existing practices and this means they don't want to share between institutions because they're worried that *people* will see just how much cut n paste is going into those *materials*. And I think the loser is the *student*, you know, because if *people* were really producing and sharing the best that they could amongst institutions to then create the best *EAP* pre-sessionals then the *students* would obviously benefit.
>
> (Knowledge User 3, focus-group discussion excerpt, Queen Mary University of London UK)

From a meeting with QMUL EAP teacher, Knowledge User 1, the concepts of *open* and *access*, which congregate in the *people* theme, relate to frequent references in the data of how people outside the university can also benefit from *education* and *resources* that are openly accessible via the Internet:

> Knowledge User 1: This *open*-source software and *open access* approach to data-driven *learning resources* does threaten current business models in *EAP* provision, doesn't it? This idea of yours to re-use the artefacts of the academy. This really bucks some *people* in academia.
>
> Researcher 1: Tell me more about that because that's what I think is important to be doing in higher education, but I realise that this isn't everyone's priority.

> Knowledge User 1: That's what I think is important as well. It's the ivory tower, isn't it? It's the secret garden behind the firewall of the ivory tower.
>
> […]
>
> Knowledge User 1: Now, yes, I need *people* within this higher education environment [Queen Mary] to re-use these *academic* texts but I also *need people* to come into this *FLAX* environment, *people* who *need* to interface with this environment for whatever *academic English need* they have, and that's what *FLAX* does for them in a manageable way. It makes it *access*ible not only to *people* who are using it in situ within the privileged brick-n-mortar of the academy but for *people* who, like I say, *need* to interface with that in some way outside of the academy, and, oh, that matters. The *resource* is not just locked inside our intranet-based VLE [Virtual Learning Environment] where I have developed *learning resources* with links out to *FLAX* on the web, which is really a Mickey Mouse version of *FLAX* in here.
>
> (Meeting excerpt with Knowledge User 1, Cutty Sark pub in Greenwich, London, UK)

6.4.4 A Crisis in EAP Identity

An emerging tension in formal EAP is the issue of EAP practitioner identity in the neoliberal university (Ding & Bruce, 2017; Hadley, 2015; Hyland, 2002). Where are EAP service units placed in universities, and more importantly, how are they received and perceived by the wider academy? At its best, EAP is viewed as drawing on and contributing to a rich knowledge base from research in systemic functional linguistics, genre theory, corpus linguistics, academic literacies and critical EAP (Ding & Bruce, 2017). At its worst, EAP has been conceived as having "accepted the role as an economic and intellectual short-cut… [with] maximum throughput of students with minimum attainment levels in the language in the shortest possible time". (Turner, 2004, pp. 96–97).

There has been an upswing in commercially produced EAP publications with a notable shift in focus towards generic academic skills and processes. The increasing prominence of generic EAP publications can be seen to exacerbate the growing fissure in EAP practitioner identity with the emergence of two opposing camps: English for General Academic Purposes (EGAP) versus English for Specific Academic Purposes (ESAP). The received definitions and understandings from the literature indicate that EAP is a subset of English for Specific Purposes (ESP) (see ETIC, 1975; Widdowson, 1983; Swales, 1985; Flowerdew & Peacock, 2001; Howatt, 2004; Belcher, 2010; Charles & Pecorari, 2016; Anthony, 2018). However, this understanding of EAP as being concerned with the teaching and learning of domain-specific language appears to have become conflated and confused as the popularity of generic skills-based EAP textbooks, subscription-based supplementary online resources and programmes continues to rise (Gillett, 2018).

The absence of data-driven approaches in the design of EAP classroom teaching and online materials is a recurring theme in the sub-dataset from knowledge users. In a focus-group discussion with former teaching colleagues at Durham (Knowledge User 5 and Knowledge User 6), reflections turned towards collaborative work that

involved trialling corpora and data-driven approaches for EAP (Fitzgerald, 2013). The discussion drew comparisons between the explicit focus on the teaching and learning of domain-specific language against a growing perception that the culture and practice of EAP are moving away from a focus on language towards generic skills, and the implications that this shift in focus might have for teachers and students:

> Knowledge User 6: I think one major, major, major issue with *EAP* is that it has become so un-*language* focused. It's moved so far away from *teaching language*. And, *students*, of course, can't understand this because that's what they think they're paying for. They think we're there to *teach* them the *English*. *I* think I'm there to *teach* them the *English* but the powers that be think that we're there to *teach* them *EAP*.
>
> Researcher 1: I mean we didn't do any, there was no *time* in the timetables for *language*, right?
>
> Knowledge User 6: No, for *language*, nothing. It's all just skills.
>
> Knowledge User 5: I couldn't believe it when I started *teaching EAP*.
>
> Knowledge User 6: Skills and process. And this is so deeply concerning when they don't have the *language* to express their ideas.
>
> Knowledge User 5: I think that's why when they started this redundancy thing, oh well, I didn't fight it because I'm not *teaching language* in *EAP* and I enjoy *teaching language*.
>
> (Focus-group discussion excerpt with Knowledge User 5 & Knowledge User 6, Café Nero, Durham UK)

Corpora provide teachers and learners with access to linguistic data that show how language is used across a variety of real-world communication contexts. There have been many successful commercial language coursebook publications that are informed by corpora. However, many more coursebook publications appear to fly in the face of evidence-based approaches to materials writing for meeting the demands of an English language education content industry that seems to be driven, first and foremost, by market research rather than research into whether or not materials have positively influenced teaching, learning and language acquisition. A meeting with EAP teacher, Knowledge User 1, highlights some of the issues with EAP materials writing with commercial publishers. Despite materials not always drawing on evidence of how language actually works, they are still widely marketed for sales distribution and consumption:

> Knowledge User 1: What I saw with him [EAP materials writer with Oxford University Press] was, with his presentation at IATEFL [International Association for Teaching English as a Foreign Language] was, that it was no more or less like really saying that THESE *materials* he is selling are THE exponents that we *need* to *teach students*. And it was still very much along the lines of we *need* to *teach* them yet more fixed phrases. And I was like sitting there and thinking some yes, some no, but prove it. I can—Can you? And he was putting up his *examples*, and I had my tablet *open* using *FLAX*, and I was going that *example* of his *works*, and that *works*, that doesn't *work*, that *works*, that doesn't *work*. But he's just basing it on his own judgement. And I'm just sitting there testing. Just right in front of him, testing his *materials*.

Researcher 1: And, you would have thought that he would have tested his *examples* with a corpus-informed approach before presenting them at IATEFL let alone publishing them with OUP. You have to wonder where the quality control lies if at all.

[…]

Knowledge User 1: The vast majority of my colleagues at Queen Mary have been pretty *open*-minded, and they've been looking at *FLAX* and they can see that it's real *academic language* data. It's the authenticity of it.

Researcher 1: Yes, that always wins out, doesn't it?

Knowledge User 1: Of course, it does but first of all they *need* to know that these non-commercial data-driven systems exist and that's where the commercial publishers have the upper hand.

(Meeting excerpt with Knowledge User 1, Cutty Sark pub in Greenwich, London UK)

6.5 Conclusion

With initiatives in open access and the changes to copyright legislation that have brought about TDM limitations and exceptions, we have seen the greatest distance travelled with this design-based research, resulting in the co-creation of the following language learning collections that remix open access content for learning features of academic English: the largest English language collocations collections used by learners online (Wu et al., 2021), the full-text BAWE collections in collaboration with EAP teachers at Durham University, the EThOS PhD abstract corpora with participating EAP practitioners from Queen Mary University of London, the legal English BLaRC collection by Dr Maria Jose Marín from the University of Murcia, and the Academic Collocations in English (ACE) corpora with the COnnecting REpositories (CORE) aggregation and Application Programming Interface (API) services at the UK Open University. There is a growing sense that knowledge organisations such as the British Library and the Oxford Text Archive and aggregation and API services such as CORE are interested in non-commercial educational re-use applications of open access content that are aligned with the Budapest Open Access Initiative. Indeed, by far the biggest impact of openness in the higher education sector has been with open access, showing the importance of knowledge organisations in promoting accessible and reusable research (Finch Group, 2012).

The research presented on remixing MOOC content with TDM approaches provides proof of concept for the importance of licensing MOOC content openly for much-needed data-driven support with domain-specific language in non-formal education that has re-use value in formal EAP education (Fitzgerald et al., 2017). This increased value from open language learning online is echoed by the upswing in the enrolment in language MOOCs that have emerged during the pandemic (Martín-Monje & Borthwick, 2021). However, findings from our research point to a current problem with the scalability of developing derivative OERs from MOOC content, with the example presented here of providing data-driven language support in the

MOOC context. This problem is apparent in current mainstream MOOC provision where current business models do not anticipate a need for the open licensing of course content, and where open educational practices are mostly limited to those subject academics and learning technologists who were already open digital scholars before engaging in MOOC and networked learning pedagogy. Rather, current MOOC business models appear to focus on charging learners for increased access to learning content. This phenomenon has been presented here as an issue that open education policy makers, in collaboration with Creative Commons, are actively lobbying to address. As a work-around solution for embedding the functions and open corpora of FLAX directly into a MOOC platform interface, research is currently being carried out by Dr Jemma König at the University of Waikato with the development of F-Lingo, a Chrome extension. F-Lingo works on top of the FutureLearn platform to support content-based learning of domain-specific terminology and concepts for academic and professional English. Nonetheless, this work with F-Lingo would still require higher education institutions to allow the traversing and re-use of All Rights Reserved course content for the R&D of automated language learning support in the MOOC context (Fitzgerald et al., 2019; König et al., 2022).

The observed absence of data-driven approaches to support EAP provision at two UK universities, and the apparent shift away from language teaching, as noted in focus-group discussions with teachers and managers, give pause for understanding current practices with EAP materials development for classroom and online learning in a time of increased uptake of generic EAP course books from commercial publishers. By drawing attention to the underlying business models and cultural practices that higher education institutions and organisations adopt, we also arrive at a closer understanding of the values placed on research, or lack thereof, with online and classroom materials development and teaching in the field of EAP.

The new paradigm for open data-driven language learning systems design presented through this research has also argued for greater access to and re-use of the artefacts of the academy and professional domains such as law, for example, that are taught and studied at higher education institutions. In this chapter, we have demonstrated the perceived value that corpus linguistics researchers and knowledge users working within EAP place on pedagogic, professional and research texts that can be mined for aspects of domain-specific language with data-driven learning systems. In addition to the value placed on open educational practices that can be fostered to re-use, remix and redistribute EAP resources for uptake across formal and non-formal higher education in increasingly uncertain times.

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University of London and the Durham Centre for Academic Development at Durham University in the UK.

Appendix

Open Collections in FLAX: Content and Collaborators

Learning collocations system in FLAX (2009–2022)	
Content	• Wikipedia corpus of contemporary English derived from three million Wikipedia articles comprising three billion words (Wu & Witten, 2016; Wu et al., 2021) • British National Corpus (BNC) of 100 million words (BNC Consortium, 2007) • British Academic Written English (BAWE) corpus of 2500 pieces of assessed university student writing from across the disciplines • Academic Collocations in English (ACE) corpora of harvested open access content and metadata from 135 million articles residing in open journals and open repositories
Knowledge organisations	Wikimedia Foundation (Wikipedia corpus); Oxford Text Archive and the UK Higher Education Academy OER International Programme with the University of Oxford (BNC and BAWE corpora); CORE (COnnecting REpositories)[10] team, UK Open University (ACE corpora)
Researchers	FLAX team
Knowledge users	Waikato University computer science students; Durham University EAP teachers and students; University of Oxford OER International stakeholders
British Academic Written English (BAWE) collections in FLAX (2012)	
Content	Full texts of the BAWE corpus divided into four sub-collections: Arts & Humanities, Social Sciences, Life Sciences, Physical Sciences
Knowledge organisations	The Oxford Text Archive; UK Higher Education Academy
Researchers	FLAX team
Knowledge users	Durham University EAP teachers and students; University of Oxford OER International stakeholders
British Law Report Corpus (BLaRC) in FLAX (2014)	
Content	8.85 million-word corpus of full-text judicial hearings derived from free legal sources at the British and Irish Legal Information Institute (BAILII)[11] aggregation website
Knowledge organisations	BAILII
Researchers	Universidad Murcia; FLAX team

(continued)

[10] https://core.ac.uk/about#mission.

[11] http://ials.sas.ac.uk/digital/bailii.

(continued)

Knowledge users	Law MOOC learners
MOOC/micro-networked course collections in FLAX (2014–2016)	
Content	MOOC / Micro-Networked Course lecture transcripts and videos (streamed via YouTube or Vimeo) and case law that reside in the public domain
Knowledge organisations	MOOC host institutions (Harvard University; University of London; Columbia University) with edX and Coursera MOOC providers
Researchers	FLAX team; Universidad Murcia
Knowledge users	MOOC learners and MOOC subject matter experts; legal English translation studies teachers, and students at the University of Murcia
PhD micro-abstract corpora with FLAX mobile activities (2014–2015)	
Content	Domain-specific micro abstract corpora in the areas of Law, Water Politics and Tourism Studies. Developed in collaboration with EAP teachers at Queen Mary University of London for use on summer EAP pre-sessional courses. Developed with web-based and mobile language learning activities using the suite of mobile applications for Android from FLAX
Knowledge organisations	British Library Labs[12] and EThOS[13] at the British Library
Researchers	FLAX team
Knowledge users	EAP teachers and learners at Queen Mary University of London
PhD abstract corpora in FLAX (2015–2016)	
Content	9.8 million-word corpus derived from the metadata, including the abstracts, of over 500,000 PhD theses awarded by UK universities and managed by the Electronic Thesis Online Service (EThOS) at the British Library
Knowledge organisations	British Library Labs and EThOS at the British Library
Researchers	FLAX and F-Lingo teams
Knowledge users	EAP teachers and managers at Queen Mary University of London; Current research with MOOC learners via F-Lingo Chrome extension and FutureLearn platform
Academic Collocations in English (ACE) collections in FLAX (2018–2022)	
Content	Harvested open access content from open journals and open repositories divided into four sub-collections: Arts & Humanities, Social Sciences, Life Sciences, Physical Sciences
Knowledge organisations	CORE (COnnecting REpositories) team, UK Open University
Researchers	FLAX and F-Lingo teams
Knowledge users	• User query data analysis research with the FLAX LC system learners worldwide • Research with MOOC learners via F-Lingo Chrome extension and FutureLearn platform

[12] https://www.bl.uk/projects/british-library-labs.

[13] http://ethos.bl.uk/Home.do.

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Chapter 7
Who Builds It, Who Benefits? Deepening Student and Faculty Knowledge About Wikipedia's Scholarly Value

Laurel Smith Stvan

Abstract Students and faculty can jointly play a role in how Open Educational Resources (OERs) are created and deployed by assigning students to expand Wikipedia pages. By producing re-usable OER materials, these assignments provide students with transferable research skills and collaborative learning opportunities, face-to-face or remotely. By taking part in the production of open-access materials, students practice sharing knowledge with a larger community and receive feedback from interested readers beyond their instructor and classmates. In addition, introducing more students to Wikipedia editing tools can increase the diversity of editors and topics in gender, language, ethnicity, and region. At the same time, learning about Wikipedia editing standards can provide instructors with evidence of Wikipedia's validity for practicing and vetting scholarly research. Seeing Wikipedia be revised, annotated, and expanded helps demonstrate content gaps in a discipline's materials, highlighting choices about which topics are included and which count as notable. In supporting the OER curriculum, WikiEdu's training provides instructors with a structure for helping students master Wikipedia rules and interfaces while still learning class content. In addition, for instructors who are more familiar with single-authored textbooks or science communication posts, Wikipedia editing can help address hesitations about the quality of multi-authored, crowdsourced OERs and provide another venue for increasing public awareness within instructors' fields. Using instructor and student reflections on integrating Wikipedia editing assignments in five American linguistics classes, I show how these small OERs can allow groups and individuals to incrementally affect the coverage of a growing global reference work.

Keywords Wikipedia · Pedagogy · Diversity · Collaborative writing · OER · Linguistics

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7.1 Introduction

7.1.1 OER Background

The twenty-first century has seen rapid development in open educational resources (OERs), pedagogical materials licensed to be freely available for instructors to revise, reuse, and share. In scope, these range from sets of full courses, such as MIT's OpenCourseWare projects (MIT, 2001), to textbooks and more modular components like repositories of readings, media, and assignments. Anticipated outcomes for using OERs include offering more affordable materials for students, creating more relevant and easily updated content, and offering ways for students to play more active roles in their education (Butcher, 2015). Early work focused on "developing and releasing OER content rather than researching its impact" (Weller et al., 2015, p. 352). Evidence of the effectiveness of OERs in meeting these goals, however, is now accumulating (e.g., Hilton, 2016; Weller et al., 2015). Observed achievements include benefiting learner engagement, achieving learner outcomes, and saving students money while leading instructors to reflect more on their practice and attempt greater instructor experimentation and innovation.

Much OER work has been supported through centralized units within school systems along with campus-external foundations such as the William and Flora Hewlett Foundation (Bliss & Smith, 2017; Stacey, 2010), providing training for instructors learning to create shareable textbooks. But instructors are also tailoring coursework for their own students' needs. Collaborative articles in wikis—crowd-sourced digital documents—can serve as kinds of reusable, "little" OERs (Hoyle, 2009; Weller, 2010). Working in wikis lets writers create and openly share knowledge with fewer up-front costs than OER courses or book series. Wikis can be both a student class resource (Meseguer-Artola et al., 2019) and a setting for doing classroom editing assignments, helping students to master assessing and creating discipline-focused content themselves (Dawe & Robinson, 2017; Olivier, 2014; Rotramel et al., 2019; Villeneuve, 2019; Walker & Li, 2016). Assigning students to create or improve Wikipedia pages, in particular, can create long-term OER materials while providing students with transferable research skills; such editing tasks have also been shown to improve the diversity of Wikipedia editors and page content and provide remote learning opportunities (Stvan, 2021). In this chapter, I distill conclusions from multiple semesters of using classroom editing assignments to show that Wikipedia editing tasks can empower students and enhance the goals of faculty in mutually beneficial ways.

7.1.2 Methodology

I incorporated Wikipedia editing assignments into five linguistics classes across three years at a large US public university to explore the pedagogical usefulness

of requiring students to add to a wiki-based OER. A total of 83 students took part, in iterations involving a single undergraduate honours student in semantics, two undergraduate classes in pragmatics, two independent study undergraduates who were debriefing from a semester abroad, and one graduate seminar in discourse markers. Based on critical reflections on my own teaching practice and input from student reflections on the Wiki editing experience (Aronson, 2011), I assessed how decisions on writing tasks were made and what underlying beliefs about sources were questioned in considering the value of students using and creating OERs.

7.2 Benefits to Students

In this section, I detail the academic benefits for students, from the experience of doing research to contributing to Wikipedia pages. I show that Wikipedia, while often written off as an easy source of plagiarism or a quick source of definitions, can be viewed as a space where students can work together to generate discipline-specific knowledge. Many of the features that Wikipedia supplies, along with the scaffolding for instructors and students that the Wiki Education Foundation (WikiEdu) provides, give students skills in consuming the output of the crowdsourced encyclopedia and evaluating and improving it. I demonstrate this point by showing how encouraging students to edit existing Wikipedia pages can provide four key benefits to students: developing and applying criteria for assessing sources in their research; practicing collaborative writing in their discipline; learning to write for an audience beyond their instructor; and contributing to a widening diversity of voices in their educational texts.

7.2.1 Criteria for Evaluating Sources

The first benefit to students is helping them learn to assess and create sources that support their work on discipline-focused content. As with writing traditional research papers, students practice finding and incorporating relevant sources to support their claims. With many items accessible from the keyboard or phone, training in evaluating traditional library catalogues of peer-reviewed material may not provide enough experience for students to learn to weigh the academic value of online material.

Many aspects of Wikipedia editing provide valuable experiences that provide students with practice in the same academic skills used in traditional research projects:

- Reading widely enough to decide what the most valued sources on entry-level topics are, and who the key names in the field are
- Thinking carefully about primary versus secondary sources
- Leaving an evidence trail of citations for claims

- Explaining their reasons for editing someone else's work
- Thinking about ontology and taxonomy within a discipline—which pages should really be a subsection of existing pages?

In short, the goals for editing assignments are for students to find information, document sources, distill information into claims and support, and share that new knowledge, all skills that apply to many other forms of writing. One valuable product of the Wikipedia community of editors is the criteria they spell out for new page editors. These include detailed explanations of what makes source material reliable (Reliable Sources, 2022). Their documentation on reliable sources, for example, discusses aspects such as the recency of claims (especially relevant in scientific claims); peer review vs preprints; types of journals, including warnings about predatory journals; how to find citation counts (but including a warning about those inflated by authors overly citing themselves); differences between news and opinion pieces in newspapers; and warning about potentially less valid sources such as self-published content, sponsored content, and user-generated content.

WikiEdu also lets students practice finding claims that need backing and checking a chosen source's reliability. For example, as part of developing their research skills, students start by assessing when a claim on an existing page needs a citation to back it up. Then they need to find a source to confirm or counter the claim. Training via WikiEdu's timeline discusses the kinds of objective secondary sources they should seek. Students need to track down a source through the university's library database or other appropriate online sources. This is the first incremental step for students daring to contribute to a publicly visible page. Directions are also listed in our course assignment, with the reminder: "Make sure you are logged into Wikipedia. Then add your citation to the page. I will track your completion of this task via the class Wikipedia Dashboard." A useful third-party tool that helps them find places to initially contribute is Citation Hunt, which randomly pulls up Wikipedia pages that are tagged with "citation needed" (Citation, n.d.). Figure 7.1 shows this assignment introduced in the course timeline.

Through this task of adding a citation, students gain skills in vetting online material. As one student in my class noted, "I now look at a page on Wikipedia, and if it does not have references for anything, I do not even bother with reading it. If there are a lot of references and I am just wanting to know something quickly, I am more apt to trust it. If I need information for something more in depth, I can look up the information on Wikipedia and then find the source that was used there and be able to look at the primary source and learn even more about the subject." Another noted, "I have been more conscious of what I'm looking at and the resources the writers used."

These are skills that composition and rhetoric instructors and reference librarians are used to spending time on, but that faculty in many other disciplines may assume are skills students have already mastered, and thus instructors may not have charted out class time to cover. Editing a page lets the recognition of types of sources in a particular discipline be a part of what students gain practice in.

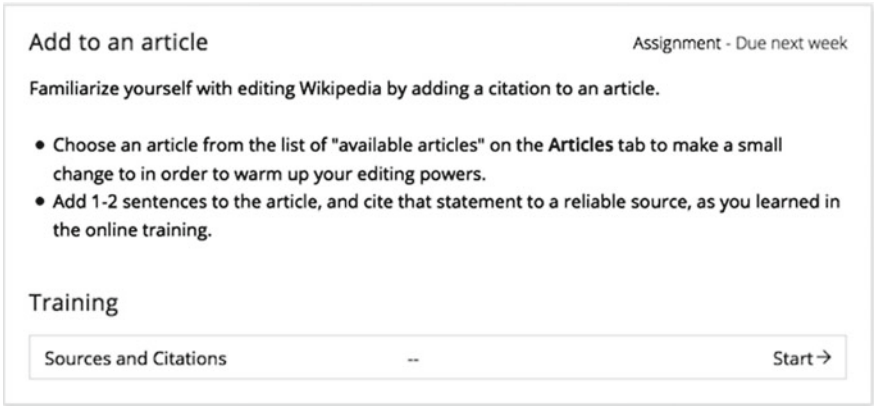

Fig. 7.1 The student's first task in contributing to an article. (Wikiedu.org CC-BY-SA)

7.2.2 Practice in Collaborative Writing

Besides mastering the search for scholarly resources for their own class papers, Wikipedia editing can benefit students by helping them learn to do collaborative writing. Students are often assigned to work together to write up a class assignment as a way to provide a more "active," "engaged," or "significant" learning experience that allows students to expand beyond initial individual reflection on a topic and to expand the thinking they bring to a project. The range of engagement types that can be tapped in assignments has been spelled out in several twenty-first-century pedagogical systems. For example, Bloom's revised taxonomy of educational objectives (Anderson & Krathwohl, 2001) presents types of engagement with class content that could be built into learning goals that access a range of cognitive levels, whereas Fink (2003) adds to these earlier types (recalling knowledge, building comprehension, applying and analyzing information, synthesis, and evaluation), by also including more interpersonal, non-cognitive goals that can play a part in increasing student engagement. Fink's taxonomy builds on Bloom's affective domain to incorporate awareness of how the material applies to the feelings and concerns of students or those around them and builds through aspects of caring, which helps to develop a new attitude, interest, or value for the topic within students. Crucially, having students edit Wikipedia in teams creates opportunities to activate these skills. Here I focus on three areas relevant to such collaborative student writing: clarifying how collaborative writing differs from other group assignments, exploring the benefits of writing in wikis, and considering student responses to group work.

7.2.2.1 What Counts as Collaborative

In doing collaborative writing, Barkley et al. (2005) emphasize that students can benefit from more opportunities to practice the different steps of research writing, and so group projects should allow students to contribute "at each stage of the writing process: brainstorming ideas, gathering and organizing information; and drafting, revising, and editing the writing" (p. 256). They note that collaborative writing provides students with good practice in synthesizing different contributions into an organized whole, skills required across many disciplines and by many employers.

Barkley et al. (2005) lay out a group task to produce a research paper that hits many of the same marks as the stages of a group Wikipedia editing project: that each group break up the project "into manageable chunks and establish interim due dates." Steps include having group members work together to organize their ideas for the paper into an outline, then dividing up the outline so that each person writes a draft on their own; then, they read drafts of the other sections and work together to "resolve any significant disparities in voice, content, and style" (pp. 256–7). Then the group combines the pieces into a single document to revise and edit together.

For many researchers, though, collaborative writing has a more precise definition. Li and Zhu (2017, p. 38) cite Ede and Lunsford's (1990) description of the need for "three distinct features of collaborative writing: (a) substantive interaction throughout the writing process; (b) shared decision-making and responsibility for the text produced; and (c) a single written product." Likewise, Storch (2019, p. 40) clarifies that true collaborative writing exists when the co-authors are involved in all stages of the writing process. They share the "responsibility for and the ownership of the entire text produced." She separates this from a merely cooperative or team writing task, which may use more of a split division of labor to create the final writing piece.

Storch (2005) directly examined this configuration with a second language (L2) collaborative writing task based on the idea that student interaction within group work is a fortifying pedagogical feature. Having noted that investigations of group writing had mainly explored aspects of brainstorming and the peer review of final written products, she provides a more detailed comparison of single-authored student work with that produced by pairs of students to compare the outcome as well as the process of achieving the written product. To explore how paired writers engaged in writing, they were recorded, and the tasks were tracked for details on the kinds of moves students took part in during writing. These included initial steps like discussing the prompt and brainstorming ideas, but also episodes such as deliberating together over vocabulary choices, focusing on the organization of the draft, or working on clarifying information. While observing that "collaboration afforded students the opportunity to pool ideas and provide each other with feedback," Storch (2005, p. 168) also found "that pairs produced shorter texts, but that they were better texts in terms of fulfilling the task, and were more succinct." Work by these pairs was also more grammatically accurate and contained sentences with more complexity. Thus in observable ways, a collaboration between writers can lead to a better final project.

7.2.2.2 Writing in Wikis

As an environment for engaging in collective writing, wikis (e.g., Google docs, EditMe, WordPress, or documents built into an LMS such as Teams, Moodle, or Weebly) allow easy access to a shared drafting space for student writers. Operationally, a wiki is simply a web page with an open-editing system that can be written in simultaneously by multiple authors (Vanderbilt, 2022). The sandbox within a student's class Wikipedia space provides another shared online space in which each team can outline, draft, and edit their joint work before it goes live on Wikipedia. This sandbox can also be viewed by the professor or by other members of the class as peer reviewers for additional feedback along the way.

In looking at the types of writing that such a joint space facilitates, the 2008 volume by Cummings and Barton presents several aspects of using wikis for writing in higher education courses, from the more well-known resource of Wikipedia to other shared spaces, including short-term class documents and longer-term institutional projects (not only Wikipedia itself but also the Social Justice Movements wiki developed at Columbia University). Some of the papers look at what Hughes (2010, p. 133) summarizes as the "user discourses within the wiki environment," but here, this mainly covers learning to navigate the territorial Wikipedia editor community. In another examination of writing within wikis, Li and Zhu (2017) examined L2 writing groups to find connections between the interactions of peers involved in writing assignments done through wikis and the qualities of the written works they produced. They looked at these group writing products "by analyzing features of rhetorical structure, coherence, and accuracy" and "explored the connections between writing products and patterns of interaction in the wiki writing task environment" (p. 38) for four configurations of groups. They found that the group using a collective pattern, produced written works with the highest quality, particularly regarding rhetorical structure and coherence that used "all the task components: topic/background, research questions, methods, sources, timeline, purpose/goal, and significance" (p. 44). The second strongest writers used an expert/novice pattern. These works showed some, but not all, of the required components. The remaining two groups which "exhibited a dominant/defensive pattern and a cooperating-in-parallel pattern respectively produced research proposals of relatively low quality" (p. 38).

As Li and Zhu (2017, p. 50) concluded, "joint efforts in mapping out the rhetorical structure and shared text constructing process contributed to their high-quality writing product particularly in rhetorical structure and coherence." In short, working together in a wiki space to write is not sufficient to produce strong jointly written work; instead, the types of writer interactions and the intentional, collaborative nature of the groups play a key role. Nonetheless, though collaborating in a wiki can produce stronger writing, overcoming student resistance to group work can also be a barrier to obtaining successful writing outcomes. As Storch (2005, p. 155) notes, "students' attitudes to group/pair work, in general, are mixed." So while some instructors have created successful buy-in when assigning group work, "others report that learners have reservations" (p. 155).

7.2.2.3 Student Responses to Group Work

Wikipedia editing assignments can work well as group assignments and easily support collaborative writing as students work jointly toward creating or improving a page. However, one initial hurdle to setting this up is student concerns about group projects. For example, Carpenter (2006) and Voyles et al. (2015) have noted students' worries about being penalized due to other group members' weaker contributions. Yet many students working in page-editing groups "have found it to be more enjoyable than they expected" (Stvan, 2021), resulting in more positive student recounting of the collaborative writing experience. Several aspects of Wikipedia editing explain this response.

For example, some of the takeaways of Vetter's large study showed that group work helped with particular tasks: "In comparison with a traditional assignment, both instructors (85% more/much more valuable) and students (63% more/much more valuable) viewed Wikipedia-based assignments as effective for teaching/learning about the reliability of sources. Additionally, certain contextual factors were found to improve this learning," including students working in groups (Vetter et al., 2019, p. 60). They also found that "82% of students thought Wikipedia assignments were as or more valuable for helping to learn how to write a literature review," with this learning outcome especially valued by "students working in groups" and "students who have less experience giving feedback on their peers' writing" (Vetter et al., 2019, p. 61). Stvan (2021) showed that another aspect that helped make group work more appealing to students was for instructors to supply a pre-set list of Wikipedia pages that need improvements from the course's discipline. This allowed students to first review the stubs and then self-select into a group focusing on a topic that they are interested in researching.

When discussing their reactions to taking part in the group editing projects, students' final class reflections (Stvan, 2021) noted a lessening of pressure that they feared might occur in trying out a new interface when they were able to compare notes on the process within the group. They were also intrigued by opening their work up to different audiences, including class members and outsider readers of Wikipedia. And they liked sharing resources within the group, so they could learn and compare notes on the steps of the research process.

To recap, one initial hurdle to getting students into editing teams is their pre-existing worry about group projects. Yet, despite initial student hesitation, several student reflections in my courses, as with those noted by Vetter (2019), show that aspects of Wikipedia editing class projects were valued specifically because learning was being done in a group.

7.2.3 Writing for a Wider Audience

In recommending that students participate in collaborative writing projects, Barkley et al. (2005) note that team projects allow students to have multiple audiences for

their work. This comes about from group members reading each other's drafts along the way and all viewing the joint final written product (p. 256). But the audience for students who contribute to Wikipedia has the potential to be much wider. Because the articles appear on a public-facing platform, pages edited on Wikipedia benefit students by enabling them to share their acquired knowledge, their choice of citations, and the outcome of their co-edited writing with a larger community. This exposure allows them to potentially receive external editing feedback as well as to learn to defend their own editing moves.

In this way, Wikipedia editing offers an additional way for students to take part in the kind of outreach that many are already primed for through social media encounters. Students are interested in how language concepts reverberate in the larger world and are accustomed to learning about current events through TikTok satires and hashtag activism, e.g., #whyIstayed #MeToo #BlackLivesMatter. In their reflection essays after editing Wikipedia in class, students commented on having the opportunity to connect with a larger outside audience since they were setting up work that could continue to grow after the semester. One student noted, "Working on a Wiki page with a group turned what could have been a one-person research paper into a collaborative learning experience that produced knowledge for the consumption of more than just one person." Indeed, Vetter et al. (2019)'s survey of students as Wikipedians noted, "students marked assignments as especially valuable for learning to write for a public audience" (p. 61). Sometimes that public is the next round of new majors in their discipline. A student in a linguistics class emphasized the goal of making the writing clear to those outside the field: "Linguistics can be difficult to understand for the lay person and with Wikipedia's help, we can give that information in more general terms. This would be great for anyone interested in topics of Linguistics." Another way of sharing what they know with other students is by filling content gaps in their area. Throughout each semester, editing class time included discussions of the varied impact of Wikipedia in their lives. Upon looking over the list of possible topics to edit, one student noted being unsure of a piece of terminology and checked the page to get some background, but found it very minimal: "The first place I go for information on an unfamiliar topic, even school related things, is Wikipedia. I was unaware of my personal reliance until there was nothing for me. I then began to truly understand the importance of what we are doing in this class."

As noted in Sect. 2.2, working on the Wikipedia page improvements works well partly because it is a group endeavor. The class Dashboard coordinates the multiple writers on the projects, allowing the editing to be a feasible group project even with an online class. Students can share their note-taking by writing in the same sandbox of one of their group members. This shared Wikipedia subspace functions like the familiar interface of a Google doc, with the added advantage that each person's contribution is easily visible to the instructor on the page's history tab. In addition, for any of their edits, students are encouraged to leave a comment on their reasons for moving, adding, or altering material, which is another experience in metacognitive thinking. Groups also received feedback from classmates outside their group through a peer review assignment. One of my undergraduate students reflected, "the biggest benefit for me with working as a group on this project was confidence. In the past,

the final projects I have done have all been fairly private. For the most part, only our teacher/professor and possibly the class will end up seeing them." This aligns with findings from Wannemacher (2009), surveying 97 instructors using Wikipedia editing in class, who noted that "writing for a very large audience was strongly motivating many students and made them put more work into the project than they would have otherwise" (p. 438).

While Wikipedia is a vast entity, each page can give individuals practice in writing for the public. Vetter (2014) describes student work on a project to bring university archive information to a wider readership by completing "a public writing task that requires the translation and transmission of local knowledge sets to an openly accessible (online) public database, providing them with valuable insights into how knowledge is produced and shared in digital forums, as well as how to become familiar with specific digital community conventions" (p. 37). In another public wiki effort, Bossewitch et al. (2008) trace several classes of student contributions to an independent class wiki that eventually became the public-facing Social Justice Movements wiki, now serving "as a portal into some of the key social justice movements in New York City" (p. 53). Working to find valid information and share it with others are outcomes that Wikipedia editing strengthens. Communicating first with their team members, then with their other classmates, and finally with readers on the web is training in a real-world task that students practice together.

7.2.4 Exposure to a Diversity of Voices

Lastly, increasing the number of students who take part in editing Wikipedia benefits students because each new student who sees their ideas and choice of citations included on the web helps deepen the range of voices that such OER projects enable. The gap caused by the uneven representation of the gender of Wikipedia editors is well established. No more than 20% of Wikipedia editors are female (Balch, 2019; Minguillón et al., 2021), and entries about women also make up less than 20% of the biographical pages (Tripodi, 2021). Thus, the status quo of Wikipedia's current configuration signals a need for several possible directions of change that could help make Wikipedia-type OERs more fully representative of their users. In short, it has the potential, as a digital space, to be a place where "the experiences, histories, and knowledge of minoritized people can be made visible" (Ramirez & Marquez, 2021, p. 60). They further note that bias in Wikipedia occurs less often in the content than through "the limited and/or missing content and the narrow range of editors of the pages" (p. 59). Thus, widening the diversity of those with experience in Wikipedia editing can increase the range of topics and experiences that surface in the larger work. Such expansion is being addressed across several demographics. Here I note projects with students that aim to better mirror the editors' gender, home language, ethnicity, and region.

Any way it is counted, women make up a small minority of Wikipedia page editors, e.g., Wagner et al. (2016) analyzed this in terms of editors who create content

pages, while Cabrera et al. (2018) focus on editors' contributions to talk pages. One way that classroom assignments can begin to compensate for this overall gap is to include students in classes from majors with a higher percentage of women, e.g., nursing, education, psychology, modern languages, and linguistics (Givens, 2021; Stvan, 2021).

The homogeneity of the languages used by Wikipedia editors is another area of unevenness. Data from Wikipedia editor surveys shows that worldwide, the majority of editors (76%) work with pages in English, followed by 20% in German and 12% in Spanish. (Wikipedians, 2022). In linguistics classes in the US Hispanic Serving Institution (HSI) where I work, many American students are either bilingual heritage speakers of Spanish or Vietnamese, or are majoring in Korean, Chinese, Russian, or Arabic. These strengths enable them to find and cite sources in languages other than English, and also use and contribute to translated versions of Wikipedia pages.

Other demographics that are not well represented include the editors' ethnicity. One use of Wikipedia class assignments to give voice to a minoritized demographic was undertaken by Ramirez and Marquez (2021). They worked with Latinx students in another HSI to examine whether the editing assignments "influence how Latinx students think about the college classroom and their roles as students" (p. 58). They argued (Ramirez & Marquez, 2021, p. 60) that Wikipedia could serve as "a means for Latinx instructors and students alike to decolonize the college classroom." Another group lacking cultural representation in the US are those with indigenous identities. Sethuraman et al. (2020) present work using an automated analysis of geotagged Wikipedia pages divided into four types: places with Indigenous majorities, rural places, mid-sized urban clusters, and urban areas. They found that the rural and indigenous pages were shorter, had more automated additions by bots, and thus far less attention from human editors. Approaching this content gap from another direction, Van der Velden (2013) notes that if someone wants to contribute Indigenous knowledge from their own community to a Wikipedia page, it can only be included if it complies with Wikipedia's policies on content, which do not allow oral sources, personal experiences, or other formats that are not verified through secondary print or recorded sources. Thus for communities that include much cultural transmission through oral narratives, this is a built-in constraint due to internal Wikipedia policy.

Even when speakers share the same home language, regional variation can be more fully represented in Wikipedia by considering the voices from more isolated areas or reflecting less standard dialects and other mechanisms of social othering. Thus another opportunity for "teaching with Wikipedia from a cultural perspective" is presented by Vetter (2018, p. 397), who worked with Appalachian student contributors. Aiming to incorporate insider perspectives of the rural and working-class members of Appalachia who are presented in popular media as "the uneducated, uncultured, and unrefined" (p. 404), Vetter's classroom assignments gave voice to students in an Appalachian Ohio writing class. Students in the class "identified a Wikipedia article on Appalachian culture, history, or place that was in need of development… wrote a proposal in which they identified gaps and made suggestions for development… then performed research on their article topics and, finally, published

their edits to the Wikipedia article" (p. 400). The students also examined "stereotypes surrounding Appalachia in mainstream media" and then reflected on how their revised articles could "help produce a more nuanced and realistic representation of this marginalized culture in Wikipedia" (p. 401).

These underrepresented demographic themes can also be supported by local extracurricular contributions. Beyond a classroom focus on highlighting gaps and better incorporating voices from a more diverse set of students, local or virtual edit-a-thons often feature ways to build content concerning underrepresented groups (Black history, women in STEM, under-documented languages, LGBTQ authors, etc.). More extensive editing networks also focus on thematic areas needing better representation, such as Women in Red, a network of Wikipedia editors who focus on addressing the site's gender gap.

Conclusions regarding improving diversity suggest that it is beneficial to support students in valuing their home sources of knowledge and identity because it enables more students to contribute to shared materials. It's also good for all readers of Wikipedia when students can create contributions that more accurately reflect their environment and perspectives.

7.3 Benefits to Faculty

In this section, I detail four benefits that faculty can take away from learning more about the goals of Wikipedia editing and how to incorporate editing assignments in their classes. I demonstrate these points by addressing faculty concerns about the quality of Wikipedia and other crowdsourced OERs; acknowledging the need for instructors to balance the goals of teaching course content while also teaching the Wikipedia editing tools; presenting types of instructor support for working with Wikipedia, including a discussion of the costs of additional labor; and showing how learning to better navigate Wikipedia can help identify and fill gaps that reveal ways that readers outside the university understand a discipline.

7.3.1 Academics' Concerns About Quality

Here, I propose that faculty can benefit by starting with an examination of why instructors may have concerns about the quality of Wikipedia-type OERs. I address three such concerns: (i) people feeling that their expertise is threatened, perhaps reinforced with associations of online sources with plagiarism; (ii) the presence of Wikipedia pages with insufficient content (stubs) or with incorrect content, and (iii) the student starting position as a novice in their field. I then show that Wikipedia editing can alleviate each of these issues.

When I talk to academics who have not edited Wikipedia, especially those my age or older, there is still a fair amount of misunderstanding, and even resistance,

about Wikipedia. Some of this resistance seems to stem from fear of competition in producing and vetting resources, through a presumption that if anyone can edit a work, then it devalues scholarly expertise. Some additional faculty resistance is residual resentment about how easily online resources, in general, can be used for student plagiarism; this leads to a kind of clamping down on the digital world. Rather than shun the modern web, however, it can be beneficial to become more familiar with the strengths of crowdsourcing on Web 2.0 sites that allow the opportunity for students to contribute in more constructivist ways (Lefoe, 1998) rather than seeing the web as simply a place to consume content.

Secondly, the devaluation of this encyclopedia is particularly reinforced when people have encountered bad or early pages. Wikipedia has a fairly active editorial evaluation system such that poor pages get marked or deleted over time, sometimes fairly rapidly (Schneider et al., 2012). But an even more useful feature is the way that Wikipedia pages can be expanded, opening coverage of a topic that needs more attention. Students can help shape this by learning to recognize good vs bad instances and helping correct or fill in gaps or fix uncited material.

One way that I have found to talk to fellow professors about Wikipedia is to frame it as a question of quality control: For years as an instructor, I said to students, "You shouldn't end up citing Wikipedia, but it's a great place to start hunting." And this is true for some topics. But the site's usefulness is really hit or miss for other subjects. Unfortunately, beginners in a discipline cannot always tell the difference between a good page and a makeshift page, so they can end up with some insufficient leads. I was attracted by the aspect of Wikipedia that enabled me to get in there and clean up the material in my field, to actually make it a good starting point for students and others learning about a topic. As Blumenthal (2018) notes, regarding academics and Wikipedia editors: We're both on the same side. So following up on this, learning to contribute to Wikipedia is a pedagogical opportunity to shape the next round of subject experts.

This leads to the third issue: page editing is also underrated as a way to get students to practice research skills. As noted in Sect. 2.1, the goals for editing assignments are for students to find information that backs up claims on a topic, document their sources, and share that knowledge with readers. In my discipline, the Linguistic Society of America (LSA) has been working to encourage academics to consider incorporating student editing work into their classes. When I first heard about these projects at an annual meeting, I was intrigued by the possibility but felt I lacked time to revise my course plans so that they would include lessons to help students navigate the interface needed to begin editing. But six years ago, I took the plunge when I had an honours student in an undergraduate semantics class. She was already interested in computational work, especially in language translation tools. For her honours work—in which students engage in extra work to receive honours credit for the course—she agreed to take on editing Wikipedia pages related to our course topics.

When the student and I drafted her honours contract, we laid out some potential page topics that were currently very preliminary and could use some thoughtful elaboration. We started with a handful of topics early on, with the idea that she

would add to the list as she learned more about the field since she was doing the regular written assignments for the class alongside these page edits. In establishing these goals, we were assisted by WikiEdu, who set up a class page for us, set up training modules for any student editors in the class, and set up a Dashboard that tracked the progress of the class edits.

That single student was my pilot endeavor. My next goal was to scale this up for a whole class. In the spring of 2018, I tackled preparations for a class of 29 seniors. I was retooling a pragmatics class with a new book and new assignments already and wanted to have everyone in class contribute to a Wikipedia page for one or two of their smaller class assignments, working on the editing in teams. The increased number of students led to the next logistical dilemma, how to have enough time to both teach the principles of pragmatics and the interface of Wikipedia editing.

7.3.2 The Tension of Dual Goals

While work on using Wikipedia in the classroom has often focused on developing students' skills in composition, rhetoric, and information literacy (e.g., Hood, 2007; Purdy, 2009; Vetter et al., 2019), in a course where the writing process itself is not highlighted, instructors may initially find it difficult to fit in additional training in writing and in using the Wikipedia interface, alongside the already planned topics in their syllabus. This section points out the benefits to faculty of considering how to balance the goals of learning and teaching the Wikipedia editing tools while simultaneously helping students develop content expertise.

For an undergraduate class that was the only one that students take in pragmatics, a sub-discipline of linguistics that most are unfamiliar with when they enter the classroom, I was loath to eliminate too much of the "try out pragmatic analysis" homework. This led to my creation of two tracks in the syllabus: five modules of pragmatics and six modules of Wikipedia editing. It culminated in student teams that improved eight existing linguistics articles.

It was great. It was chaos—from the grading perspective. Table 7.1 below shows the assignment schedule for this class. The second time I taught the same class, I changed the grade for the final article into a reflection essay on the editing experience, which encouraged them to evaluate changes to the page and their encounters with the editing interface. This was a much easier way to assess individual efforts and led to their expressing more thoughtful engagement.

Of course, the balance of content and tools would differ in undergraduate versus graduate classes. With an undergraduate class, there are lots of moving pieces because, while it was an upper-division class, it was the first class on that topic. Some of this was resolved the next semester when I did the third iteration, this time with 11 graduate students in a seminar. They were a mix of MA and PhD students with some previous familiarity with the discipline who were taking a readings class focusing on Discourse Markers. I reframed the Wikipedia editing components so that a reflection essay on the Wikipedia tasks meshed with an outreach component (the

Table 7.1 Overview of undergraduate class point distribution

Contributions from the textbook and lecture (total of 105 points)	Points for each assignment
Class attendance total	10
Gricean implicature exercise	15
Reference and deixis exercise	20
Direct and indirect speech act exercise	20
Choice of linguistics reflection essay	10
Final exam	30
Contributions from Wikipedia editing (total of 95 points)	
Get started on Wikipedia	5
Evaluate Wikipedia	10
Add to an article	10
Draft your article	20
Respond to your peer reviews	10
Group in-class presentations	10
Final article	30
Grand total for all classwork	**200 points**

fifth assignment listed in Table 7.2.) While they worked in groups on making page improvements, students also did a traditional research paper in addition to their Wikipedia work.

The fourth iteration was the undergraduate pragmatics class again, with an even larger class, but reducing some of the assignments from both sides of Table 7.1: taking out one pragmatics assignment and changing the grading of the final article into a reflection paper on the Wikipedia editing experience.

Finally, the fifth class in which I used Wikipedia editing assignments was an emergency class that was created when two study abroad students were sent back to the US and quarantined due to the risk of possible Covid-19 exposure in Korea. Since they returned mid-semester, they needed to take classes they could jump into quickly. And because they were quarantined from their travels, these courses needed to be done online. We developed a class where they would explore topics related to their truncated stay in Korea by editing pages related to the Korean language and to second language acquisition. Because it was just two highly focused students, this resembled the first editing class, which involved a single honours student improving pages.

Table 7.3 shows the information culled from the WikiEdu class Dashboards for the five classes, showing the students' total writing and citation contributions.

Table 7.2 Overview of graduate class point distribution

Assignment	Description	Percentage (%)
HW1	**Collecting and reflecting**	5
	Collect 10 examples of your chosen DM and give a preliminary suggestion of its function(s)	
HW2	**Turn-taking**	10
	Sketch examining the role of turn-taking with a particular DM	
HW3	**Literature**	15
	History of previous research on your chosen DM (and/or related forms or functions)	
HW4	**Gap**	15
	Find a gap not addressed in existing theories that could apply to your particular DM	
HW5	**Outreach**	10
	Discuss the presence or lack of your DM's uses and its related concepts in Wikipedia (i.e., what info for the public should be added or edited?)	
Paper	**Final paper**	30
	Essay explaining an aspect of your chosen DM	
Presentation	**Oral presentation**	5
	Present to the class on your chosen DM	

Table 7.3 Contributions from students in the five classes

Course	Articles edited	Total edits	Student editors	Words added	References added
Semantics 2017	8	26	1	3540	31
Pragmatics 2018	45	713	29	9610	116
Grad seminar 2018	3	180	11	2330	12
Study abroad 2020	3	67	2	316	5
Pragmatics 2020	46	1130	40	20,9000	143

One thing that should be noticed here is the sheer amount of writing. The first student in 2017, for example, wrote over 3500 words. For academic colleagues who worry that page editing is not a sufficient quantity of writing—this work is easily the equivalent of a 14-page term paper in length. But, I would argue, via a much more engaging experience. To give a sense of the outcome of the piloted use of wiki editing in the classroom, here are two reflective comments by the student:

> Boy did I underestimate the time it takes to edit an article! I had assumed it was like an essay, which I usually pump out pretty quick. I didn't even think about all the formatting, page linking, referencing, and research issues. … The hardest part of all has been jumping back

> and forth between the article and researching in an attempt to discern what information can be added, what needs to be corrected, and what is already there.[1]

> I see now that some of the articles I chose are stubs for a reason … Sometimes there just is not enough information, and sometimes it's just a part of a larger concept where the necessary information is all on the "parent page". Another issue I've run into is trying to figure out how much information should be on a page when its "parent" concept has most of the information already.

I was delighted with her engagement with the topics, which revealed higher-level thinking in considering how to better organize research material. Indeed, both the individual writers and the students in teams successfully incorporated the class content to build and expand Wikipedia coverage.

A final case study of successfully balancing lecture content and its application within wiki writing assignments was detailed in Olivier (2014). He presented basic tenets of linguistic fieldwork and language variation in face-to-face classes. Then students worked in groups to apply their new knowledge by doing their fieldwork and then drafting up their notes in a local university wiki space. Finally, after peer work and group polishing, they transferred new lexical entries to the templates in the public Wiktionary site, a word-level resource that is a kind of companion site to Wikipedia. In short, attention up front to how to fit in engaging with the course topic and trying out the Wikipedia tools can help faculty and students successfully balance these components.

7.3.3 Support for Instructors

Next, I highlight ways that faculty can benefit by incorporating Wikipedia in their teaching by identifying types of instructor support. These include (i) considering the learning curve for instructors—noting similarities with other relevant technologies and interfaces and countering concerns that instructors must already be experienced Wikipedia editors; (ii) connecting with the WikiEdu; (iii) taking advantage of Wikipedia tasks that align with teaching remotely; and (iv) seeking other local resources such as edit-a-thons and Wikipedians in Residence as ways to help counter the additional labor required in establishing this new classroom practice.

Before leading a class in the use of the Wikipedia editing interface, one question that may arise is what kind of preparation instructors need. Writing an OER book may require content expertise but may or may not require familiarity with a special OER editing interface (Pressbooks, Open Author, etc.) So how familiar with the workings of Wikipedia must instructors be in order to teach with it? Instructors can arrive at Wikipedia work through many paths. Some have already focused on other science communication contributions in their discipline through blogging, podcasts, or Twitter. Some seek a way for their majors to apply a class's core content knowledge

[1] Student quotations come from reflections students completed at the end of the Wikipedia assignment in Spring of 2017 and Spring of 2020. Names are withheld to maintain student privacy.

in the larger world. Some are already comfortable with formatting HTML or some other coding. Some are driven by a desire to increase open-access or open education resources in their community. And instructors who start down this path occur at all ranks. I have seen many junior scholars with excellent classroom editing projects.

Conversely, I am a tenured faculty member. I began editing Wikipedia while I was the chair of a Department of Linguistics and TESOL. I create and add to English Wikipedia pages, focusing on producing accurate, accessible information on major female scholars, particularly for articles on linguists, poets, and genre fiction. My goal has been to increase the coverage of female linguists and contemporary poets, as well as to bring knowledge of the linguistics topics in my sub-disciplines and the genres that I am steeped in onto the radar of readers of this much relied upon, front-line source of public information. That is, it is a natural extension of classroom teaching to attempt to represent the voices, issues, and scholars I study and those I want my students to understand and value.

While I have been editing Wikipedia articles for seven years, I have taken part in other online communities for three decades. In Gretchen McCulloch's terms (2019), I am "old internet." But I learned how to edit Wikipedia through edit-a-thons sponsored by the Linguistic Society of America (LSA). These were helpful opportunities for novice editors to encounter all the beginning steps in setting up an account and making changes to an article. During the first LSA edit-a-thon, I was attending a different conference in another state, so I took part in the edit-a-thon training remotely, following along on their ongoing Twitter hashtag: #lingwiki. From the start, I found Wikipedia editing to be a task that new and experienced editors could work on together and one that groups could work on virtually.

Even in their classrooms, however, instructors using Wikipedia editing assignments do not need to be alone. I mentioned the group's contributions earlier, but here I expand on the impact of WikiEdu, a non-profit organization that offers free training, curriculum, and tools for creating Wikipedia assignments in the classroom (WikiEdu, n.d.). This organization paves the way for instructors to prepare class assignments that use Wikipedia. When an instructor registers with WikiEdu, they are assigned a virtual classroom space with a Dashboard that coordinates each of the class's students and team projects, a series of training modules for the instructor and the students, sample citation tasks to fit into the curriculum, and a contact for questions along the way. The group also hosts panels and focus groups at national Wikipedia conferences.

Another path that may lead instructors to Wikipedia work is finding that article editing activities can serve as a remote learning task. Thanks to the impact of Covid avoidance strategies, many instructors have developed a familiarity with, and sometimes a new desire for, group work tasks that can be done remotely. Accessing student work through the Wikipedia Dashboard can be done from a browser, making a class Wikipedia assignment something that can be done partly or fully online. In working from off-campus, students can use other tools to create synchronous discussions, such as Teams group meetings, Zoom breakout rooms, or phone apps like Facetime, to maintain visual ties to their peers while brainstorming their editing plan.

A final aspect related to support for instructors is the costs involved. Many OER products are touted for lowering costs. Financially, Wikipedia fits this well, since it is free to read and free to edit. So class editing tasks can make more information accessible to readers around the globe when college students contribute their knowledge and use their library access to fine-tune the encyclopedia that everyone uses. But there are certain costs in terms of instructor labor. Incorporating Wikipedia editing requires more time than the usual class preparation (Milson, 2018; Stvan, 2022). Each class of students will have different levels of comfort with the technology and levels of confidence in their own research. Differing numbers of pages will be available for each discipline to revise, the selection of which creates extra elements to incorporate into an existing curriculum. Thus, in shaping a course where students contribute to these OER sources, several steps are key in order for instructors to maintain a manageable workload. In addition to the structuring offered by WikiEdu, it is useful to seek out any available on-campus training, including coordinating early with campus librarians. Wikipedians in residence are also often embedded in schools and public institutions and could be recruited for support. Avocational Wikipedians can often be found at extracurricular events on campus such as themed edit-a-thons. Instructors can check for any Wikipedia practice that their professional societies may offer. To help anticipate and streamline the upcoming workflow, instructors would benefit by comparing notes with other teaching staff on their campus who have used editing tasks, even those from other disciplines. If one's department has the option, incorporating a teaching assistant or research assistant can help with tracking the Wikipedia interface and answering group's questions outside of class.

It's also useful to start small. Wikipedia tasks can be used for large and small classes but may work better with more advanced students who already have some familiarity with the class's content. I have also found these projects to be especially useful in working with individual students who already have a spelled-out research focus when the term begins, such as with independent studies, or in setting up honours contracts. In the US, undergraduates enrolled through a separate intra-campus Honours College unit can commit to an honours component within regular classes, which aims to enrich their knowledge of a discipline. While writing a research paper is one way to fulfill an honours component, building or enhancing Wikipedia pages in the discipline offers another alternative.

7.3.4 Tracking a Discipline's Public Presence

Finally, as seen with issues of underrepresenting Appalachia (Sect. 2.4), there is a need to find content gaps in Wikipedia coverage that can show how readers outside the university understand a field, as well as offer a way to clarify a particular discipline's ontology for students. So benefits to faculty working with Wikipedia come through being able to use the site as a tool to identify and enhance a discipline's public presence. Just as Sect. 2.3 showed how students could learn to present work to the public, instructors may also desire to explore new routes to communicating the topics

and key claims of their fields to the public. To that end, this final section addresses finding and assessing discipline content gaps within Wikipedia and ways to fill these in order to better shape public-facing perceptions of one's field.

One way of tracking what is known by the public is the depth and clarity of coverage on Wikipedia. The issue of underrepresented topics on Wikipedia pages is an ongoing issue among its editors but may come as a surprise to many people unfamiliar with Wikipedia policies. Here I will demonstrate with the coverage of my own field of linguistics, but the issue exists across many disciplines. Linguistics, the systematic study of human language, comprises subfields in the humanities, social sciences, and physical sciences. In the US, the discipline is most often first encountered at the college level rather than in a high school curriculum. While linguists use language as data, scholars studying theoretical aspects of linguistics may also be interested in more applied disciplines like second language acquisition or in learning a particular human language themselves. However, these interests are not automatically correlated. Like many scholarly topics, linguistics is unevenly represented in Wikipedia (Halavais & Lackaff, 2008), with areas such as underdocumented and minority languages and biographies of female linguists having particularly low coverage, as can be seen for women's biographical pages in general. For example, Reagle and Rhue (2011) found that in Wikipedia, biographical articles on women are more likely to be missing than articles on men, compared to Encyclopædia Britannica's coverage. Moravec (2018) commented on the cyclical difficulty of justifying the notability of women as topics when the criteria are based on how much has been published on them and their work; due to this, Wagner et al., 2016 note that the women covered in English Wikipedia end up being more notable than the men, due to a glass ceiling entry barrier).

Part of the training WikiEdu provides is class discussion prompts that help students identify content gaps among existing articles. Figure 7.2 shows an excerpt from the class timeline provided by WikiEdu.

In addition to considering which topics are published, it can be a revelation to students that lots of editors have added to most pages in Wikipedia, each adding

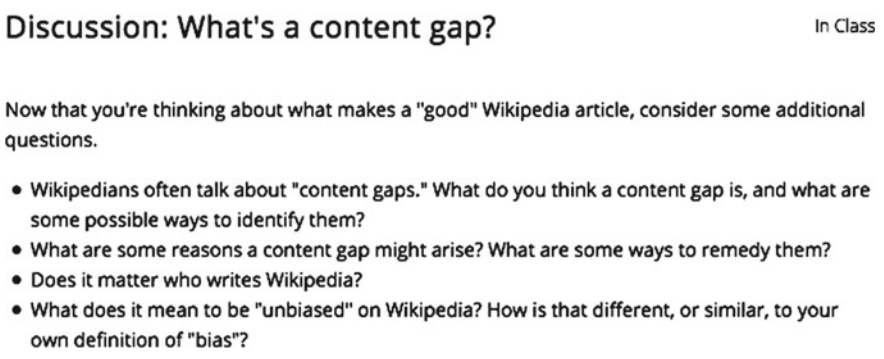

Fig. 7.2 A WikiEdu discussion prompt from the class timeline. (Wikiedu.org CC-BY-SA)

a correction, a fact, a date, a reference, or a link to a related page. The history of every page on the View History tab can be seen. But furthermore, students can also observe a discrepancy in how many people contribute to building up some pages versus others. In class, we examine the length and organization of pages and the number of editors contributing to different topics. We look at articles that reflect popular but rather trivial topics compared to some linguistic topics we have studied. For example, in some semesters, we looked at the entries for Doritos (an elaborate page with years of edits) and Tenseless language (a two-sentence page). Exploring these together in class lets us talk about content gaps and the huge number of people involved in creating and shaping a single page. One student noted in their end-of-term reflection: "This experience, in general, has been truly eye-opening. It was like watching the behind-the-scenes of your favorite show and seeing every crew member and hidden detail. I knew that Wikipedia was open for people to edit, but I had no idea how much effort went into creating and updating pages by so many people." As an OER example, Wikipedia provides a way to contribute to reusable materials in a shorter timeframe than that which is needed to author a full textbook. And it easily allows instructors and students to share in the creation.

7.4 Discussion and Conclusion

I conclude by considering the reflections on the assignments, both from the students' and instructor's perspectives. In five class sections that incorporated Wikipedia editing, students had opportunities to give feedback on the editing experience. The prompt for their final reflection contained a mix of targeted questions that asked them to report on sources they had found and on the content and structural changes that their group made to their page, and open-ended questions about their experience working as a group of new editors, about what they learned by contributing to Wikipedia, how the Wikipedia assignment compared to other assignment types they had done in the past, and how Wikipedia could be used to improve public understanding of our field or their particular topic.

I saw that students gained practice in transferable skills in digital literacy, basic research skills in finding and assessing sources, and collaborative writing practice. By taking part in producing open-access materials, students tried out sharing their acquired knowledge with a larger community, allowing interested readers beyond their instructor and classmates to see and give feedback on topics that students learned to write about in class. In addition, introducing more students to Wikipedia editing tools continued to increase the diversity of editors and topics regarding the gender, language, ethnicity, and regions represented, all issues they were passionate about.

In mining my reflections from these semesters, several valuable outcomes emerge, yet several areas of change are also suggested for future work. In setting out the assignment schedule, I would keep the distinct reflection essay, which offered a clearer chance to capture individual student development than the final joint presentation I had originally envisioned. In addition, it is worth finding and incorporating

model pages from within the discipline to illustrate the possible subsections students could be building. Regarding group work, after seeing how groups addressed the division of labor, I would provide more overt clarifications on the cooperative division of tasks versus collaborative writing strategies. I would also build in a step for them to plan a minimal number of group meetings outside of class. All told, a more systematic study is called for that would repeat the class plan with similarly sized sections for better comparison. These would continue to emphasize group work for the bigger sections, but I also plan to spin off a distinctive assignment track for honours work, which tends to occur with individual students.

Reflecting on how to better use resources from outside the class, in future iterations, I would reach out earlier to the campus Wikipedian in Residence for better-aligned collaboration. Once I discovered that Wikipedia-related campus events were occurring, I gave my students the chance to attend the library's monthly edit-a-thons to practice their skills. But bringing a Wikipedia expert to our class could be even more effective. Likewise, if instructors in other departments were using Wikipedia assignments, some synergy might be achieved by having instructors compare notes to build a joint training session in key writing and researching skills across classes.

In addition to student experiences, there are faculty takeaways. In university professional development, while library staff has more positively endorsed Wikipedia (March & Dasgupta, 2020), faculty have often been more resistant. Learning about Wikipedia editing standards can provide instructors with evidence of Wikipedia's validity for practicing and vetting scholarly sources. In developing this curriculum, WikiEdu's training provides instructors with a structure for helping students master Wikipedia rules and interfaces while students still progress through learning course content.

Seeing Wikipedia being revised, annotated, and expanded helps demonstrate content gaps in a discipline's materials, highlighting how to affect decisions about which topics are included and which count as notable. In addition, while instructors may be more familiar with single-authored outlets for OER textbooks or science communication posts, Wikipedia editing can let participants address hesitations about the quality of crowdsourced OERs and provide another venue for increasing public awareness of their fields. Especially after obtaining on-campus assistance to help mitigate the additional instructional labor, this type of OER production has proven to be rewarding for students, for me as the instructor, and for our discipline.

Through the editing of Wikipedia, we see pedagogical benefits in case studies from multiple disciplines—often in composition and rhetoric, but also as regards STEM, social sciences, and humanities fields. In these linguistics courses, too, we see that students and faculty can jointly play a role in how OER is created and deployed. Wikipedia is made more useful as participants work individually and collaboratively, class by class and editor by editor, to create material that can complement larger individual OER volumes. This type of small OER allows groups and individuals to incrementally change the balance of a growing global reference work, one page at a time.

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Chapter 8
Legacy Building Through a "Teaching with Technology" Open Textbook Project

Susie Gronseth, Haoyue Zhang, and Waneta Hebert

Abstract Situated within a department that offers both undergraduate teacher preparation programs and graduate programs in various educational specialization areas, an open textbook project was conducted in which graduate students served as content contributors to a textbook that was then utilized as a part of an undergraduate course. The project design employed an OER-enabled pedagogical approach, amplifying the element of students-as-contributors in the development of OER. With the target audience for the OER being future teachers, the OER authors having more advanced educational experience, and both groups being co-located within the same department, the project embodied an explicitly designed "legacy" aspect in which the OER can be viewed as a means of knowledge transmission within a local community of practice. Topics addressed in the textbook include facilitating creativity through technology, leveraging technologies to support academic goals, erasing borders and encouraging collaboration, and teaching students to become responsible digital citizens. The chapter describes the OER development process initiated during a 16 week graduate course in the learning, design, and technology program area and details how the textbook and associated supporting materials were used during its implementation in the undergraduate educational technology course spanning four years. Design considerations of openness, legacy-framing, designed flexibility, text format, and readability for the target audience are discussed.

Keywords OER-enabled pedagogy · Open education · Educational technology · Pre-service teacher education · Flipped classroom · Renewable assignment · Instructional design

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8.1 Project Context

This chapter describes a design case of an open textbook project in which graduate students were content contributors to the development of a textbook that has since been implemented as part of an undergraduate course. The chapter will detail the contextual considerations for the project, theoretical groundings from related supporting literature for project design decisions, the project's process for developing the OER, and noted outcomes from the past four years of the resulting OER's use as the primary text in an undergraduate course. The project is situated within the context of the University of Houston College of Education (UHCOE), located in Houston, Texas, United States. UHCOE offers undergraduate programs that equip individuals to become K-12 teachers and graduate programs that provide more advanced training in specialized areas of education, such as art education, bilingual/ESL education, math education, learning, design, technology, and others. The learning, design, and technology (LDT) program area within the Department of Curriculum and Instruction at UHCOE offers graduate programs at master's and doctoral levels that focus on instructional design and technology theory, applications, and, for doctoral programs, research. The program area also coordinates and teaches the educational technology coursework for the Bachelor of Science (B.S.) in Teaching and Learning, an undergraduate degree that prepares future teachers to be certified in the state of Texas in early childhood through middle grades, and the education minor for individuals who intend to pursue teaching certification at the secondary level. Undergraduate students in both the Teaching and Learning bachelor and education minor programs take an educational technology course during the "pre-teaching" semester, the first of three to four semesters of pre-service education experiences. The program semesters are 16-week terms spanning August–December and January–May. The educational technology course is instrumental in covering the core competencies in technology applications that Texas teachers are expected to know and be able to do. Core competencies include teachers being knowledgeable about technology-related terms and ethical practices, communicating information through varied means and for different audiences, evaluating electronic information resources, and effectively using technology to teach the curriculum (Texas State Board for Educator Certification, 2003).

Overall, the teacher education programs aim to provide coursework and preparation experiences that incorporate research-based strategies and current technologies and engage future teachers in the profession of teaching. Students usually begin their pre-teaching semester in their third year of their bachelor's degree studies and complete two semesters of student teaching in their fourth year. The Teaching and Learning bachelor's program also contains a "developing teaching" semester prior to student teaching in which students complete additional pedagogical coursework. The Council for the Accreditation of Educator Preparation (CAEP) accredits all programs. The programs are designed to prepare individuals to pass teacher certification exams and observations that evaluate teaching competencies articulated by the Texas Education Agency. This governing state agency is the Commissioner of Education in Texas and oversees primary through secondary public education (TEA,

2022). At UHCOE, about 1000 students are enrolled in the B.S. in Teaching and Learning program each year, making it one of the largest programs in the college. The education minor typically enrolls an additional 150 students.

Before the implementation of this open textbook project, the instructional materials in the undergraduate educational technology courses tended to primarily consist of collections of instructional handouts modified by the instructors of record each semester. The courses thus did not have assigned textbooks. Within this context, the LDT program area recognized an opportunity for transmitting professional teacher knowledge from experienced teachers in their graduate programs to future teachers in the undergraduate teacher education programs. The co-construction of open textbooks as a learning activity for advanced students has been recognized as productive and meaningful (Wiley et al., 2017). The affordance of openness in the textbook facilitates broader access, grounded in the philosophy of open education in which all can access and collegially build upon the knowledge that others in the knowledge-sharing community produce. Thus, a knowledge-sharing project was organized in which LDT graduate students would co-construct an open textbook focused on integrating technology in the classroom that would then be read and utilized by future teachers in an undergraduate educational technology course. The project used open education to empower learners in contributing to the education of others through the tangible means of the OER development.

8.2 Literature Review

The project design is aligned with OER-enabled pedagogy, amplifying the element of students-as-contributors in the development of OER. The target audience for the open textbook is future teachers, its authors have a more advanced educational experience, and both groups are co-located within the same department. The project embodies an explicitly designed "legacy" aspect in which the OER can be viewed as a means of knowledge transmission among members within a local community of practice. Employing this project design approach offers external structuring to foster internal motivation and self-regulatory learning processes promoted through knowledge-sharing. To position the open textbook project within the broader scope of literature, the associated conceptual concepts of OER-enabled pedagogy, students-as-contributors, and motivational aspects will be discussed. The review justifies the design decisions made in the project.

8.2.1 OER-Enabled Pedagogy

OER-enabled pedagogy refers to instructional practices dependent on the "5R permissions" of retain, reuse, revise, remix, and redistribute (Wiley & Hilton, 2018). This instructional method has its roots in open pedagogy, which positions students

as co-creators of knowledge and involves process-based and participatory practices (DeRosa & Robison, 2017). Open educational practices embody connectedness and trust and are evident in elements that ground the open learning design methodology (Conole, 2013). These elements include—

- An "openness" in the broadest sense possible,
- Facilitating dialogue regarding teaching and learning ideas and designs,
- Collective aggregation of knowledge via social and participatory media,
- Engagement in peer critique and sharing of practices to support digital scholarship, and
- Fostering creativity through the support of serendipitous opportunities, lateral thinking, and encouraging new perspectives.

Conole (2013) further extols the positive affordances of open education. Open education can facilitate the expanded adoption of OER through an enhanced understanding of how the resources can be designed or repurposed to support the needs of learners. It can foster scholarship of teaching and learning communities in which ideas are discussed and researched to promote evidence-based instructional practices. The openness offers greater transparency in designing and implementing a formal educational provision. Finally, embracing open education can propel research on using innovative e-learning tools that support the creation and sharing of OER as part of a learning experience.

OER-enabled pedagogy involves active student learning that guides students in creating original works or derivatives of other openly licensed works. Through open licensing, students can engage with various artifacts freely to support their learning. Wiley et al. (2017) advocate for "renewable assignments" to apply OER-enabled pedagogy. Renewable assignments are more authentic and have utility beyond the course in which they are created. Such assignments are contrasted with "disposable assignments" that have little value beyond the purpose of a course.

Further, renewable assignment artifacts can be made public and openly licensed to ensure the 5R permissions in perpetuity. Wiley and Hilton (2018) describe an example of OER pedagogy in which Wiley collaboratively revised a project management textbook with his students to produce a customized version that included applications of the concepts for the area of instructional design. The resulting text was then used, further revised, and remixed through that course in subsequent semesters.

8.2.2 Students-As-Contributors

In Hegarty's (2015) model of an open pedagogical approach for using OER, learners' contribution to producing artifacts that address real-world problems is a key attribute. Further, generating OER in-house can offer additional affordances, such as—

- being able to design custom materials for specific target course content and learning outcomes,

- having greater control to readily update materials with current information on topics, and
- supporting relevancy and authenticity by crafting course materials informed by the local learning context.

Writing-to-learn is a documented instructional strategy that can provide meaningful learning through organizing information, integrating new knowledge with prior experiences and understandings, and metacognitively planning the communication of concepts to others through writing (Balgopal et al., 2018). Developing OER using this strategy can thus generate benefits for both writers and readers. Writers are challenged to deepen their knowledge about topics to communicate them effectively through their written products. Readers can utilize the written materials to learn in their university courses.

The Rebus Community has compiled *A Guide to Making Open Textbooks with Students* (Mays, 2017), which provides project ideas and case studies for faculty interested in conducting their own open textbook creation with student writers. One example in the book details the case study of an art history professor who conducted an open textbook creation project within her upper-division research course. Utilizing the online book-formatting tool Pressbooks (2022), students contributed to chapters featuring Frank Lloyd Wright homes. In order to have the needed information to compose their chapters, they toured the homes, explored focal concepts during class discussions, and engaged in their own research using information resources. The instructor provided a chapter template in which students were expected to introduce the house that would be presented with an orienting chapter thesis statement, provide an architectural description of the building, and expand in a detailed narrative integration of class concepts and their additional research. Students could upload and format their own chapter content in the e-book via Pressbooks. The instructor concluded that the project was successful and would be utilized by art history students in future semesters. She noted that incorporating designated time for collaborative editing and refinement of the final project would be an area for further refinement of this initial project design.

8.2.3 Motivational Aspects

One explanation for how elements of open pedagogy support student motivation is self-determination theory (SDT), which speaks to how external actions can become internal motivators when they meet basic psychological learner needs of autonomy, competence, and relatedness (Ryan & Deci, 2020). Autonomy involves how one's interests align with a learning task and contribute to their initiative in engaging in the task. When learners have a sense of ownership of the learning task, their need for autonomy is supported. External control involving externally implemented rewards and punishment can undermine the autonomous aspect. The need for competence corresponds to having an optimal challenge in which learners can grow in their

learning to feel successful and attain mastery. Belonging and connection are associated with the need for relatedness and fostered through feeling respected and cared for by others.

Werth and Williams (2021) examined the motivational impacts of an OER-enabled pedagogical course project in a first-year studies course using a qualitative approach involving interviews and inductive coding. They analyzed the transcripts for evidence of four extrinsic motivation SDL-associated processes—external regulation, introjected regulation, identified regulation, and integrated regulation. They noted that half of the participants were motivated by external regulation, that is, being motivated by a tangible reward or avoiding a threat of punishment. A majority (87.5%) of participants were also found to reference motivational views associated with introjected regulation in which they were motivated by actions that enabled them to either avoid low self-worth or approach a feeling of high self-worth. Identified regulation was found to be the most frequently occurring extrinsic motivation regulator (91.6%), with the most motivated by the pragmatic acquisition of skills they attained through the project and how they were contributing to the learning of others. A few students (25%) even saw the project as a means to their own career advancement. Integrated regulation, which involves a connection between behavior and one's personal values, was found in only about a third of the student responses. The authors discuss that this type of motivational process may not have been prevalent in the sample of interviewees due to its need for significant self-awareness and maturity in the learners. In sum, the motivational impacts of a renewable assignment such as creating an open textbook can be a powerful driver, with most students valuing such an opportunity to develop their own skills and contribute to skill acquisition in others.

8.3 OER Development Process

Given the powerful motivational value of renewable assignments, authoring chapters for the textbook was structured as a key assignment in the Spring 2018 LDT graduate course "Integrating Technology in the Classroom." The content of the proposed OER aligned closely with the foundational scope of the course that covered assessment, productivity tools, and ethical issues for the effective integration of technology into the school curriculum. In essence, the graduate course was an advanced version of the undergraduate course within which the OER would be used. This alignment is evident in the syllabus, which articulates that the course offers "practical integration of technology into curriculum and appropriate uses of technology and software." Both courses utilize freely available digital tools to support hands-on collaborative and multimodal learning. A description of the graduate course will be provided, followed by a discussion of the structuring of the OER development in the course and how quality considerations were addressed in this process. Figure 8.1 presents the development and implementation processes of the project.

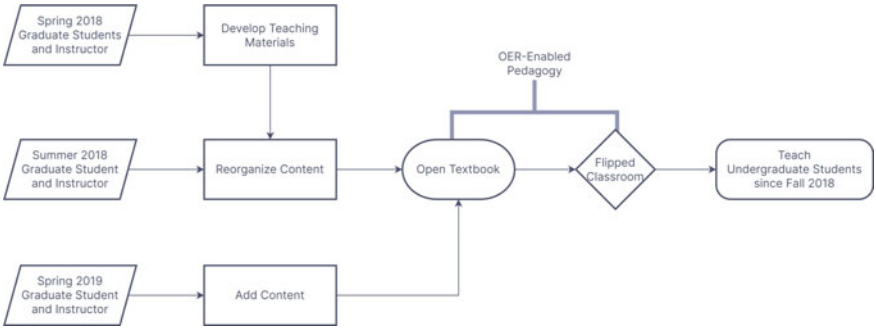

Fig. 8.1 The development and implementation processes of the open textbook project

8.3.1 Description of the Graduate Course

The graduate course was designed and taught by a full-time clinical faculty member in the LDT program, and the 2018 offering was the fourth time the faculty member had taught it for over six years. The course tends to be offered either annually or bi-annually. With a central focus on K-12 technology integration, the instructional faculty typically revamps the course each time to provide a novel approach to current tools, theoretical frameworks, and instructional strategies. Such additional effort for continuous course revamping is generally considered part of the teaching load and not additionally compensated.

Course goals include—

- developing educational materials through cloud-based tools,
- collaborating as educators with colleagues and professional organizations,
- becoming knowledgeable about how to teach with technology effectively at the K-12 level,
- and presenting to an audience in creative ways through various technology tools.

Professional learning activities connected with the International Society for Technology in Education (ISTE, 2022a), a leading professional organization for K-12 technology integration, are also frequently incorporated, such as ISTE-facilitated Twitter chats, book studies, and synchronous sessions with leading instructional technology experts. These offer opportunities for the students to access additional related resources, connect with educators worldwide and share technology integration ideas with a broader range of perspectives and backgrounds beyond the college classroom.

In the Spring 2018 graduate course, two sections were offered—one held in-person and the other in an asynchronous online format. The in-person section had weekly three-hour class sessions in a computer lab. The online section covered the same content through asynchronous online discussions and activities. Both sections utilized the same Blackboard course site, and the instructor also set up a combined group on the app GroupMe to promote connection, engagement, and collaboration

in the course. Students in the in-person section were invited to participate in the online activities, and online students were welcome to attend any in-person class sessions (though students mainly worked through the course in their enrolled section formats). In total, 23 graduate students enrolled, most of whom were in the LDT master's program and a few in doctoral programs within the department. Many were currently practicing K-12 teachers in school districts within about a 200 mile radius of the university. Some had experience in education in other capacities, such as teaching in K-12 in other regions previously or working in instructional design and technology at the college level. As a prerequisite to their enrollment in the course, the graduate students were advised to have either completed a lower-level introductory educational technology course or to have adequate foundational educational technology knowledge and skills as deemed by the program area faculty.

Though creating the OER as a renewable-type assignment would be an authentic and motivating way to express student learning for the course, the course scope was broader than just creating the textbook. For example, out of 300 possible points for the various course activities, 60 points were designated for the OER development (e.g., the student writing of the open textbook section), which translated to 20% of the course grade. An additional 40 points (about 13% of the course grade) were designated for developing four supplemental materials that would be used in the undergraduate course to support the OER implementation. Other course activities that helped to inform the student writers of relevant technology integration conceptual knowledge and skills, and accounted for the remainder of the course grade, included discussion activities, a book study of a technology integration-related book (Kolb, 2017), quizzes, a project on professional educator digital presence, and an optional case study assignment. For example, during the first week of the course, students read a practitioner article about K-12 teacher perspectives on technology integration and discussed themes from the article in relation to the intersection of technology, pedagogy, and content within the K-12 context that they would be targeting for the writing of the open textbook.

8.3.2 The "Open Textbook Project"

Developing the OER and related supplemental materials were termed the "Open Textbook Project" in the course. The graduate students would take on the role of writing contributors to compose chapters and supporting materials that describe what pre-service teachers should know about and be able to do to teach effectively using technology. They could also incorporate examples and case descriptions of technology use in K-12 classrooms from their experiences. Their writing would then be collated into a book for use by pre-service teachers in an undergraduate educational technology course starting in Fall 2018. Along with the chapters, they were asked to create teaching materials that instructors of the pre-service teacher course could use to support textbook implementation.

The OER development process was broken down into key steps and checkpoints across the 16 weeks of the semester-long course—

- Week 1: Writing team sign-ups
- Week 2: Teams meet to outline sections and assign portions to team members
- Weeks 3–5: Individual portions of the sections drafted
- Weeks 6–7: Teams meet to review chapter content, discuss areas that need further development or revision, and assign teaching materials to team members
- Week 8: Sections ready for initial instructor review and feedback
- Week 9: Teams meet to discuss instructor feedback and requested revisions
- Week 10: Revisions completed; Spring holiday week
- Weeks 11–15: Sections piloted within class and feedback received from classmates; sections revised
- Week 16: Sections and teaching materials compiled.

Structuring the OER writing in this way provided specific due dates for drafted portions and facilitated opportunities for peer and instructor feedback and revision at incremental points in the process.

At the outset, writers were instructed to choose a section of material to focus on, which formed five writing teams of 4–6 members each. The five sections were—

1. Digital citizenship in the classroom
2. Innovative design for learning
3. Empowering learning with technology
4. Connecting and collaborating in the digital space
5. Facilitating learning expression with technology.

To facilitate collaboration and documentation of drafts through the semester, the instructor created and shared with the graduate students a project folder on Google Drive and set up sub-folders for each team. The instructor also created some orienting documents that described the project and the intended readership. The teams were instructed to aim for about 5,000–6,000 words of written content for their sections and to develop the following associated teaching materials:

- an example or case description that connects one or more of their section topics to the classroom,
- slides and speaker notes for a 5–10 minute presentation that introduces the section content,
- instructions for a hands-on activity that relates to the section content and can be used in either in-person or online formats,
- instructions and grading rubric for an assignment that students would complete to demonstrate their learning related to the section content,
- and five closed- or open-response quiz questions with correct/incorrect response feedback and answer key.

The students were advised that pictures, figures, illustrations, and other media (such as using background music in supplemental presentations) needed to follow

copyright and fair use guidelines, specifically to use only their own original, copyright-free, or Creative Commons-licensed media.

Teams met at least three times during the semester, either in-person or via synchronous videoconferencing tools such as Google Hangouts and Zoom. The meetings were sometimes just for within-team discussion. Occasionally the instructor joined a team meeting to clarify the feedback given, brainstorm ways to expand the writing, and facilitate discussion regarding the division of responsibilities among team members. Teams were instructed to create an outline of their section in the team sub-folder. They noted on the document and via comments which team member would work on writing which portion of their section. They also documented when and where each team meeting took place and shared drafts and related files. This enabled all team members to access their team's files, track versions, and support instructor awareness of the team's progress. Students could also use the course GroupMe group to instant message others in their team.

The course began in January, and by the Spring holiday week in mid-March, the teams had completed their written portions of the sections and the accompanying teaching materials. Upon the return from the Spring holiday, the class spent five weeks piloting the five sections of content. Each week, a writing team led the class through the materials they had developed. They prepared an introductory presentation to their section topics and shared their materials via Google Drive. The class read through the chapters written by the team, pilot tested the associated quiz questions, and completed any planned assignments or activities. Classmates then posted feedback as comments on the Google Drive documents, offering recommendations for revision, expansion, or incorporation of additional related resources. At the end of the course, they revised and provided final versions of their materials, and the class celebrated at a pizza restaurant on the university campus where students from both sections could meet in-person and celebrate the successful completion of the project (and the associated course).

8.3.3 Content Scope

The scope of the planned textbook was based on the ISTE Standards for Educators that had just been recently updated and released the previous year. The standards specify competencies for technology integration knowledge and skills—

- Learner: Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning.
- Leader: Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning.
- Citizen: Educators inspire students to positively contribute to and responsibly participate in the digital world.

- Collaborator: Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems.
- Designer: Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.
- Facilitator: Educators facilitate learning with technology to support student achievement of the ISTE Standards for Students.
- Analyst: Educators understand and use data to drive their instruction and support students in achieving their learning goals (ISTE, 2017).

US states use the ISTE Standards for Educators widely in developing state-specific educational technology benchmarks at the K-12 level and informing educator development and professional learning on using technology in sustainable and transformative ways. The standards are also often referenced internationally and are aligned with the United Nations' Sustainable Development Goal 4 (SDG 4) to support quality education for all students (ISTE, 2022b). The standards connect to the ICT Competency Framework for Teachers (ICT CFT) and specify the knowledge, skills, and mindsets needed to attain SDG 4 objectives, providing direction on fostering equity and inclusion through leveraging technology for effective teaching in early childhood, primary, and secondary education (UNESCO, 2021).

Building on the ISTE Standards, the graduate students explored additional resources that provided more detailed information and examples that they could use to inform their writing. Some of the additional resources were course readings, and others were resources that they found through the university library and open access online sources. Upon completion of the text, more than 60 references were cited throughout the chapters, including books, empirical research articles, research reports and white papers, policy documents, and practitioner articles.

8.3.4 OER Finalization

Since the graduate students worked in independent groups, the teaching materials developed were not uniform chapters, but disparate contents. Following the completion of the course, an LDT master's student worked with the instructor through an independent study course during the summer of 2018 to edit and reorganize the content. They created a master outline of the completed chapter content and identified areas of redundancy and gaps in coverage. They revised the organization of the book according to this master outline, using the outline items as headings and sub-headings in the chapters. Portions of the drafted chapters were then selected and merged to fill in the new structure. Redundant content was identified and omitted, and new content was added to fill in gaps. The case studies were integrated into the text under the common heading "Extending and Examining a Teacher's Example," and discussion questions were incorporated to support the reflection and application of the case study examples. Images used in the figures were checked, and additional

supporting figures were added where needed. Introductory and conclusion paragraphs were also added to each chapter, and references were checked and updated as needed to the APA format. In sum, this finalization step improved the sequencing of content and overall flow of the text and presented the material in a more polished, ready-for-use form.

Another challenging aspect is that the student writers created the teaching materials building upon what they experienced in local schools and learned in the LDT program, rather than the recommended scope of content for pre-service teacher preparation in educational technology. Therefore, additional content was needed to cover other important topics. In Spring 2019, another LDT graduate student worked with the instructor to create a chapter focused on computational thinking during the same "Integrating Technology in the Classroom" graduate course.

The resulting product is the *Teaching with Technology* open textbook that has been used in the undergraduate educational technology course for the past four years. This OER consists of eight chapters–seven chapters that focus on a particular aspect of technology integration in K-12 and one chapter that extends practical applications of digital citizenship. Below is an overview of the book's table of contents.

- Chapter 1: Facilitating creativity through technology
  - Topics: fostering a culture of student ownership, educators and technology, teacher-centered versus student-centered learning, technology impact on pedagogy
- Chapter 2: Leveraging technology to meet academic goals
  - Topics: setting personal learning goals, strategies for leveraging technology to achieve goals, enhancing engagement, understanding fundamental technology
- Chapter 3: Teaching students to become responsible digital citizens
  - Topics: digital access, digital etiquette, digital law, digital communication, digital literacy, digital commerce, digital rights and responsibilities, digital safety and security, digital health and wellness
- Chapter 3 supplement: Teaching digital citizenship
  - Topics: digital presence, digital citizenship lessons, copyright and fair use, cyberbullying, unintended uses of technology, social media in education, learning culture, ergonomics
- Chapter 4: Using technology to differentiate instruction
  - Topics: breaking down the ISTE Standards for Educators, customizing learning environments, selecting technology tools to enhance curriculum, feedback for students, reflecting on the learning process
- Chapter 5: Erasing borders and encouraging collaboration
  - Topics: UN SDGs, Skype in education, collaborative technologies that facilitate teamwork, gaming in education, project-based learning activities, digital

tools for global connectivity, students as creative communicators, peer-to-peer learning

- Chapter 6: Using technology to develop computational thinking
  - Topics: defining computational thinking, levels of computational thinking, designing learning opportunities that require computational thinking, creating digital objects
- Chapter 7: Learning how to teach through collaboration
  - Topics: communication and discussion tools, teaching experience versus technology experience, professional learning networks (PLNs), using technology to collaborate with other educators locally and globally, time management, communicating with parents.

The chapters are online Microsoft Word documents that are provided altogether within a "Technology Integration Open Textbook" folder in the Course Content area of the Blackboard LMS, as well as linked individually as assigned readings for weeks 2–9 in the associated weekly handouts and materials. The other supporting resources the graduate students created have also been revised and incorporated into the undergraduate course. Slides and ideas from the overview presentations have been used to inform class teaching materials. Many of the hands-on activities and assignments have been adopted as part of in-class activities during class sessions. Quiz questions have been utilized in creating two assessments of 10 closed-response (multiple choice, multiple answers, and true/false) questions, each of which was built within the Blackboard LMS. One assessment encompasses content from Chaps. 1–2 and 4–7, and the other addresses topics from Chaps. 3 and 3 supplement.

8.4 Implementation Considerations

After it was finalized, the textbook was first implemented in the undergraduate educational technology course in the Fall 2018 semester. Adopting the OER coincided with a planned course redesign, which enabled the textbook to be embedded as a core learning resource within the redesigned course. The course uses a flipped learning structure in which students are assigned chapters to read prior to class, and class time is used to engage in hands-on activities that explore and apply the focal concepts explained in the text (Talbert & Bergmann, 2017). During the four-year timeframe, two to three sections of the course have been offered each fall and spring semesters. Most of the sections have been offered in-person, except for the 2020–21 academic year, in which the course was offered fully online due to the impacts of the COVID-19 pandemic. Thus, the textbook and its associated materials have been implemented in multiple learning modalities with about 450 students at the time of this writing.

Table 8.1 Document stats by chapter

Chapter	Word count	Time to read (minutes)	Text to speech (minutes)	Flesch readability
1	1,992	9	14	34
2	1,916	8	14	47
3	4,214	18	30	31
3 supplement	3,384	15	24	45
4	2,412	11	17	42
5	3,328	15	24	37
6	1,280	6	9	48
7	4,823	21	34	31

8.4.1 Length and Readability

Instructors of the undergraduate course have noted that students tend to readily complete the textbook readings as assigned before each class session, a welcome benefit of the book. One of the primary reasons for students to select a textbook is the reading ease (Sheu & Grissett, 2020). Student willingness to read the textbook could be partly related to its brevity and practitioner writing style. Reviewing document stats information available through Microsoft Word, the total textbook length was 19,806 words with an estimated reading time of 87 minutes, or 141 minutes for text-to-speech. Regarding readability, the Flesch reading ease score was calculated using the formula $206.835 - (1.015 \times \text{average sentence length}) - (84.6 \times \text{average number of syllables per word})$. On the 100-point scale, where higher scores indicate easier understanding, the textbook was found to have a score of 40, meaning that it is written at a college level of difficulty. Chapter lengths have some variability, ranging from 1,280 words (6 minutes of reading time) to 4,823 words (21 minutes of reading time). The readability score is overall consistently at the college level difficulty across the individual chapters, with a range of 31–48 (see Table 8.1).

8.4.2 Use and Applications

Instructors also reflect that students may not be viewing the OER as a "typical textbook" because it is in a Word document, having similar characteristics to other document-based resources (such as handouts and guides) provided throughout the course. Further, the OER-enabled pedagogy supports instructors in adopting more student-centered activities (Jung et al., 2017). Therefore, students can better utilize the class time when they have completed the readings, focusing their efforts during the in-class activities on applying the textbook content in creative and innovative ways. In-class activities often involve assigning collaborative learning groups of

students to specific portions of a chapter and engaging them in utilizing various instructional technology tools to represent, synthesize, and extend the information. Through the hands-on activities, students learn various technology tools and skills while considering the conceptual course knowledge presented in the textbook in varied ways. For example, in the class session that builds upon the first chapter, students worked in groups to create a product using the web-based design tool Canva (2022) to visually convey concepts from a specific portion of the chapter—

- Group 1 was assigned to the "Introduction" and "Fostering a Culture of Student Ownership" sections and challenged to create a visual that answers the question, "What does learning in the digital age look like?"
- Group 2 was assigned the first "Extending and Examining a Teacher's Example" (case study) and challenged with the question, "How does technology fit into a lesson?"
- Group 3 was assigned the second case study and the question, "What is needed for technology to have a 'positive impact' in education?"
- Group 4 was assigned the "Teacher-centered versus Student-centered Learning" and "Technology Impact on Pedagogy" sections and challenged to address the question, "How can technology support varied student needs?"

As another example, students read the two chapters relating to digital citizenship (e.g., Chap. 3 and supplement), and then in-class engaged in a presentation creation activity in which they were challenged to create a presentation of the nine essential elements of teaching digital citizenship using each of the following slide types at least once:

- Quote/paraphrase slide: Quote or paraphrase an insightful, important, or memorable statement from the chapters. The statement could be displayed in a decorative way, and pictures that illustrate the statement could be added to the slide.
- Meme slide: Create a "meme" relating to a key idea or insight from the chapters. The conventional meme design can be used in which text is displayed in "Impact" white font with a black border on the top and bottom and a background "known image," e.g., *Grumpy Cat* or *Most Interesting Man in the World*. The meme can be created using a Meme Generator (Imgflip, 2022) tool, and the chapter statement can be refined to adjust for clarity or length or incorporate a playful integration with the background image.
- Word cloud slide: Generate a word cloud from a portion of the chapter content to visually illustrate the most frequently appearing words as larger in the cloud arrangement. Text font, color scheme, layout, size, and word list may be adjusted to customize the resulting word cloud. Tools such as WordItOut (2022) can be used to create the word cloud, which can be downloaded or screenshot to create an insertable image file for the presentation slide.

The instructors have implemented varied in-class activities connected to the chapters during the past four years; however, the portions of the textbooks that are applied and extended have largely been retained. Instructors feel that the textbook provides

concrete conceptual information that can serve as the foundation of application activities in which students can practice target concepts and skills. The textbook introduces theories, frameworks, key terms, and overarching ideas, and the instructors complement this with skill development during the class sessions.

8.4.3 Designed Flexibility

Unlike adapting an open textbook from open source platforms, in which the professors might need to develop a large percent of new content for their courses (Mays, 2017), the textbook was designed specifically for the course. Therefore, its scope aligns well with the course, and all eight chapters are used without skipping over unneeded chapters or sections that are not as relevant. Also, due to its brevity and modularity, the instructors use it for eight out of the 16 weeks of content in the course. For the other eight weeks, the instructors have developed other modules that engage learners in different current topics and skills, including technology integration lesson planning, peer-teaching practice, escape room-style activities, and virtual simulation experiences. This overall course design in which the textbook is embedded in only half of the course has facilitated greater flexibility and instructor freedom for exploring emerging technologies and expanding upon the varied student interests and needs from semester to semester. Also, the textbook's scope of content, mainly conceptual-based information, has helped to support its sustained relevancy within a discipline that requires continual and frequent updating due to rapidly changing technological advances. Meanwhile, the course can provide up-to-date technology skill instruction through the in-class activities accompanying the textbook readings and the course modules that come after the textbook study.

When the need to update aspects of the textbook arises, revisions could be seamlessly made within the chapter documents, as they are easily editable. The instructors have noted the potential of expanding the textbook chapters with corresponding resource lists that would enable them and students to access more in-depth coverage of topics of interest. To further include learners' contributions in the open pedagogical approach (Hegarty, 2015), the students in the undergraduate course could contribute to the resource gathering and curation efforts. Further, the instructors could potentially explore reordering and remixing the textbook chapters in other ways; the possibilities of variations and versions are endless. During the next curriculum refresh, such 5R options (Wiley & Hilton, 2018) will be explored so that the textbook will continue to be a relevant and useful resource for providing foundational knowledge on technology integration in K-12.

For a course that is largely taught by adjunct faculty and graduate student instructors, having a textbook has helped with onboarding new instructors to the foundational content of the course. The textbook and supplementary materials can be quickly and easily shared with new instructors, who are sometimes hired on short notice due to fluctuations in enrollment that are connected to the timeframes of students declaring their majors or receiving program acceptance. The textbook provides a

common base of knowledge upon which instructors can build the learning experience in ways that meet the overall course objectives while also supporting their own instructional strengths and teaching personalities. Further, the textbook enables the authored content to continue to be utilized in impactful ways to equip future teachers for teaching with technology in the classroom.

8.5 Conclusion

The project is framed as a legacy initiative in which the graduate student writers shared their understandings of technology integration strategies and tools through creating OER that about 450 teachers in training have since utilized. Through a graduate course, the LDT faculty member and students delved more deeply into current research, theory and practice, and tools so that they would be fully knowledgeable about the topics that would be included in the OER they were writing. Though the graduate student writers brought a broader range of educational experiences in addition to the K-12 context, the OER development project was structured for a narrow audience to facilitate project management and afford an authentic audience that would later read and be impacted by their work. The affordance of creating an OER offered benefits to the writers of gaining experience in authorship and deepening their understandings of foundational concepts and skills in K-12 technology integration. Similarly, creating an OER for use as an undergraduate course textbook mitigated cost barriers for the pre-service teachers and enabled them to learn from accomplished local teachers who enriched the writing with authentic examples and applications of the target concepts from their own classrooms.

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Chapter 9
A Mixed-Methods Study with MOOC Learners to Understand Their Motivations and Accessibility Needs

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Abstract An accessible Massive Open Online Course (MOOC) environment should consider each learner's abilities, goals, context, and which specific assistive technologies can be used to facilitate the learning experience. Learners with accessibility needs can face difficulties in interacting with MOOCs, different MOOC platforms and course designs may influence their self-regulated learning skills, learning engagement, and communications with other learners. Unfortunately, MOOC platforms and the pedagogies used in the courses are not fully accessible. Literature has shown that there is a lack of understanding of what learners with accessibility needs can expect from participating in MOOCs. While there are extensive studies of MOOC demographic data, these studies rarely consider the diverse needs of learners. This chapter reports a research study which employed pre- and post-course survey data from 14 Open University MOOCs in the UK's MOOC platform, FutureLearn, (with 29,000 and 5,000 respondents). The analysis of survey data provided preliminary insights and was a source of secondary data as a precursor to interviews with 15 learners who had declared a disability, participated in MOOCs, and filled in the course surveys. The data from the semi-structured interviews with MOOC learners helped understand their motivations, the accessibility barriers they experienced, whether/how they worked around those barriers and their suggestions for accessibility solutions. A descriptive approach was applied to analyse the survey data, while a thematic analysis of the interview data was conducted. This research has yielded an understanding

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of the motivations of learners with accessibility needs when taking part in MOOCs and how MOOCs should be designed to be more accessible.

Keywords Accessibility · Disability · Learner motivation · MOOC · Mixed-methods research · User-centred research

9.1 Introduction

Massive open online courses (MOOCs) provide opportunities for online distance education. Moreno et al. (2018) reported that increasing numbers of learners with accessibility needs are using open educational resources (OERs) such as MOOCs. In that sense, MOOCs in higher education (HE) appear to be converging to support innovative learning experiences such as blended learning, including flipped classroom (Iniesto et al., 2021).

Over 900 universities have launched at least one MOOC, and the total number of MOOCs that have been run stands at 13,500 in 2020 (Shah, 2020), reaching 220 million learners in 2021 (Shah, 2021). The COVID-19 pandemic has enhanced interest in online education, particularly OERs and MOOCs (AlQaidoom & Shah, 2020). However, literature has shown that there is a lack of understanding of what learners with accessibility needs expect from participating in MOOCs. Studies that have reported demographic data in MOOCs (Ingavélez-Guerra et al., 2020; Zhang et al., 2020) did not include data for MOOC learners with accessibility needs.

MOOCs require a significant commitment to self-regulated learning (Handoko et al., 2019). Even with the increase of interest in online education, the technologies used in MOOC platforms and the pedagogies used in courses are not necessarily accessible. Consequently, learners with accessibility needs can face difficulties in interacting with MOOCs, and different platform features and course designs may influence their self-regulated learning skills, engagement, and ability to communicate with other learners (Iniesto, 2020). An accessible MOOC environment needs to consider each learner's abilities, learning goals, where learning takes place, and which specific devices can be used to facilitate the learning experience.

This chapter reports a research study which employed pre- and post-online survey data from 14 Open University (OU) MOOCs in the UK-based platform, FutureLearn, and interviews with 15 learners, who had reported disabilities, participated in MOOCs and filled in the course surveys. The OU is the founder of FutureLearn and was an early developer of MOOCs for the platform. We report findings on the motivations of learners with accessibility needs when taking part in MOOCs and derive recommendations on how MOOCs should be designed to be more accessible.

9.2 Background

Research has highlighted issues with MOOCs, including the low engagement of learners undertaking MOOCs and the high dropout rates (Zhu et al., 2020). It is difficult to know the accurate number of learners taking part in MOOCs (Li, 2019). However, the definition of success needs to relate to the learner and finishing the MOOC is not necessarily the goal for all learners (Liyanagunawardena et al., 2017). The motivations of online learners are diverse. Some learners at the university level show particular interest in "*having a full-time job*" (Ilgaz & Gulbahar, 2017) while using online environments for social interaction or leisure (Serdyukov & Serdyukova, 2015).

Research on learners' perspectives of participating in MOOCs includes Littlejohn et al. (2016), who found via surveys and interviews that learners' motivation differed depending on their self-regulated learning experience. Shapiro et al. (2017), in a similar mixed-methods approach with two MOOCs, suggested the educational background of the learners influenced their motivation and frustration. Watted and Barak (2018) showed that a substantial number of the learners who completed their MOOC were looking for "*career development*" and "*personal and educational benefits*", but motivations differ depending on demographic factors such as age, personal aspects, and affiliation to a university. Sablina et al. (2018), in a sample of 30 MOOC learners, found inconsistencies between the measures of success used by platforms providers and the views of learners, who placed value on acquiring "*new knowledge*", "*increased self-confidence*", and "*social connections*" rather than on course completion or certification. FutureLearn has devised three archetypes to classify its learners: "*work and study*", "*personal life*", and "*leisure*" (Walker, 2018). These studies show that MOOC learners are diverse and have different motivations, and completion is not the aim of all learners.

The inclusion of motivations of learners with accessibility needs has been investigated via survey data by Liyanagunawardena and Williams (2016) with older learners, indicating MOOCs can help tackle loneliness. Uchidiuno et al. (2018) conducted interviews and surveyed learners who were studying English as a second language (ESL), showing their need for individualised/personalised tools. While research by Liu et al. (2015) did not focus on accessibility, the authors highlight the importance of good MOOC design because difficult navigation and an unintuitive interface negatively affected the learning experience and perception of the course. In the same sense, Park et al. (2015) reinforce the idea that MOOCs can be a challenging experience and should be as flexible as possible to meet the diverse needs of learners, for example, by making more time available.

The pedagogical and visual design of MOOCs, their information architecture, usability, and interaction design could have a negative impact on learners' engagement (Liyanagunawardena et al., 2017). There are barriers such as limited access to the Internet for some learners and use of the language that can affect the learners' experience (Sanchez-Gordon & Luján-Mora, 2015).

The study presented in this chapter builds on this literature by providing an understanding of the motivations of learners with accessibility needs when taking MOOCs and how MOOCs should be designed to be more accessible. It was designed to elicit the perspectives of learners towards answering the following research questions (RQs):

- RQ1. What are the motivations of learners with accessibility needs when taking MOOCs?
- RQ2. How can MOOCs be made accessible for learners with accessibility needs?

This study is part of a broader programme of research that investigated the state of accessibility in MOOCs from multiple perspectives (Iniesto, 2020). The other studies included interviews with MOOC providers (Iniesto et al., 2022) and an accessibility audit that involved evaluating MOOCs on major platforms of MOOCs (Iniesto et al., 2019a, 2019b).

9.3 Methodology

The two research objectives in this study that have influenced the design of the study, samples and analyses are described in this section.

9.3.1 MOOC Structure

Iniesto and Rodrigo (2016) defined a range of components to be considered for MOOC accessibility:

- **Access to the platform.** Access to the MOOC platform through the registration and sign-in process.
- **MOOC platform**. MOOC components include assignments, discussions, and evaluations.
- **Learner information**. The user profile includes data on learner preferences.
- **Educational resources**. The educational content is available within the platform as educational resources in text-based or video format or outside the platform in social media (i.e., third-party software).

For clarity in this study, the specific structure analysed is based on the one found in the FutureLearn platform, which sets out steps that include all the interactions learners perform with a MOOC (FutureLearn, 2017). These steps can include articles to convey information, discussions, videos, audios, peer reviews, quizzes, tests and exercises. The derived structure presented in Table 9.1 was then adapted to consider the other leading providers and their terminology (e.g., forums instead of discussions, assignments instead of exercises) and is influenced by previous research (Iniesto & Rodrigo, 2016). It differentiates platform and course structures, including

Table 9.1 MOOC structure

General structure	MOOC structure	MOOC components	Definition
MOOC platform	Platform design and access	• Registration and sign in • MOOC search • Personal profile	The design of the platform, the software that hosts the MOOCs and access to it
MOOC	Course main page	• Homepage • Syllabus	Homepage with learning goals, practical information and the workload schedule
	Educational resource	• Article • Video • Podcast (audio) • Images • Text-based files • Third-party software	All the educational resources that may include articles, videos, podcasts, images, text-based files and third-party software
	Discussion	• Forum\Discussion	Forums or discussions which can have their own space or be embedded in the educational resources
	Assignment	• P2P • Individual assignment	P2P assignments (peer to peer, reviewed between peers) or individual assignments
	Test and Quiz	• Test • Qiz	Tests are scored and have implications for getting a certificate; quizzes are designed to provide feedback to the learner
Both	Help	• Support • Helpdesk	Report and feedback on barriers to learning

their definitions. The structure in Table 9.1 was used to analyse the interview data, as detailed later in this chapter.

9.3.2 Design of the Study

Two sources of data are used in this study: existing standardised online pre- and post-course surveys administered by the OU for OU-developed FutureLearn courses, and interviews with learners. In a mixed-methods research design, the primary data are those of the interviews, while the survey data represent secondary data (Creswell & Clark, 2017).

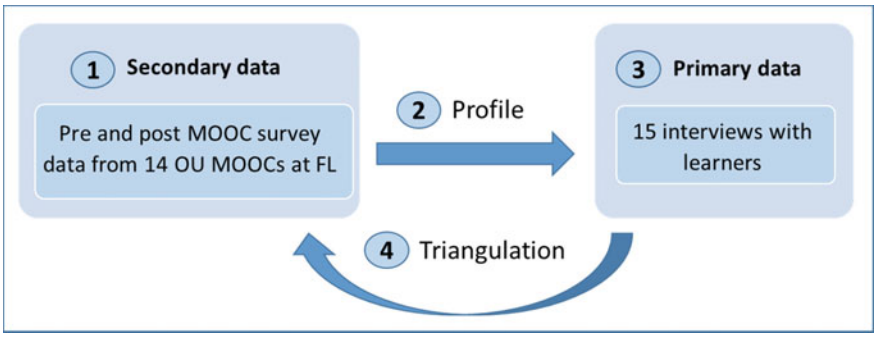

Fig. 9.1 Study design

The pre-course survey in FutureLearn was included as a link from a "*thanks for joining*" email learners received when they enrolled on an MOOC, and the post-course survey was included in the "*farewell*" email. Due to the approach of capturing learner IDs, it was not possible to identify the same learners across the two surveys. This aspect has influenced the design of this study as data from the pre- and post-course surveys is not linked for the analysis of surveys. These online surveys were not developed by the research team (the authors of this chapter), and the questions were not designed for the purpose of this research. However, the surveys contained relevant questions for the proposed methodology and have been used (as shown in Fig. 9.1) to:

- Draw initial findings for the RQs.
- Develop a profile and contact learners for the interviews.
- Triangulate the findings from the interviews.

The approach used to analyse the surveys has been descriptive and comparative between learners declaring and not declaring a disability. Those topics covered in the surveys helped design a profile with basic information to facilitate the following interviewing process. The profile helped design the questionnaires for the interviews and the recruitment of the learners. The approach to recruitment facilitated to contact experienced MOOC learners who self-identified as disabled. As Richardson (2017) indicates, the limitations of grouping all learners with accessibility needs and the need to understand their experiences and attitudes differ. For that reason, the priority was to produce a heterogeneous sample of learners with accessibility needs to be interviewed. The same rationale was used while collecting online survey data from MOOCs across different subjects. Ethical approval for the research was granted by The OU's Human Research Ethics Committee (Application Reference No.: HREC/2017/2451/Iniesto).

9.3.3 Design of the Surveys, Sample, and Data Analysis

The survey design was based on a generic course survey design developed internally by the OU for learner feedback across all its courses. No constructs were considered when the surveys were developed, and no validation work or scoring guidance on the constructs was provided (Neuman & Robson, 2014). The surveys included questions related to disabilities and their educational interests and goals. Disability markers used in this data were based on the ones used for Higher Education Statistics Agency (HESA) reporting at the OU and so aligned with a medical model of disability (that is, it captured impairments rather than functional needs or barriers) (Shyman, 2016).

The pre-course survey had 21 questions, while the post-course had 39. The selection of relevant questions resulted in 11 from the pre-course and 18 from the post-course seen as relevant to the research.

Data was gathered from the Open Media and Informal Learning Unit at the OU. Following Sapsford & Jupp (1996), the sampling method was simple random sampling since it was not possible to know the population beforehand. A large sample size was used to allow the representation of different groups.

The sample included 14 MOOCs from 2013 to 2015 and covered a range of HESA subjects. Table 9.2 shows the information disaggregated by MOOCs. In all courses, the number of learners who completed the post-course survey is smaller than the pre-course survey.

The response rates are in line with those found in the literature on MOOCs (Liyanagunawardena & Williams, 2016). The large discrepancy in pre- and post-course survey response rates is symptomatic of the high MOOC dropout rates (Zhu et al., 2020).

In the sample, the presence of female learners was greater in those who declared disabilities (versus those who do not) (58.9 vs. 52.3%) and those over 45 years old, particularly those who were ages 56–65 (21.4 vs. 15.8%) and over 65 (13.9 vs. 10.2%). Those learners who declare disabilities more commonly had a school-leaving qualification (8.0 vs. 6.4%) and college diploma (17.6 vs. 13.0%) as their highest qualification, with lower proportions having an undergraduate degree (31.9 vs. 33.9%) and postgraduate or doctorate (22.4 vs. 32.1%) than the rest of the population. Regarding the employment status, there was a significant difference between those learners declaring a disability reporting lower percentages in full-time employment (28.1 vs. 51.6%) but higher levels of retired participants (22.4 vs. 15.9%). This proportion could be related to the predominance of mature learners with declared disabilities.

Table 9.3 indicates the sample of learners declaring a disability in the pre-course survey disaggregated by categories of disability. The number of disabilities totalled a percentage of cases of 176%. This number reflects that many learners declare more than one disability. The most declared disabilities are fatigue or pain, restricted mobility, and unseen disabilities. The sample shows alignment with the OU 2020/2021 students who have disclosed disabilities population in fatigue (13.5%),

Table 9.2 Pre-and post-course survey participation

		Pre-course survey			Post-course survey		
Name of MOOC	HESA	Total	RR (%)	DD (%)	Total	RR (%)	DD (%)
Basic science understanding experiments	Physical sciences	804	11.6	20.9	163	2.4	13.3
elements of renewable energy	Physical sciences	974	14.3	11.3	150	2.2	11.6
Get Started with online learning	Education	1668	19	15.7	280	3.2	15.2
Introduction to cyber security	Computer sciences	6,065	24.9	9.9	1,049	4.3	9.4
Introduction to ecosystems	Biological sciences	734	6.0	12.1	240	2.1	13.1
Learn to code for data analysis	Computer sciences	3,454	17.5	7.6	158	0.8	8.8
Managing my money	Mathematical sciences	1,401	9.1	12.4	394	2.6	13.1
Moons	Physical sciences	1,251	15.5	12.2	935	11.6	11.8
Smart cities	Architecture, building and planning	1,020	12.7	2.9	137	1.7	5%
Start writing fiction	Creative arts and design	5,215	20.2	16.0	714	2.8	14.2
The business of film	Business and administrative studies	977	10.7	9.6	240	2.6	8.3
The lottery of birth	Historical and philosophical studies	1,426	23.5	7.3	96	1.6	13.5
The science of nutrition	Medicine and dentistry	2,813	14.9	12.0	702	3.7	10.5
Understanding musical scores	Creative arts and design	1,631	24.8	14.0	371	5.6	12.8
Total		**29,433**	**16.1**	**12.2**	**5,629**	**3.4**	**11.3**

Note RR = response rate, DD = Declared disability

Table 9.3 Categories of disability in percentage

Categories	
Partially sighted	3% (181)
Hard of hearing	8% (462)
Restricted mobility	17% (1050)
Restricted manual skills	6% (363)
Impaired speech	1% (88)
Learning difficulties	10% (643)
Mental health difficulties	13% (790)
Personal care support	2% (147)
Fatigue or pain	18% (1077)
Unseen disabilities	15% (902)
Autistic spectrum disorder	3% (196)
Other disabilities	4% (241)

learning difficulties (13.9%), and unseen disabilities (12.29%) but less representative of the population disclosing mental health (32%).

As noted previously, the online surveys were not designed with constructs that allow building correlations between questions. Therefore, the analysis is descriptive. It shows the total number of answers and column percentages of positive responses for the total of all learners, learners who declare a disability, and learners who do not declare a disability. Pearson's Chi-Squared test of independence is added in a column to show the association between the variables applying Phi and Cramer's V nominal association. The response levels are compared in percentages between the two groups of learners, where * indicates significance at $p < 0.01$ using a z-test for its convenience between pairs of means (Calder, 2006).

9.3.4 Design of the Interviews

As explained earlier, learners across 14 MOOCs responded to the same pre- and post-course surveys. Those completing these surveys were asked to self-identify whether they had any disabilities. The topics covered helped to design a profile with basic information to simplify the interviewing process and to design the questionnaire for those learners who were approached for interviews. The profile included three main areas: (1) "*demographic information and areas of interest*" (sourced from both surveys), (2) "*location and previous experience*" (pre-survey), and (3) "*devices, motivation, learning experience and feedback*" (post-survey).

For the design of the interviewing process, a Person-Centred Planning (PCP) approach has been used (Wilson et al., 2016), which allows learners to choose their preferred way to communicate with the support of epistolary interviews (Debenham, 2007). Three steps were designed to support that flexibility:

1. **Profile**. Learners' responses from the surveys were collected to help the research team profile the learner and prepare for the following steps.
2. **Pre-questionnaire**. Learners were contacted, and once they agreed to be interviewed, two steps were followed: an online questionnaire and a semi-structured interview. The pre-questionnaire was the procedure to collect all the information missing from the profile and conveniently conduct the interview in the shortest time possible, allowing learners to avoid a long and stressful interview. The pre-questionnaire was administered using an online survey.
3. **Semi-structured Interview**. The pre-questionnaire included the consent form and allowing the learners to indicate if the interview would be conducted via an online survey or a Skype interview.

Therefore, for the interview, we had information to build a set of questions based on the research questions. The interview protocols were run in pilots with five researchers to clarify the order and complexity of the questions (Castillo-Montoya, 2016). The interviews were designed to be focused on three main themes over about 30 min:

- Learners' motivations when participating in MOOCs (RQ1). The different types of motivations.
- Accessibility and daily work: current state and improvements. (RQ2). Accessibility barriers found and how learners reacted to them.
- MOOCs and adaptation (RQ2). The way learners would like to have accessibility information provided in MOOCs and the content and platform to be adapted to their needs.

9.3.4.1 Sample

Learners from the most recent data were given priority in identifying potential participants. Therefore, the focus was on the survey respondents who participated in the last 8 presentations on MOOCs. The three criteria to get a diverse sample are aligned with the RQs:

- **Declared disabilities.** Cover a range of different declared disabilities in the sample.
- **Demographical background.** Include in the sample different ranges of age, educational qualification, and employment status.
- **Previous experience.** Capture different experiences with providers other than UK's FutureLearn.

A cluster sampling approach was used during the recruitment in two different phases (Sapsford & Jupp, 2006). A joint group of 56 pre- and post-common learners participated in both surveys, and 31 were contacted following the previous criteria, from which eight learners completed the process. These eight interviews formed the first phase. The research team indicated the missing experiences and voices from

these interviews and their transcription. For example, the sample was overrepresented by learners over 56 years and those "*retired*" or "*not able to work*".

For the second phase, from those learners who only answered the pre-course survey, 142 (meeting the criteria to cover the missing voices) were contacted, of which five completed the process. Of those who only answered the post-course survey, 14 were contacted, and two of them completed the interview. Considering the sufficient information that was gathered and the complexity of finding new participants, the sample was closed with 15 learners interviewed. The process took place from May to September 2017.

Names and identifying information were anonymised by applying a random pseudonym to each participant. Table 9.4 shows the sample disaggregated by disabilities; the Table shows the percentages within the sample, where 10 learners reported more than a disability (a total of 29 declared). Unseen disabilities represent a higher percentage, followed by restricted manual skills and fatigue or pain. These three disabilities are consistent with the survey data previously disclosed.

Regarding the two other variables used for recruitment, Table 9.5 shows that "*school-leaving qualification*", "*postgraduates*", and "*undergraduates*" (26.6% each) are the most represented. Learners in the sample are mostly "*full-time employed*" or "*not able to work*". The largest group in age are those between 36 and 45 (46.6%). In the set of participants, we found that after FutureLearn, Coursera was the MOOC platform most used. Other variables that have not been primary for the recruitment process show the difficulty of keeping a balanced sample when prioritising some variables. The sample is biassed towards 80% female and the predominance of UK-based learners (80%) and use of English as their mother tongue (93.3%). The preference to participate in the interview was text-based (60%).

9.3.4.2 Data Analysis and Validation

Complete transcripts of the interviews were produced from verbal data taken from the recorded audio. An intelligent verbatim transcription approach has been used, followed by an edited transcription to provide the quotes used in the text written in British English for readability and consistency. The analysis followed Braun and Clarke's (2006) six phases of thematic analysis as it is shown in Table 9.6. Printed copies of the transcripts and NVIVO software were used to support the analysis. Each iteration was developed from the previous analysis. In this case, the process had three levels of depth for the themes, representing an interpretative level approach.

The two iterations detailed are:

- **First iteration.** All 15 interviews were analysed from the beginning. Themes and sub-themes have been obtained using an inductive perspective to understand the richness of the information provided by the learners. These themes have been structured over the two pre-established deduced main themes related to the research questions: "*Learner's motivations*" while participating in MOOCs (RQ1) a*nd* "*Accessibility in MOOCs*" (RQ2) with three themes "*Accessibility barriers*

Table 9.4 Sample disaggregated on disabilities

	Partially sighted	Hard of hearing	Restricted mobility	Restricted manual skills	Learning difficulties	Personal Care Support	Mental health	Fatigue or pain	Unseen disabilities
Alexia									✔
Celia					✔				
David									✔
Deborah									
Gemma						✔		✔	✔
Jodie			✔	✔			✔		
Laura									✔
Lorraine				✔	✔			✔	✔
Martha	✔		✔	✔				✔	✔
Matthew							✔		
Natalie							✔	✔	
Rebecca					✔				
Simon			✔	✔					✔
Sylvia		✔							
Veronica	✔	✔							
Total disabilities (29)	6.9% (2)	6.9% (2)	10.3% (3)	13.8% (4)	10.3% (3)	3.4% (1)	10.3% (3)	13.8% (4)	24.1% (7)

Table 9.5 Sample disaggregated by age, education, employment, experience, gender, country\language, and interview type

	Age	Educational qualification	Employment status	MOOC platform experience	Gender	Country Language	**Interview**
Alexia	36–45	Postgraduate	Full-time employed	FutureLearn, Coursera, edX, Others	Female	France\ESL	Text-based
Celia	36–45	College diploma	Full-time employed	FutureLearn, Coursera	Female	UK\English	Text-based
David	36–45	SL qualification	Full-time employed	FutureLearn	Male	UK\English	Text-based
Deborah	56–65	SL qualification	Full-time carer	FutureLearn	Female	UK\English	Text-based
Gemma	36–45	Postgraduate	Not able to work	FutureLearn, Coursera, Stanford Online, edX, NovoEd, Canvas, Open2Study	Female	UK\English	Text-based
Jodie	36–45	Postgraduate	Unwaged	FutureLearn	Female	UK\English	Audio
Laura	36–45	SL qualification	Full-time employed	FutureLearn	Female	UK\English	Text-based
Lorraine	46–55	Postgraduate	Not able to work	FutureLearn	Female	UK\English	Text-based
Martha	56–65	Undergraduate	Not able to work	FutureLearn, Others	Female	USA\English	Audio
Matthew	36–45	SL qualification	Unwaged	FutureLearn, Coursera, edX, Open2Study	Male	UK\English	Audio
Natalie	56–65	Undergraduate	Not able to work	FutureLearn, Coursera, Udemy, Others	Female	UK\English	Audio
Rebecca	26–35	Undergraduate	Full-time employed	FutureLearn, Others	Female	UK\English	Text-based
Simon	65+	No qualification	Retired	FutureLearn, Coursera	Male	Australia\English	Audio
Sylvia	65+	No qualification	Retired	FutureLearn	Female	UK\English	Text-based
Veronica	65+	Undergraduate	Retired	FutureLearn	Female	UK\English	Audio

Table 9.6 Thematic analysis iterations

Phase	Iterations
1. Familiarising with the data	1
2. Generating initial codes	2
3. Searching for themes	2
4. Reviewing themes	2
5. Defining and naming themes	2
6. Producing the report	1

and enablers", "*Response to accessibility barriers*" and "*Solutions proposed to accessibility barriers*". The analysis generated 39 sub-themes.

- **Final iteration.** A final iteration of thematic analysis was based on the first and is represented in Fig. 9.2, including the counts of themes and sub-themes. The research questions drove an intensive exercise to reduce the sub-themes from the first iteration. The result is 4 sub-themes for the "*Learners motivations*" and 5 sub-themes for the "*Accessibility in MOOCs*" following the previously defined "*MOOC structure*".

Two of us followed an inter-rater reliability process to validate the semantics of the final iteration. This involved 94 quotes (11.45% of the data set) and 3 possible answers randomised across the sub-themes. The agreement was substantial, with a Cohen's Kappa of 0.79 (Table 9.7). The coverage is as per percentage in the literature (between 10 and 15%) (Strijbos & Stahl, 2007).

As detailed previously, following a mixed-methods research design, survey data is secondary data for general insight to define learners' motivation and accessibility aspects. The primary data are those from the interviews.

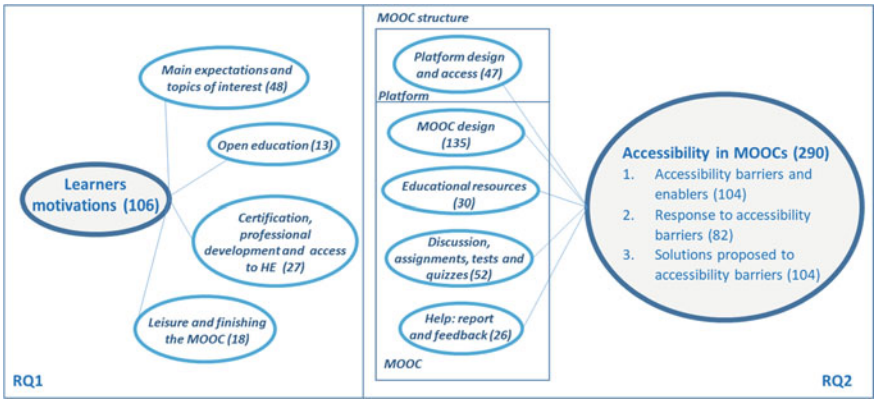

Fig. 9.2 Thematic map representing the themes and sub-themes at the final iteration

Table 9.7 Cohens Kappa for the final iteration validation

	Value
Relative observed agreement	80/94
Hypothetical probability	1/3
Cohens Kappa	0.79

9.4 Results

In this section, the results are described as per the research questions. Relevant survey data, alongside example quotes from the analysed interview data, are detailed in tables.

9.4.1 Motivations of MOOC Learners with Accessibility Needs

Data from the surveys indicate that the motivation for studying MOOCs is usually driven by the personal interests of learners with accessibility needs (88.2.%) (see Table 9.8). However, they are also more likely to be studying MOOCs to find out if they can study at the HE level and prepare themselves for future study (12.5 and 20.8%). These interests may be related to the use of MOOCs to access HE and because these courses are free (45.9%). Learners with accessibility needs have experience in taking online courses for university credit (30.4%) and continuing professional development (CPD) (29.6%). They are highly motivated when participating in MOOCs (38.3%).

Data from interviews corroborate that learners' motivations depend on their previous learning experience (Table 9.9):

- **Main expectations and topics of interest**. There is a general commitment that learners are primarily motivated by the subject matter of the MOOC they choose. MOOCs represent a friendly online environment compared to face-to-face educational experiences and offer a broad number of subjects to be studied at their pace. For some learners participating in MOOCs, it could be their first experience with online learning. MOOCs enable learners with accessibility needs to access MOOCs on their personalised devices and learning environment (home, workplace, etc.), which helps develop self-confidence for study.

- **Open education.** The affordable cost of MOOCs opens up opportunities for a basic understanding of topics as "*tasters*" MOOCs challenge learners with new educational stimulations. Free MOOCs allow access to learning for low-income learners and benefit everyone by facilitating personal development through high-quality educational materials.

Table 9.8 Interests, experience, and motivation in MOOCs—Quantitative results

Why are you interested in studying this course?	Total (%)	DD (%)	NDD (%)	Pearson X-2
Personal interest	85.2	88.2	84.8	23.4*
Professional development	39.1	29.9	40.2	139.9*
Relevant to my work	26.8	19.2	27.8	112.1*
Relevant to my current studies	11.5	12.7	11.4	4.7
To prepare me for future study	17.1	20.8	16.6	35.4*
To find out if I can study at this level	8.3	12.5	7.7	88.9*
To find out more about MOOCs	11.4	13.4	11.1	14.4*
The course was free	38.4	45.9	37.5	86.6*
To try out learning online	22.1	26.0	21.7	31.6*
To learn more flexibly around my other commitments	22.0	25.1	21.6	20.2*
Total	**29,303**	**3,324**	**25,979**	
What sort of online course have you taken?	**Total (%)**	**DD (%)**	**NDD (%)**	**Pearson X-2**
An online course for continuing professional development	33.5	29.6	34.0	11.3*
A MOOC	65.1	64.3	65.2	0.03
An online course for university credit	23.3	30.4	22.4	72.9*
An online course based around OER	18.4	23.9	17.7	53.4*
Total	**19,671**	**2,268**	**17,403**	
Which phrase best describes your approach to the course	**Total (%)**	**DD (%)**	**NDD (%)**	**Pearson X-2**
I was highly motivated	33.1	38.3	32.4	8.7*
I was motivated	51.7	46.9	52.3	7.3*
I was motivated some of the time	12.4	11.0	12.6	1.2
I struggled to stay motivated	2.5	3.7	2.3	4.9
I wasn't really motivated	0.4	0	0.4	2.7
Total	**5,520**	**671**	**4,849**	

Note DD = declared disability, NDD = non-declared disability, * statistical significance

- **Certification, professional development, and access to HE.** Some learners report that MOOCs play a decisive role in their personal and professional development. In that sense, learners report that MOOCs are useful for CPD and that the certification can add value to their curriculum. This achievement can demonstrate an employer's ability and interest in self-sufficiency in education. For that purpose, MOOCs need to be comprehensive enough to count for certification, and certificates should provide detailed information on the learning that has been achieved.

Table 9.9 Motivations in MOOCs—Qualitative results

Theme	Sub-theme	Sample quotes from the analysed data
Learners' motivations	Main expectations and topics of interest	I gained an interest in MOOCs and how many different platforms and subjects you can access them from (…). They give time for your brain to be stimulated and give you the opportunity to challenge yourself. (Rebecca)
	Open education	I do not have much money available so free courses are wonderful. Also, with the fact I often can't finish a course on time or must leave it, paid courses are too much of a risk financially. (Gemma)
	Certification, professional development and access to HE	I think employers would look at them, I know it is not a qualification, but it is a certificate that shows that you have that skill and that you have completed certain tasks and achieved certain skills. (Jodie)
	Leisure and finishing the MOOC	I needed a mental outlet and something I could do at home. The FutureLearn was just what I needed, short and challenging, with a huge variety of courses and the chance to choose topics. (Deborah)

- **Leisure and finishing the MOOC.** Finally, some learners enjoy taking MOOCs for leisure, keeping their minds active, and enjoyment.

9.4.2 Making MOOCs Accessible for Learners with Accessibility Needs

Survey data shows that learners with accessibility needs predominantly take MOOCs at home (96%), implying that they will use their own devices. Laptops and desktop computers are the primary devices used (44.5%, 37.7%) (Table 9.10).

The richness of interview data helps us understand how to make MOOCs more accessible. The theme "*accessibility in MOOCs*" provides a multilevel perspective where "*barriers*" show the current state and "*responses*" and "*solutions*" involve the identification and addressing of barriers (see Table 9.11). Barriers, responses to those and solutions by learners identified in this study are summarised in Table 9.12, with the practical responses that could be implemented shown in italics. The "*MOOC structure*" (see Table 9.1 and Fig. 9.2) is used to report the findings:

Table 9.10 Location and main device—Quantitative results

Where do you expect to do the course?	Total (%)	DD (%)	NDD (%)	Pearson X-2
At work	19.0	12.2	19.9	112.9*
At school/college/university	4.9	3.5	5.1	16.4*
At home	94.6	96	94.4	11.18*
In a public place	9.6	10.8	9.4	6.1
While on the move	8.7	7.4	8.9	7.7*
Total	**29,229**	**3,314**	**25,915**	
Which devices did you use to study the course?	**Total (%)**	**DD (%)**	**NDD (%)**	**Pearson X-2**
Tablet	15.4	20.0	14.7	136*
Desktop computer	37.6	37.7	37.6	13.6
Smartphone	3.6	3.8	3.6	1.1
Laptop	48.8	44.5	49.4	7.7
Total	**5,577**	**681**	**4,896**	

- **Platform design and access.** Learners interact with different MOOC platforms, and their different designs influence their behaviour. Difficulties in achieving a task on the platform increase learners' anxiety. Learners face barriers using different browsers and devices or updating information after registration. Language is a barrier for those learners accessing them in a second language. To address those barriers, MOOC platform design should be as simple as possible and support several languages for usability. Platforms should add profiling options to allow learners to set up their default configuration and get recommendations on which MOOCs better fit their preferences. They should include tools, internal or external, to help learners, for example, dictionaries.

- **MOOC design.** Learners report barriers caused by the workload and the limited time to complete each week. The design is affected by the chronological order of modules. The number of educational resources and assignments per week can be too many, and finding the right balance of time to watch or read the content can be challenging for a learner with accessibility needs. To solve these issues, the information given to learners should include relevant details about accessibility, a detailed syllabus and information about the previous knowledge expected. Other information that should be provided includes the learning goals, the workload, and information about future runs of the course. Platforms should provide access to the entire MOOC content in one go from the beginning and avoid preventing access to the MOOC when the scheduled study period finishes.
- **Educational resources.** In terms of educational resources, the lack of availability of subtitles and transcripts is a barrier for many learners, as is the language barrier.

Table 9.11 Accessibility in MOOCs—Qualitative results

Theme	Sub-theme	Sample quotes from the analysed data
Accessibility barriers and enablers	Platform design and access	If I wanted to change my email address, then I would lose all my courses to date and records. This should be easier to do. (Deborah)
	MOOC design	I have health problems, and there are some weeks when I could get quite a lot in another week when I cannot do very much at all. (…) By the time I can get back to them, I 've kind of lost interest, or I feel so far behind everybody. (Natalie)
	Educational resources	I found once or twice that I could not get the quality of sound, and sometimes I could not get the video in my old equipment. (Veronica)
	Discussion, assignments, tests and quizzes	I did not like critiquing other people's work but let alone them critiquing mine, I do not enjoy that sort of things at all. (Natalie)
	Help: report and feedback	I have very rarely contacted anyone who runs the MOOCs because it is not necessarily a problem with the content—it is a problem with my mental health which they cannot help with. (Matthew)
Response to accessibility barriers	Platform design and access	I use it (Google translator especially). However, the translations are not very good. (Alexia)
	MOOC design	If some weeks this was not possible due to work and other commitments, I would try to do half an hour first thing in the morning before work to make sure I kept on top of the work and did not fall behind. (Rebecca)

(continued)

Table 9.11 (continued)

Theme	Sub-theme	Sample quotes from the analysed data
	Educational resources	I use the two possibilities at the same time (watching and using subtitles). By acting like this, I try to improve my written and oral comprehension. (Alexia)
	Discussion, assignments, tests and quizzes	I must admit I've always skipped those bits not because I don't think they are worthless, and this is possible because of my depression I suffer from. I don't want people to look at my stuff and tear it to shreds because I have very fragile self-esteem. (Matthew)
	Help: report and feedback	I emailed FutureLearn to complain about the changes to their structure and got a standard reply and a link to an online discussion which had been closed to further comment. (Gemma)
Solutions proposed to accessibility barriers	Platform design and access	I often find myself scrolling through so many different courses to seek out ones that would suit me. Profiling I think is a great idea as it is tailored to you. (Rebecca)
	MOOC design	Detailing that the platform includes transcripts, audio transcripts and other features before a person signs up would be useful. (Gemma)
	Educational resources	I did like to watch the videos because I seem to take more in from a video than if I am reading something. (Jodie)
	Discussion, assignments, tests and quizzes	The tutors cannot mark so many people, they have to rely on us to help them, but I think they should give us clearer directions on marking (Simon)
	Help: report and feedback	I think live chat is useful, particularly as a course commences for help with any technical issues. (Lorraine)

Table 9.12 Main accessibility barriers, responses, and solutions identified by learners

MOOC structure	Accessibility barriers and enablers	Response to accessibility barriers	Solutions proposed to accessibility barriers
Platform design and access	• Designs across platforms • Registration and sign in • Devices • Offline access • Second Language	• Abandonment • *External tools*	• Better and multilingual platform design • Profiling • Offline access
MOOC design	• Workload	• Abandonment • Skipping parts • Re-join next run • Self-organisation	• MOOC information • Variety of tools • External links • MOOC structure • MOOC content access
Educational resources	• Videos • Text-based files • Images	• *Use of subtitles and transcripts* • *External tools*	• Alternative formats for educational resources • Video design
Discussion, assignments, tests and quizzes	• Participation	• Abandonment • Skipping assignment	• Optional assignments and tests • Discussion and assignment guidelines
Help: Report and feedback	• Facilitators	• *Tools: email and do it request*	• Help guidelines • Facilitators • Discussions • Chatbot • Social media

The lack of accessibility of text-based files and images was also reported. Therefore, educational resources should be provided in alternative formats such as subtitles and transcripts in several languages; transcripts need to be visible when the video is being played. Platforms should add facilities to download the educational resources for low-quality Internet connections.

- **Discussion, assignments, tests, and quizzes.** Not all learners enjoy participating in course discussions. The design of forums sometimes increases the difficulties experienced in finding helpful content. Not all learners enjoy their contribution being reviewed and reviewing assignments by other participants. Learners prefer self-assessment mechanisms such as quizzes that test their understanding and provide feedback, but they are wary of the fixed time limits. Since learners report that some collaborative activities and assignments can cause anxiety, MOOCs should provide alternative learning pathways for those not aiming for certification. MOOCs should provide instructions on how to evaluate assignments when involved with peer-to-peer reviewing. These aspects are a major focus of MOOCs, given the conversational learning/connectivist models underpinning them.

- **Help: report and feedback.** The limited presence of facilitators in MOOCs and the feedback they could provide was a barrier for some learners. To overcome this barrier, guidelines should indicate how to ask for help and report barriers. Several options were asked for, including a contact email, *"do it"* request forms, the use of discussions to ask for help, a chatbot, and social media. Finally, at the beginning of the MOOC, there should be clear information on how learners can ask for help.

9.5 Discussion and Conclusion

The results provide a richer understanding of the motivations and barriers of learners with accessibility needs and how these relate to MOOC design. In this section, we discuss the key findings related to the motivations of learners and the accessibility of MOOCs and discuss the limitations, implications and potential for future work building on the research reported in this chapter.

9.5.1 Motivations of MOOC Learners with Accessibility Needs

The sample in survey data has shown the difference in employment status between those who declare disabilities and those who do not, which could be due to the higher unemployment rate of those with disabilities, similar to those reported in Powell (2018). Learners' motivations to participate in MOOCs are broad and depend on factors identified earlier, such as improving professional development, leisure, or social interaction (Ilgaz & Gulbahar, 2017; Sablina et al., 2018; Serdyukov & Serdyukova, 2015).

There are several other aspects, following the results detailed in Sect. 4.1, to consider to understand the motivations of learners with accessibility needs: (1) learners with accessibility needs find MOOCs useful for personal development, CPD, and as a route to access HE (Watted & Barak, 2018). (2) they consider the low cost of MOOCs to be an important factor (Al-Imarah & Shields, 2019), and (3) they are interested in the flexibility of accessing MOOCs, studying at their own pace, and opportunities for self-regulated learning (Wong et al., 2019). They feel that MOOCs offer a more friendly environment compared to classroom attendance.

However, there is a risk that such motivations and requirements may no longer be met since low cost and openness are not a priority in the recent business models adopted by the platforms that provide MOOCs (Ruipérez-Valiente et al., 2020). As reported by Shah (2021), the focus of these providers has changed, including the launch of over 500 micro-credentials. These types of courses, even when not massive, can offer focused training for the labour market and promote social inclusion through employability and CPD opportunities (Farrow, 2020). They offer certification

and HE recognition, but the increased costs can be a barrier. However, MOOCs, micro-credentials and other designs may continue to co-exist on these platforms.

9.5.2 Making MOOCs Accessible for Learners with Accessibility Needs

Learners with accessibility needs indicated different strategies they used to cope with accessibility barriers; however, these workarounds were far from the desired solutions. Several key points from the research reported in Sect. 4.2 should be considered for MOOC design and development, following the "*MOOC structure*" previously defined, include:

- **Platform design and access.** For a simpler platform design, the profiling used in OER repositories and recommender systems could benefit from the application of accessibility metadata standards to allow personalisation which matches the varied needs of learners (Iniesto et al., 2021).
- **MOOC design**. Universal Design for Learning (UDL) principles should be considered in MOOC design. They can support providing information to learners, foster inclusion, and widen access (Iniesto, Rodrigo & Hillaire, 2019b).
- **Educational resources.** The length of the videos and their design affect the engagement. They should be short and focused on the tasks (Li, 2019).
- **Discussion, assignments, tests, and quizzes.** These types of activities need to be designed carefully, with different levels of difficulty and practising learners' expectations and engagement (Bonafini et al., 2017).
- **Help: Report and feedback**. Research shows the potential benefits of facilitating support, for example, using chatbots to disclose accessibility needs (Lister et al., 2021), which could be helpful considering the limited resources in terms of the availability of educators and facilitators in MOOCs.

9.5.3 Contributions, Limitations, and Future Work

MOOCs can be seen as a significant change in online learning, offering the public a vast supply of free-to-access courses. MOOCs offer an opportunity for broadening participation. For instance, research shows that there are benefits for learners regardless of their background due to the low or no-cost model (Iniesto et al., 2022). Learners who disclose a lower socioeconomic background or a disability are more likely to report the benefits of participating in MOOCs for CPD and social interaction (Padilla et al., 2020). Certain projects have also considered using MOOCs in CPD, where MOOCs have been used for training in the Global South (Cerniewicz et al., 2017). These different initiatives have demonstrated the role of MOOCs in expanding free access to online courses supporting some of the early hopes that

MOOCs would provide a life-changing opportunity to facilitate equity, diversity, and inclusion values in education (Rao et al., 2015).

MOOCs reach global audiences and should consider all potential learners who might otherwise be left behind. Because of this, MOOCs really should be accessible to all learners, with attention paid to diversity as a social imperative (Barrera et al., 2017). To make MOOCs more accessible, processes must be implemented to identify barriers, strengthen mechanisms that involve learners' participation in MOOC design and facilitate agile responses in addressing barriers (Iniesto, 2020).

One limitation in this research is the use of data from surveys were not designed by the research team. These were also designed with a lack of constructs limiting the scope for clustering of responses and identifying correlation factors in terms of how gender, age, and location influence disabilities. MOOC learners who filled in the post-course survey may have shown biassed satisfaction since they had finished the MOOC (Pursel et al., 2016).

The set of 15 learners who were interviewed was considered to have a degree of representativeness, given their diverse backgrounds, disabilities, and answers. However, it is acknowledged that the sample has limited scope to represent the diversity in society. Different recruitment criteria could be used to complement the sample, for example, to consider the age and gender of learners. The criteria used also focus on experienced MOOC learners who had completed the courses and, as such, could have missed experiences and issues faced by unsuccessful or disengaged learners. Future work could focus on case studies with specific and individual accessibility needs to understand them in-depth. Such an approach would avoid medical models of clustering learners who declare a disability and support the perspective of "*putting people and processes first*" (Cooper et al., 2012).

The contribution of the research presented in this chapter has identified that MOOCs require accessible platforms and course activities to fully open up access to education in the future. As reported in the results and indicated with suggestions in Sect. 5.2, to achieve this, MOOCs need to include a range of accessible educational resources and offer options for learners to set their own goals. They should give clear guidance to facilitate collaboration in discussions and assignments, provide feedback in quizzes, and operate better processes to give help. Personalisation options will be required to achieve this flexibility. That way, MOOC learners can adapt their learning environments to their individual needs.

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Chapter 10
Repositories of Open Textbooks for Higher Education: A Worldwide Overview

Maria Perifanou and Anastasios A. Economides

Abstract Open TextBooks (OTB) can be a solution to the increased cost of textbooks and provide learning opportunities for all. All over the world, open repositories store, curate, and share OTB for free use by anyone, anywhere, at anytime. First, this chapter identifies twenty (20) major repositories of OTB for higher education. Then it analyzes the characteristics, popularity and visitors' engagement of these repositories using manual inspection and web analytics tools. The findings reveal that most repositories share OTB with Creative Common (CC) licenses in various subjects. Half of the repositories provide some type of evaluation tools so that users or experts can review and evaluate the available OTB. Regarding their visitors, LibreTexts, OpenStax, and Project MUSE received millions of visits during the last six months. Usually, most visits to a repository come from users located in the country where the repository is located. Also, most repositories received most of their visits after the visitors performed a search using a search engine. Each one of MIT Online Textbooks and Project Muse was pointed by around 36 K websites and over 1 M links. Visitors stayed the longest and visited the most pages in OpenStax (over 4 min; 3.60 pages per visit) and MIT Open Textbooks (over 3 min; 4.28 pages per visit). However, most repositories did not achieve a good bounce rate. Most repositories were mobile-friendly, although their speed access from mobiles was worse than from desktops. OpenBook Publishers, AUPress, and MIT Online Textbooks showed the best speed. Most pages were accessible, having very few errors. Finally, the chapter makes suggestions to ROER administrators.

Keywords OER · Mobile-friendly · Open educational resources · Open repositories · Open textbooks · Popularity · ROER · Traffic analysis · Quality · User engagement · Web analytics

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10.1 Introduction

Open education can enable equal opportunities in education and thus in employment, civic participation, economy, and society in general (Bliss & Smith, 2017; Nusbaum et al., 2020; UNESCO, 2019). Open Educational Resources (OER) can support the open education objectives.

However, researchers (e.g., Wiley, 2021) have questioned what " open " means and have explored its meaning. What mainly was argued about was the meaning of "open", taking different interpretations such as "accessible to everyone" or "free of cost". Furthermore, openness in education would be viewed as "(1) Freedom in Acting; (2) Non-Discrimination; (3) Absence of Requirements and Negative Consequences; (4) Transparency and Awareness; (5) Diversity; (6) Autonomy; (7) Adaptability; (8) Easiness; (9) Quality; (10) Tolerance; and (11) Opportunities" (Economides & Perifanou, 2018a).

OER are teaching, learning, and research materials in digital or not that are either (a) in the public domain or (b) under an open license that allows anyone to access, use, adapt, and redistribute them for free (UNESCO, 2021). More specifically, Creative Commons (2022a) defines OER as teaching, learning, and research materials that are either (a) in the public domain or (b) licensed in a manner that provides everyone with free and perpetual permission to engage in the 5R activities (https://opencontent.org/definition/):

- Retain—the right to make, own, and control a copy of the resource (e.g., download, duplicate, store, and manage);
- Reuse—the right to use your original, revised, or remixed copy of the resource publicly;
- Revise—the right to edit, adapt, adjust, change, or modify your copy of the resource (e.g., translate the content into another language);
- Remix—the right to combine your original or revised copy of the resource with other existing material to create something new;
- Redistribute—the right to share copies of your original, revised, or remixed copy of the resource with others.

An OER could be a series of courses, curriculum, syllabus, course, lesson plan, a module of a course, educational objectives, learning map, educational content (e.g., text, multimedia), data, software, tool, simulation, game, experiment, portfolio, mind map, bibliography, recommendation (cognitive, affective, motivational feedback), discussion, scenario, assessment (task, assignment, quiz, project, exam), pedagogy, method, practice, educational policy (e.g., participation policy, assessment/ grading policy, evaluation criteria), and certificates (Economides & Perifanou, 2018b).

The public domain is the space where a resource is not protected by any copyright restrictions and may be freely used, copied, revised, remixed, and redistributed by anyone. In other words, the resource belongs to all.

Extending the 5R model, Economides and Perifanou (2018b) proposed the Open FASUCICESA—CPT framework, which describes OER as teaching, learning, and

research materials that anyone can freely and openly Find, Access, Store, Use, Create, Interact, Collaborate, Evaluate, Share, and Abandon without any Cost, at any Place and any Time.

Creative Commons (2022b) developed open licenses to help creators get credit for their work and retain copyright while permitting others to copy, distribute, and use their work. Attributing a CC license to a created work, a creator (e.g., individual, team, organisation) grants permission to anyone to use this work under specific copyright restrictions. A CC license can contain the following restrictions:

- BY: Credit must be given to the creator;
- SA: ShareAlike: Adaptations of the work must be shared under the same terms;
- NC: NonCommercial: Only non-commercial uses of the work are permitted;
- ND: No derivatives or adaptations of the work are permitted.

The CC licenses (Creative Commons, 2022b) are the following from most to least permissive:

- Attribution (CC BY): It allows others to distribute, remix, adapt, and build upon the work in any medium or format, even for commercial use, as long as they credit the previous creators.
- Attribution-ShareAlike (CC BY-SA): It allows others to distribute, remix, adapt, and build upon the work in any medium or format, even for commercial use, as long as they credit the original creators and license their new work under the same license.
- Attribution-NonCommercial (CC BY-NC): It allows others to distribute, remix, adapt, and build upon the work in any medium or format for non-commercial use only, as long as they credit the previous creators; however, they do not have to license their derivative works on the same license.
- Attribution-NonCommercial-ShareAlike (CC BY-NC-SA): It allows others to distribute, remix, adapt, and build upon the work in any medium or format for non-commercial use only as long as they credit the previous creators and license their new work under the same license.
- Attribution-NoDerivs (CC BY-ND): It allows others to copy, distribute, and reuse the work in any medium or format, even for commercial use, as long as they credit the original creators and do not modify (change, remix, adapt) it.
- Attribution-NonCommercial-NoDerivs (CC BY-NC-ND): It allows others to copy, distribute, and reuse the work in any medium or format for non-commercial use, as long as they credit the original creators and do not modify (change, remix, adapt) it. It is the most restrictive of all six main licenses.

Recently, the Public Domain Mark was also introduced, CC0 (CC Zero), allowing creators to waive all rights and share their work in the public domain. It allows others to distribute, remix, adapt, and build upon the work in any medium or format, with no conditions.

Open TextBooks (OTB) is one of the most popular OER types. This is not surprising since OTB can save money for students and their parents (Chiorescu,

2017; Clinton, 2018, 2019; Hilton, 2016, 2020; Hilton et al., 2014; Howard & Whitmore, 2020; Jung et al., 2017; McGowan, 2020; Weller et al., 2017). The high cost of commercial textbooks may prevent students from registering for specific courses (Florida Virtual Campus, 2016). Adopting an OTB for a course, students can access it anywhere, anytime, without any restrictions. Most commercial books lack digital versions, so teachers and students cannot access them online. Commercial publishers are generally reluctant to develop digital versions of their books since these digital books could be easily copied. The digital format of OTB makes it easier to access and interact with them from anywhere anytime, adjust their font size, search inside them, copy-edit-share any part of them, instantly update them, and interconnect them with other digital resources, augment them with extended reality resources, and more. In addition, OTB could rescue education in situations where face-to-face teaching is unfeasible (such as emergency lockdown due to pandemics, weather conditions, and war), and all teaching must take place online.

Furthermore, some teachers consider OTB to be superior to their copyright-restricted alternatives with regard to timeliness, comprehensiveness, and readability (Bauer & Heaps, 2017; Kimmons, 2015; Mason & Kimmons, 2018). About three-fourths of teachers prefer their science OTB to their previous textbooks (Clinton, 2018; Mason & Kimmons, 2018). In addition, the student withdrawal rate for post-graduate courses with OTB was significantly lower than the rates for commercial textbooks (Clinton & Khan, 2019).

However, only 15% of university faculty use OER as required materials for their course (Seaman & Seaman, 2021). Even during the mandatory transition to emergency remote teaching (Tzafilkou et al., 2021), almost all of the faculty did not make any changes to their typical course materials (Seaman & Seaman, 2021). One reason for not using OER is that educators prefer what they are already familiar with and what is easily available to them. For example, more than 80% of UK academics select a textbook for teaching if it is available in the institution's library (Pitt et al., 2020). In addition, most educators do not know where to look for OER and find appropriate OER for their course (Allen & Seaman, 2014; Atenas et al., 2014; Belikov & Bodily, 2016; de Los Arcos et al., 2015; Luo et al., 2020; Perifanou & Economides, 2021a, 2021b).

OTB is curated in the Repositories of OER (ROER). Authors can deposit their OTB in such ROER for later access, use, adaptation and sharing by teachers and students. Currently, there are about 800 Repositories that curate OER (including OTB) for teaching and learning (DOAR, 2021; ROAR, 2021). So, it is difficult for educators to explore all these ROER in order to find appropriate OTB for their teaching practice. Furthermore, almost all of these ROER mainly contain pieces of learning materials and parts of a course (e.g., module, lesson, assignment, diagram) and not the whole OTB (Perifanou & Economides, 2021b). Thus, the aim of this chapter is to explore and find ROER that mainly curate OTB for higher education as well as investigate their characteristics, popularity, and user usage and engagement.

After presenting the state-of-the-art, the chapter proceeds with the following methodology: (1) Identification of well-known ROER worldwide; (2) Selection of those ROER that curate higher education OTB; (3) Identification of indicators in order

to analyze each ROER; (4) Analysis of each ROER with respect to the indicators; and (5) Analysis of the findings. Then, the chapter discusses the findings followed by the chapter conclusion and suggestions for further research.

10.2 Previous Studies

Rather than hosting whole courses and textbooks, most ROER host and manage small bits and pieces of instruction (Perifanou & Economides, 2021b). Since the focus of this chapter is on OTB, it will be interesting to further investigate repositories that specialize in curating the whole OTB and not small pieces of educational material. A good ROER should provide advanced and effective search tools (e.g., Atenas & Havemann, 2013; Atenas et al., 2014). Perifanou and Economides (2021a, 2021b) investigated Repositories of OER (ROER) that curate OER for language teaching & learning. They concluded that it was difficult to find appropriate language OER for specific languages and specific educational objectives. It would be interesting to also investigate how easy it is to find OTB in repositories. Also, previous studies (e.g., Atenas & Havemann, 2013; Atenas et al., 2014; Santos-Hermosa et al., 2017) suggested that a good ROER should curate OER with a CC license. However, many educational materials in major ROER are not truly open and free educational resources (Perifanou & Economides, 2021a). It would be interesting to know what kind of open licenses are attributed to OTB in various repositories.

Atenas and Havemann (2013) and Atenas et al. (2014) suggested that a good ROER should provide user evaluation tools and peer reviews. However, only a few well-known ROER select, evaluate, and curate quality OER that have been evaluated according to their quality assurance guideline (Perifanou & Economides, 2022a, 2022b). It would be interesting to know which repositories apply quality assurance policies and curate quality OTB that have been evaluated by experts or at least other users.

The aim of open education is to enable education for all without exclusions. However, people with disabilities are not always considered even in the OER world (e.g., Brahim et al., 2017; Navarrete & Luján-Mora, 2018). In several countries, there are many government-imposed initiatives and efforts to develop accessible products and services. However, what are the accessibility levels of OTB repositories?

Furthermore, using five web traffic analytics tools (Google MobileFriendly, Google PageSpeed Insights, OpenLink Profiler, SimilarWeb, and WAVE), Perifanou and Economides (2022a) investigated 13 well-known repositories of OER (ROER) while Perifanou and Economides (2022c) investigated 35 massive open online courses (MOOC) platforms. This chapter investigates twenty (20) repositories that curate OTB using such web analytics tools.

This chapter tries to answer the question: "What are the characteristics, popularity, and visitors' engagement of major repositories of open textbooks (OTB) for higher education?".

The next section presents the methodology followed by the results section. Finally, the chapter presents conclusions and suggestions for future research.

10.3 Methodology

This study took place during Winter 2021. A five-stage methodology was followed: (1) identification of major OTB repositories around the world; (2) selection of those OTB repositories that systematically curate HE OTB; (3) identification of indicators in order to analyze each OTB repository; (4) analysis of each OTB repository with respect to the indicators; and (5) analysis of the findings.

Initially, we located OTB repositories around the world. We have consulted the following sources: (a) lists of OER repositories such as OER Repositories & Platforms List (https://oer-obp.pubpub.org/pub/wac0y6kx/release/12); (b) lists and directories of publishers of open access books such as http://oad.simmons.edu/oadwiki/Publishers_of_OA_books and https://www.doabooks.org/; (c) library resources of international organizations such as UNESCO (https://unevoc.unesco.org/home/commented+list+of+platforms+and+services?context =); d) universities' libraries such as University of Massachusetts Amherst (https://www.library.umass.edu/oer/open-textbooks/), Concordia University (https://www.concordia.ca/library/guides/oer/findoer.html), and University of Cambridge https://libguides.cam.ac.uk/cambridgeebooks/). After cross-checking these sources, we concluded to cover fifty OTB repositories.

Then we visited and thoroughly explored each one of these repositories and selected twenty (20) repositories that curate several hundred OTB for higher education. We have excluded repositories that only curate either of the following: (a) links to open books (e.g., Merlot, Mason OER Metafinder-MOM, Maryland Open Source Textbook -MOST), (b) open books written by many authors (e.g., conference proceedings), (c) open books that target the general population (e.g., Library of Congress, Project Gutenberg, World Digital Library), (d) open books that target elementary or secondary education students (e.g., American Institute of Mathematics -AIM, Curriki, KlasCement), e) less than one hundred OTB for higher education. The selected repositories are presented in Table 10.1.

Next, we briefly describe each of these major global and regional OTB repositories worldwide.

Athabasca University Press is the first open-access scholarly press founded in Canada in 2007. Its main aim was to reduce barriers to knowledge and increase access to scholarships. In 2021, it became a globally certified producer of accessible publications. Until recently, it has published 384 open textbooks, including 146 open, accessible textbooks, and 154 open-reviewed textbooks.

B.C. Open Textbook Collection is the first major repository of OTB founded in Canada in 2012. Its main aim was to facilitate students' access to higher education by reducing student expenses through the use of OTB. It states that OTB are digital textbooks, and anyone can freely access, use, print, retain, modify, remix, reuse,

Table 10.1 Major Repositories that curate Open TextBooks (OTB) for Higher Education

Athabasca University Press: https://www.aupress.ca/	BC Open Textbook Collection: https://open.bccampus.ca/
eCampusOntario: https://search.ecampusontario.ca/	EdTech Books: https://edtechbooks.org/
GALILEO: https://oer.galileo.usg.edu/	Go Open VA: https://goopenva.org/
Kallipos: https://repository.kallipos.gr/	LibreTexts: https://libretexts.org/
Manitoba Open Textbook Initiative: https://openedmb.ca/	MIT Online Textbooks: http://ocw.mit.edu/courses/online-textbooks/
OER Commons: https://www.oercommons.org/	OpenBook Publishers: https://www.openbookpublishers.com/
OpenStax: https://openstax.org/subjects	Open Textbooks for Hong Kong: https://www.opentextbooks.org.hk/
Open Textbook Library: https://open.umn.edu/opentextbooks/	PressBooks: https://staging.pressbooks.directory/
Project MUSE: https://muse.jhu.edu	WirLernenOnline: https://wirlernenonline.de/
University College London UCLPRESS: https://www.uclpress.co.uk/	ULibros: https://ulibros.com/

and share them. Today, it contains hundreds of higher education OTB adopted in thousands of classrooms in 43 institutions by 734 faculty and 234,917 students. It is estimated that students saved $27,813,176.

eCampusOntario Open Library was launched in Ontario, Canada, in 2017. It supports Ontario's postsecondary educators and learners. Recently, it reported 337 adoptions of OER; 700 OER in the Open Library; 119,021 textbook downloads;133,169 learners impacted by OER; 277 unique educators; 2,809 total course sections using OER; and $13,641,449 reported in student savings. It offers services to find, customize, create, and review OER, as well as easy creation or adaption of OER, and the integration of H5P interactive content, version tracking, and cloning support.

EdTech Books provides an OTB publishing platform. It aims at offering free quality content that is in mobile format, easily accessible and usable. Readers can review and rate each chapter of an OTB. It recently reported an average chapter rating = 4.1/5.0 out of 8,737 chapters. Also, 9 OTB have been officially adopted, leading to savings of $90.5 K per year or $440 K total. According to another estimate based on the website's activity during the past 19 months, an $11.4 M savings was calculated.

GALILEO Open Learning Materials belongs to the University System of Georgia. It aims to reduce the cost of textbooks for students to enable their retention, progression, and graduation. Recently, it reported 509 total resources, 2,082,324 total downloads, and 667,540 downloads in the past year.

GoOpenVA is affiliated with the Virginia Department of Education (VDOE). It aims at providing OER and the Open Author software.

Kallipos Repository digital library was launched in Greece in 2013. The Association of Greek Academic Libraries (SEAB), the National Network for Research

and Technology, and the National Technical University of Athens collaborated on implementing Kallipos. It aims at the systematic recording, organization, long-term preservation, and free access of academic books and learning objects for Greek higher education. Until recently, more than 500 OTB have been created.

LibreText was launched at the University of California, Davis. It aims to provide an available OTB to download, edit, and share. Until recently, it published 398 Textbooks, Textmaps, and LibreTexts that are used by 154 courses and 223 million students. An estimated $31 million total amount is saved for 30 million learners. In addition, it provides interactive visualizations for learning and supports a community of active collaborators.

OpenED Manitoba was founded in Manitoba, Canada, in 2015. It aims at providing higher education OTB. Recently, it reported over $2,123,500 in student savings; 12,550 students benefitting; 383 open textbooks, including 146 accessible textbooks and 154 reviewed textbooks.

MIT Online Textbooks offers free digital textbooks together with its open courses. These OTB serve as an alternative to conventional textbooks.

OER Commons is a major repository of OER. It was launched in 2007 by the Institute for the Study of Knowledge Management in Education (ISKME) in California. It contains over 50,000 OER, including 1,616 OTB for higher education. In addition, it supports a collaboration platform for curriculum experts and instructors to collaborate in adapting, evaluating, and using OER. Also, it offers the Open Author (for creating OER), OER Commons Hubs (for bringing together educators to create, organise, and share OER in specific topics), Customised Microsites (for allowing users to search OER in specific topics), Content Integration Services, and OER Training Programs.

Open Book Publishers was founded in the UK in 2008. It publishes open-access academic books. All books are available to read online and download for free in PDF, HTML, and XML formats. Recently, it reported 240 titles published, over 4 M book interactions; 226 library members; and over 20,000 readers each month.

OpenStax is a repository of OER at Rice University that was founded in 1999. In 2012, it started publishing college OTB that are peer-reviewed. Until recently, it published 42 OTB for college and high school courses across science, math, social sciences, business, and the humanities. These OTB are being used in 60% of U.S. colleges and universities and in over 100 countries; in 38,159 classrooms by more than 36,000 instructors and 14 million students, enabling $1,747,421,611 students' savings since 2012. In addition, the OTB is accompanied by LMS course cartridges, lecture slides, and more resources to help instructors teach online.

Open Textbooks for Hong Kong aims at developing an online collaborative environment to provide an online OTB platform, online OTB, quality assurance, community, and capacity building.

Open Textbook Library was launched at the University of Minnesota in 2012. It offers more than 700 peer-reviewed OTB. All textbooks are licensed with GNU and Creative Commons (CC) licenses. In order for a new OTB to be included in it, it must be: "i) licensed with GNU and Creative Commons (CC) licenses, with the exception of the CC ND (No Derivatives) component; ii) a complete textbook available as a

completely portable file (e.g., PDF, EPUB); iii) in use at multiple higher education institutions, or affiliated with a higher education institution, scholarly society, or professional organization; iv) an original textbook (not a derivative of another textbook)". Since 2016, it does not curate any textbook with a No Derivatives component to the license (CC BY SA ND or CC BY ND) because ND licenses do not allow for revising and remixing. The Open Education Network is a supportive community of 120 Members, 1,147 Campuses, and 2,500 Faculty.

Pressbooks is based in Montreal, Canada. Since 2011, it has supported the creation of thousands of OER. It provides a Directory, an Authoring & Editing Platform, and Results for LMS. The Pressbooks Directory provides an index of 3,243 books published across 110 Pressbooks networks. The PressbooksEDU Authoring & Editing Platform allows anyone to clone, revise, remix, and redistribute all of the openly licensed content found through the Directory.

Project MUSE was launched in 1995 at Johns Hopkins University. Project MUSE's Open Access Books Program was launched in 2018, providing publishers with the ability to publish open-access books on the MUSE platform. Selected open books are in browser-native HTML5 or PDF format.

WirLernenOnline is both a search engine and a community for free educational materials (OER). It was launched in 2002 by Wikimedia Germany eV and edu-sharing.net eV. It supports teachers, students, parents, and others in finding good and suitable content, as well as methods and tools for teaching and learning. It enables anyone to browse, exchange and share materials. The content is curated and quality-checked by specialist editors. Currently, it hosts 151,781 contents; 21,052 tested materials in 2,407 collections of topics; 75 specialist editors curated content in 27 specialist portals.

University College London Press was established as the UK's first fully open-access university press in 2015. It aims to produce and distribute high-quality university OTB. Currently, it publishes over 50 open-access books per year.

ULibros, the Association of University Presses of Latin America and the Caribbean (EULAC), offers a platform and a reference system for university publishing production. More than 100 university publishers from Argentina, Brazil, Colombia, Costa Rica, Chile, Ecuador, Mexico, Panama, and Peru provide 15,000 references.

Next, we defined the methods, tools, and metrics for evaluating these twenty (20) OTB repositories. Initially, we thoroughly explored each one of these repositories by visiting their websites.

Visitors to a repository with many OTB would have many options to find OTB appropriate to their teaching and learning objectives. So, it is important for the *number of available OTB* in a repository. Visitors to a repository with a variety of subjects would have more chances to find OTB in their specific subject. So, it is important to have a *variety of subjects* in a repository. Visitors to a repository curating OTB would like to know that they will find OTB of good quality (e.g., Atenas & Havemann, 2013; Atenas et al., 2014; Perifanou & Economides, 2022b). So, it is important that repositories curate OTB that have been *evaluated by experts* or at least other users.

The difficulty of finding quality OER for specific educational objectives is one of the roadblocks to their broad adoption (e.g., Atenas et al., 2014; Perifanou & Economides, 2021a, 2021b). It will be useful that the repository provides *facilities for easy discovery* of OTB appropriate for specific teaching and learning objectives.

More and more repositories have started curating OTB that have Creative Commons (CC) licenses as open as possible. For example, Open Textbook Library considers that a textbook with a No Derivatives (ND) component to the license (CC BY ND or CC BY SA ND) is not an OTB since it is not allowed to be revised or remixed. So, it is important to know the existence of *open licensing* in a repository (e.g., Atenas & Havemann, 2013). Finally, openness goes hand in hand with accessibility. Open education should also be inclusive in education. It is important to know if a repository considers *accessibility issues* (e.g., Brahim et al., 2017).

Considering all of the above variables for each repository, we recorded the number of available OTB, the levels of subjects' variety, user/expert evaluation tools, and searchability, as well as the existence of open licensing and accessibility considerations. We used a three-level scale (Fair = *; Good = **; Very Good = ***) to record the corresponding levels of subjects' variety, user/expert evaluation tools, and searchability.

However, all these repositories organize their available OTB in a different way and provide different information about their OTB. In order to also uniformly evaluate these repositories using objective measures, we also used web analytics tools. We employed the following five (5) web analytics tools: SimilarWeb, OpenLinkProfiler, Google PageSpeed Insights, Google Mobile-Friendly, and WAVE.

Using SimilarWeb, we measured the following metrics for each repository: *total number of visits during the last 6 months; Distribution (percentages) of visits by top countries; Distribution (percentages) of visits by source (direct, refer, search); Average visit duration; Average number of pages per visit; Bounce rate* (Table 10.2).

Using OpenLinkProfiler, we measured the *Number of websites pointing to it; Distribution (percentages) of countries' websites pointing to it; Number of links pointing to it; Links' age* (Table 10.2).

Using Google PageSpeed Insights, we measured the *Speed* of each repository. Performance: Poor (0–49), Need Improvement (50–89), Good (90–100). Using Google Mobile-Friendly, we measured the *mobile-friendliness* of each repository. Using WAVE, we measured the *accessibility errors and contrast errors* of each repository (Table 10.2).

The *popularity* of a repository can be described by the following metrics: Number of visits during the last six months; Distribution of visits by top countries; Distribution of visits by originating source; Number of websites pointing to it; Distribution of websites by top countries pointing to it; Number of links pointing to it; Links' age (Table 10.2). If a repository attracts many visitors and many websites point to it using many links, then this website is popular. The distribution of visits per country and the distribution of websites pointing to the repository per country indicate the countries where this repository is popular. The links age describes the distribution of new links to the repository per year (during 2021; 2020; 2019; 2018; 2017; 2016).

Table 10.2 Parameters and metrics to evaluate repositories of OTB

OTB repository's parameter	OTB repository's metrics
Characteristics of OTB in the repository	Approximate number of available OTB; Level of OTB subject's variety; Level of user/expert evaluation tools of OTB; Level of easiness to search and find OTB; Types of open licenses; Accessibility considerations;
Repository's Popularity	Number of visits during last 6 months (SimilarWeb); Distribution of visits by top countries (SimilarWeb); Distribution of visits by originating source (SimilarWeb); Number of websites pointing to it (OpenLinkProfiler); Distribution of websites by top countries pointing to it (OpenLinkProfiler); Number of links pointing to it (OpenLinkProfiler); Links' age (OpenLinkProfiler)
Visitors' engagement in repository	Average visit duration (SimilarWeb); Average number of pages per visit (SimilarWeb); Bounce rate (SimilarWeb)
Repository's technical characteristics	Speed (Google PageSpeedInsights); Mobile-friendliness (Google Mobile-Friendly); Accessibility (errors, alerts, etc.) (WAVE)

The *visitors' engagement* in a repository can be measured by the following metrics: Average visit duration, Average number of pages per visit, and Bounce rate (Table 10.2). Visitors who stay for a long time and visit many pages in a repository are more engaged with this repository. The bounce rate measures the percentage of visitors who left a website without visiting another page beyond the one they entered the website on. If they do not leave the repository after visiting it (low bounce rate), they are considered to be more engaged with this repository. In other words, a repository with a low visit duration, a low number of pages per visit, and a high bounce rate can indicate low user engagement. In addition, a repository with a low visit duration, a high number of pages per visit, and a high bounce rate can indicate a low engagement due to uninteresting content or poor design.

Finally, the *technical characteristics* of a repository include the following: Speed, Mobile-friendliness, and Accessibility (such as errors and alerts) (Table 10.2). Visitors to a website would like to browse its pages very fast. They also want the website to be mobile-friendly and accessible to all.

10.4 Results and Discussion

After visiting each repository, we thoroughly examined it with regard to the following characteristics of its OTB: 1) Number of available OTB; 2) Level of OTB subject's variety; 3) Level of user/expert evaluation tools of OTB; 4) Level of easiness to search and find OTB; 5) Types of open licenses; 6) Accessibility considerations (Table 10.3).

Table 10.3 Characteristics of the OTB in the repositories

Repositories of OTB	Approximate Number of OTB	Subjects' variety	User / Expert evaluation tools	Search ability	Open licenses	Accessibility
AUPress	200	***	?	**	CC BY-NC-ND 4.0	Y
BCcampus	400	***	**	***	CC 4.0	Y
eCampusOntario	700	***	*	**	CC	?
EdTech Books	100	*	***	***	CC	Y
GALILEO	100	*	?	*	CC 4.0	Y
Go Open VA	350	**	**	**	CC	?
Kallipos	500	***	?	***	CC	?
LibreTexts	400	***	?	*	CC BY-NC-SA 3.0	Y
Manitoba Open Textbooks	400	***	**	**	CC BY-NC 4.0	Y
MIT Online Textbook	100	*	?	***	CC BY-NC-SA	?
OER Commons	1,600	***	***	***	CC	?
OpenBook Publishers	250	*	*	***	CC BY	Y
OpenStax	100	**	***	**	CC BY 4.0	Y
Open Textbooks for Hong Kong	100	**	***	**	CC BY-SA 4.0	?
Open Textbook Library	1,000	***	***	***	CC	?
PressBooks	2,500	***	?	**	CC	?
Project MUSE	4,400	**	?	**	Various	Y
WirLernenOnline	100	***	*	*	CC	Y
UCLPress	300	*	*	*	CC	?
ULibros	2,500	*	?	*	Various	?

Note A question mark means that data were not available
Fair = *; Good = **; Very Good = ***

The findings show that OER Commons, Open Textbook Library, PressBooks, Project MUSE, and ULibros curate the most OTB. However, some of these numbers of available OTB may not show the exact picture. These numbers change day by day, and some of the repositories (e.g., PressBooks) even count the same OTB multiple times since they curated multiple copies of the same OTB. Also, in some repositories, it was not an easy task to distinguish the higher education OTB from other OTB, while in other repositories, this was clear. For example, OER Commons curate 1,616 higher education OTB among a total of 3,121 OTB.

Most repositories provide OTB in a variety of subjects (e.g., AUPress, BCcampus, Kallipos, Libretexts, Manitoba Open Textbooks, OER Commons, Open Textbook Library, PressBooks, WirLernenOnline), while some other repositories focus on specific fields (e.g., EdTech Books, MIT Online Textbook, UCL Press). Half of the repositories provide some type of evaluation tools so that users or experts can review and evaluate the available OTB (e.g., OER Commons, OpenStax, Open textbooks for Hing Kong, Open Textbook Library).

Repositories provide search tools, filters, and taxonomies of OTB in order to help the users find a specific OTB or all available OTB in a specific sub-subject. For some repositories (e.g., BCcampus, Kallipos, OER Commons, Open textbook Library), it was easy to explore the repository and find what we were looking for. However, for some repositories, it was simply not possible due to the fact that these repositories did not curate thousands of OTB (e.g., EdTech Books, MIT Online Textbook).

Most repositories attributed various Creative Common (CC) licenses to their OTB. Few repositories attributed specific CC licenses to their OTB. For example, LibreTexts and MIT Open textbooks attributed CC BY-NC-SA to their OTB.

Finally, less than half of the repositories clearly and explicitly take into consideration accessibility (e.g., AUPress, BCcampus, GALILEO. LibreTexts, Manitoba Open Textbooks, OpenBook Publishers, OpenStax, project MUSE).

We used two web analytics tools to measure the popularity of the repositories: SimilarWeb and OpenLink Profiler. Using SimilarWeb, we measured the following indicators: (1) Total number of visits during the last six months; (2) Distribution of visits by top countries; (3) Distribution of visits by originating source (Direct; Refer; Search). Using OpenLinkProfiler, we measure the following indicators: (1) Total number of websites (unique links) pointing to it; (2) Total number of links pointing to it; (4) Link Influence Score; (5) Registration date of the repository by OpenLinkProfiler; (6) Percentages of links pointing to it by year (2021; 2020; 2019; 2018; 2017; 2016).

Almost half of the repositories received less than 50 K visits during the last six months, and SimilarWeb did not record any data for them (Table 10.3, 10.4). On the other hand, LibreTexts, OpenStax, and Project MUSE received millions of visits during the last six months. Usually, most visits to a repository come from users located in the country where the repository is located. So, 50% of visits to BCcampus come from Canada, and 91% of visits to Kallipos come from Greece. However, visits to Open Textbooks for Hong Kong are from around the world. This may happen because it uses the English language and Hong Kong's population is very small. Most repositories are located in the U.S., so most visits to them come

from the U.S. However, they also receive a substantial number of visits from Canada, India, the Philippines, the U.K., and Indonesia.

Most repositories (e.g., EdTech Books, Kallipos, Libretexts, MIT Online Textbooks, OpenBook Publishers, Open textbooks for Hong Kong, Open textbook Library, project MUSE) receive most of their visits after the visitors perform a search using a search engine. Few repositories (e.g., BCcampus, OpenStax) receive most of their visits directly, which means the visitors of these repositories are well acquainted with these repositories and come directly to them.

Regarding the number of websites pointing to a repository, MIT Online Textbooks and Project Muse are pointed by around 36 K websites each. AUPress, BCcampus, OER Commons, OpenBook Publishers, and OpenStax are pointed by over 1 K websites each. The rest repositories do not attract much attention from websites. Note that a website pointing to a repository may contain many links that point to this repository.

Regarding the links pointing to a repository, again, MIT Online Textbooks and Project Muse are pointed by over 1 M links each. OER Commons and OpenStax are pointed by over 100 K links each.

Most repositories achieve a high Link Influence Score which depends on the quality and number of links pointing to the repository. MIT Online Textbooks and project MUSE achieve a perfect score of 100%. AUPress, BCcampus, EdTech Books, LibreTexts, OER Commons, OpenBook Publishers, OpenStax, Open Textbook Library, and UCLPress closely follow.

OpenLinkProfiler, MIT Online Textbooks (1985), Open Textbook Library (1987), and Project MUSE (1987) are the oldest ones regarding the registration of a repository, while Go Open Va (2019), LibreTexts (2016), and Manitoba Open Textbooks (2016) are the newest. Most repositories were registered in OpenLinkProfiler between 2006 and 2012.

OpenLinkProfiler continually scans the web looking for links pointing to a website. So, every year, it detects new links to a website. We recorded the percentages ‘of backlinks to each repository that OpenLinkProfiler found during each one of the last six years between 2016 and 2021.

For most repositories (i.e., AUPress, BCcampus, Kallipos, MIT Online Textbooks, OERCommons, OpenBook Publishers, OpenStax, Project MUSE), the number of links pointing to them (found by OpenLinkProfiler) is almost evenly distributed during the last five years.

Few repositories, EdTech Books (72%), LibreTexts (73%), UCLPress (58%), and ULibros (80%), received most of their backlinks during 2021. They may only become well-known in 2021.

Also, few repositories, Go Open VA (43%, 56%), PressBooks (53%, 47%), and WirLernenOnline (53%, 41%), received their backlinks during the last two years (2021, 2020). They may become well-known during 2020–21.

It is strange that eCampusOntario received 60% of its backlinks during 2019, and Manitoba Open Textbooks received 65% of its backlinks during 2018. It is possible that administrators of these Canadian repositories implemented marketing campaigns to promote their repositories during these years.

Table 10.4 Popularity of OTB repositories

Repositories of OTB	No. visits	Traffic distribution (%) by top countries	Traffic distribution (%) by source: Direct; Refer; Search	No. websites pointing	No. links pointing	Link Influence Score	Registration Date	Percentages of backlinks by year
AUPress	<50 K	?	?	1,569	41,162	98%	2007	27; 15; 17; 9; 14; 3
BCcampus	56.2 K	Canada:50; US:5; India:5; Australia:4; Mongolia:3	69%; 25%; 4%	1,727	54,588	99%	2008	18; 29; 26; 12; 10; 1
eCampusOntario	<50 K	?	?	52	1,962	53%	2008	12; 28; 60; 0; 0; 0
EdTech Books	78.2 K	US:24; Philippines:12; Indonesia:5; UK:4; India:4	16%; 2%; 80%	601	6,799	97%	2018	72; 20; 4; 2; 0; 0
GALILEO	<50 K	?	?	?	“	?	?	?
Go Open VA	<50 K	?	?	137	1,405	93%	2019	43; 56; 0; 0; 0; 0
Kallipos	163.3 K	Greece:91; Cyprus:5	17%; 5%; 76%	411	34,406	87%	2012	22; 9; 9; 27; 7; 7

(continued)

Table 10.4 (continued)

Repositories of OTB	No. visits	Traffic distribution (%) by top countries	Traffic distribution (%) by source: Direct; Refer; Search	No. websites pointing	No. links pointing	Link Influence Score	Registration Date	Percentages of backlinks by year
LibreTexts	9.7 M	US:39; India:10; Philippines:10; Canada:5; UK:3	12%; 0.5%; 87%	724	63,685	99%	2016	73; 12; 2; 13; 0; 0
Manitoba Open Textbooks	<50 K	?	?	25	1,316	39%	2016	0; 0; 10; 65; 24; 1
MIT Online Textbooks	4.1 M	US: 35; India:9; Canada:4; UK:3; China:3	30%; 3%; 55%	36,303	1,011,606	100%	1985	11; 9; 14; 11; 17; 5
OER Commons	113.2 K	US:52; Philippines:14; India:6; Canada:3; Turkey:2	39%; 15%; 44%	8,128	188,790	99%	2006	18; 16; 16; 16; 12; 2
OpenBook Publishers	51.5 K	US:22; UK:11; India:9; Philippines:7; Canada:4	31%; 12%; 54%	2,681	66,558	99%	2007	25; 25; 19; 11; 12; 2

(continued)

Table 10.4 (continued)

Repositories of OTB	No. visits	Traffic distribution (%) by top countries	Traffic distribution (%) by source: Direct; Refer; Search	No. websites pointing	No. links pointing	Link Influence Score	Registration Date	Percentages of backlinks by year
OpenStax	3.1 M	US:70; Canada:5: Philippines:4; India:4; Malaysia:1	65%; 8%; 26%	4,762	106,888	99%	2011	32; 20; 22; 13; 10; 1
Open Textbooks for Hong Kong	102 K	US:18; India:12; Ethiopia:6; Philippines:5; UK:4	13%; 1%; 82%	?	?	?	?	?
Open Textbook Library	401.1 K	US:44; Canada:6; India:5; Philippines:3; Ethiopia:3	31%; 14%; 53%	1,741	14,953	98%	1987	0; 0; 24; 37; 28; 5
PressBooks	<50 K	?	?	18	34	58%	? 2007	53; 47; 0; 0; 0; 0
Project MUSE	1.9 M	US:46; UK:9; Canada:6; Germany:3; Philippines:2	20%; 5%; 73%	36,824	1,057,288	100%	1987	14; 15; 20; 14; 13; 4
WirLernenOnline	<50 K	?	?	264	1,777	81%	? 2014	53; 41; 0; 0; 3; 0
UCLPress	<50 K	?	?	983	8,954	97%	2011	58; 22; 9; 2; 2; 2

(continued)

Table 10.4 (continued)

Repositories of OTB	No. visits	Traffic distribution (%) by top countries	Traffic distribution (%) by source: Direct; Refer; Search	No. websites pointing	No. links pointing	Link Influence Score	Registration Date	Percentages of backlinks by year
ULibros	<50 K	?	?	30	1,203	66%	2011	80; 18; 0; 0; 0; 0

Note A question mark means that data were not available

Table 10.5 Visitors' engagement and technical characteristics of OTB repositories

Repositories of OTB	Avg visit duration	Avg no pages per visit	Bounce rate	Speed: Mobile; Desktop	Mobile friendly	Accessibility errors; Contrast errors
AUPress	?	?	?	78; 92	Yes	9; 25
BCcampus	02:07	2.74	49%	41; 61	Yes	2; 10
eCampusOntario	?	?	?	48; 88	Yes	0; 0
EdTech Books	01:38	1.80	80%	73; 81	Yes	1; 4
GALILEO	?	?	?	41; 72	No	0; 7
Go Open VA	?	?	?	20; 35	Yes	10; 0
Kallipos	01:20	1.91	75%	47; 85	Yes	26; 67
LibreTexts	02:03	1.60	73%	13; 37	Yes	14; 30
Manitoba Open Textbooks	?	?	?	57; 80	Yes	0; 10
MIT Online Textbooks	03:08	4.28	53%	60; 90	No	10; 49
OER Commons	02:39	2.99	55%	17; 38	Yes	8; 7
OpenBook Publishers	01:20	2.22	59%	85; 99	No	13; 57
OpenStax	04:41	3.60	52%	22; 67	Yes	0; 0
Open Textbooks for Hong Kong	01:39	1.65	69%	49; 61	Yes	0; 0
Open Textbook Library	01:04	2.14	51%	69; 88	Yes	0; 0
PressBooks	?	?	?	25; 55	?	0; 0
Project MUSE	01:42	2.47	59%	25; 2	Yes	0; 8
WirLernenOnline	?	?	?	37; 75	Yes	0; 2
UCLPress	?	?	?	57; 83	No	1; 12
ULibros	?	?	?	54; 71	Yes	4: 41

Note A question mark means that data were not available

The average visit duration for most repositories is low (between 1 and 2 min). Only two repositories succeed in keeping their visitors on for longer than 3 min: MIT Online Textbooks (03:08) and OpenStax (04:41). Similarly, the average number of pages per visit for most repositories is low (between 1.60 and 2.00 pages per visit). Again, visitors to MIT Online Textbooks and OpenStax visit on average 4.28 and 3.60 pages per visit, respectively.

Most repositories do not achieve a good bounce rate. EdTech Books achieved the worst bounce rate (80%) while BCcampus (49%), MIT Online Textbook (53%), OpenStax (52%), Open Textbook Library (51%) achieved the best.

In order to provide a good user experience, the repositories should have a high speed. Using PageSpeedInsights (2021), we measured the speed performance of

a page on both mobile and desktop devices. A score of 90 or above corresponds to a good speed. A score between 50 to 90 corresponds to moderate speed, and a score below 50 corresponds to poor speed. The speed scores for all repositories were worse for access from mobiles than from desktops. OpenBook Publishers achieved an almost perfect speed score of 99 for access from desktop (and 85 from mobiles). Also, two other repositories achieved good speed scores for access from desktops: AUPress (92) and MIT Online Textbooks (90). However, Go Open Va, LibreTexts, OER Commons, and Project MUSE achieved very poor scores for access from both mobile and desktop.

The overwhelming majority of repositories are mobile-friendly. However, the following repositories were not mobile-friendly: GALILEO ("*The text is too small to read*"*;* "*Clickable items are very close to each other*"), MIT Online Textbooks ("*The text is too small to read*"*;* "*Clickable items are very close to each other*"*;* "*Viewport not set*"), OpenBook Publishers ("*Clickable items are very close to each other*"*;* "*The text is too small to read*"), UCLPress ("*Clickable items are very close to each other*"*;* "*The text is too small to read*"). These repositories exhibited the following errors:

- *"Text is too small to read*": "The font size for the page is too small to be legible and would require mobile visitors to "pinch to zoom" in order to read. After specifying a viewport for your web pages, set your font sizes to scale properly within the viewport".
- "*Clickable elements are very close to each other*": "Touch elements, such as buttons and navigational links, are so close to each other that a mobile user cannot easily tap a desired element with their finger without also tapping a neighbouring element. To fix these errors, make sure to correctly size and space buttons and navigational links to be suitable for your mobile visitors".
- "*Viewport not set*": "The page does not define a viewport property, which tells browsers how to adjust the page's dimension and scaling to suit the screen size. Because visitors to your site use a variety of devices with varying screen sizes—from large desktop monitors to tablets and small smartphones—your pages should specify a viewport using the meta viewport tag".

Using WAVE, we measured the accessibility of the repositories' first page. Most pages are accessible, having very few errors. However, the first page of the following repositories has quite a lot of accessibility and contrast errors: Kallipos (26; 67), LibreTexts (14;30), MIT Online Textbooks (10; 49), and OpenBook Publishers (13; 57). Usually, there was no alternative text for an image, and the contrast between text and background colors was very low.

10.5 Conclusions and Future Research

This chapter investigated twenty (20) major repositories of open textbooks (OTB) for higher education through various methods. These repositories curate from a few hundred up to a few thousand OTB in a variety of subjects. Few repositories apply quality assurance procedures to secure the quality of their OTB. Almost all of them curate OTB with CC licenses. The results of this study would be useful to administrators of repositories of OTB as well as to authors, teachers, and learners of OTB. Administrators of repositories of OTB would take action to increase the visibility and efficiency of their repositories. For example, they may upgrade their servers and Internet connections to increase their repository's speed. They may also launch Internet marketing campaigns to promote their repositories to educational institutes, libraries, authors, teachers, learners, and anyone interested in OTB. Authors of OTB would select the most appropriate repository of OTB in order to publish, and share their OTB. Teachers and learners of OTB would select appropriate repositories of OTB in order to find quality OTB fittings their teaching and learning objectives.

LibreTexts, MIT Online Textbooks, OpenStax, and Project MUSE attract a few million visitors, while each one of the rest repositories has attracted much less than half a million visitors during the last six months. Most visitors to a repository come from the local country. However, EdTechBooks, LibreTexts, MIT Online Textbooks, OpenBook Publishers, and Open Textbooks for Hong Kong receive visitors from many other countries. Most visitors to a repository come to it from a search engine.

MIT Online Textbooks and Project MUSE are pointed by most websites (over 36 K) and links (over 1 M). However, some repositories are pointed by very few websites (e.g., 18, 25, 52, 137) and links (e.g., 34). So, administrators of these repositories should apply internet marketing methods to promote their repositories to librarians, curators, educators, and learners. Finally, most repositories achieve a good link influence score.

The visit duration varies from 01:04 to 04:41 min:sec. MIT Online Textbooks (03:08) and OpenStax (04:41) manage to hold their visitors the most, while the rest repositories do not achieve a good average visit duration (less than 2 min). On average, the number of pages per visit ranges from 1.65 to 4.28. Again, MIT Online Textbooks (4.28) and OpenStax (3.60) achieve the best average number of pages per visit, while BCcampus (2.74), OER Commons (2.99), and Project MUSE (2.47) follow. No repository achieves a good (low) bounce rate—more than half of the visitors leave the repository after they visit a page of it. So, administrators of these repositories should try to curate their repositories with many OTB of high quality and variety as well as improve the design, organization, aesthetics, and offered services of their repositories.

Regarding speed, OpenBook Publishers offers good access speed from either mobiles or desktops. In addition, AUPress and MIT Online Textbooks offer good access speed from desktops. However, some repositories show very low speeds. Similarly, another study found low speeds for repositories that curate any type of

OER (Perifanou & Economides, 2022a). Administrators of these repositories should make efforts to upgrade their digital infrastructure.

Most repositories are mobile-friendly. A similar result was also found for global repositories that curate any kind of OER (Perifanou & Economides, 2022a). However, few repositories show mobile-friendliness issues. Over 90% of internet users worldwide use mobile devices to access online resources. So, administrators of these repositories should intensify their efforts to develop mobile-friendly user interfaces.

Regarding accessibility errors, no errors were identified in eCampusOntario, GALILEO, Manitoba Open Textbooks, OpenStax, Open Textbooks for Hong Kong, PressBooks, Project MUSE, and WirLernenOnline, while there were many errors in some other repositories. Administrators of the last repositories can use accessibility testing tools to correct such errors.

Future research may investigate ways to increase the users' engagement in a repository. Besides offering good design and organization, fast access, mobile-friendliness, large variety and quantity of OTB, repositories could provide live users' assistance, complementarity material to the OTB (e.g., presentation slides, tutorials, community).

Also, the quality of OERs in a repository is very important. Experts and reviewers can evaluate the quality of OERs. However, such an evaluation requires time, effort, expertise, and guidelines. Several repositories, as well as studies (e.g., Perifanou & Economides; 2022b), have proposed such guidelines. However, it is not easy to motivate experts to offer their valuable time, effort, guidelines, and expertise. So, future research may investigate ways of persuading experts to evaluate OERs. Besides economical compensation, other incentives and reward types could also be investigated.

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Chapter 11
Integrating Open Education Resource Praxis and Feminist Pedagogy in Gender, Women's, and Sexuality Studies

Jessica Turcat

Abstract This essay examines how the use of open educational resources (OERs) aligns with feminist pedagogy. It specifically addresses the theme of "course design" by drawing on my experience teaching Gender, Women's, and Sexuality Studies (GWST) courses at Oklahoma State University. After obtaining a university grant for OER course design, I taught remotely in 2020, exclusively using OERs in the following three undergraduate courses: Introduction to GWST, Feminist Mothering, and Gender and Representation: Body Image. One of the hallmarks of feminist pedagogy is the challenge of building community while decentring the role of the instructor. Of particular importance in the course design were the personal relationships that students could build with the course themes. By relying on OERs, the courses were designed to empower students to co-construct knowledge, learning from one another by introducing topics adjacent to the course themes that emerged during the semester. Students were able to acknowledge their power and privilege and—perhaps most saliently due to the reliance on OERs—their positionality. Structuring the class with contemporary OERs sets a foundation for students to view the subjects alongside their peer groups while questioning how they are situated within larger communities beyond the class. Understood in conjunction with solidarity and coalition, such a focus on community, as bell hooks argues, lies at the center of a feminist value system. This piece reviews the potential of OERs in relation to feminist pedagogy.

Keywords Open education resources · Feminist pedagogy · Gender · women's · and sexuality studies · Popular culture

11.1 Introduction: Selecting Resources

In 1890, Walt Whitman, a poet and essayist whose popularity had steadily gained over his 70 years as a humanist writing for the people, bellowed the following four

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lines to create a 36-s wax cylinder recording: "America/central of equal daughters, equal sons,/all, all alike endear'd, grown, ungrown, young or old/strong, ample, fair, enduring, capable, rich,/perennial with the Earth, with Freedom, Law and Love" (1982). Whitman emerged as a populist poet due largely to his glorification of American moral principles and championing of egalitarian values. Even though Victorian, prudish, double standards flourished during Whitman's lifetime, his liberating cultural insights come through in his poetry and his personal relations, as in his infamous declaration to Horace Traubel: "Sex is the root of it all: sex—the coming together of men and women: sex: sex" (Karbiener, 2006, p. 30). Whitman's adulation of the sexed body and the coupling of bodies also makes him widely regarded as a pioneer in women's representation on the page, with some writers even going so far as to classify him as an early feminist.

Unlike many of his contemporaries—Henry David Thoreau, Henry Wadsworth Longfellow, and Ralph Waldo Emerson—Whitman did not resist the drastic societal changes he witnessed. As a result, his voice is one of the earliest surviving recordings of American poetry. His eagerness to embrace the newest technological mode of communication is the primary reason his legacy endures as one of the most influential American poets to this day. Karbiener writes, "Though Whitman was to die a year later, his voice, like his poetry, would live on, both in the cylinders of Edison's phonograph and in the hearts of every American poet and lover of poetry who came after him" (p. 4). From this perspective, perhaps I could present Whitman as a model who represents the lasting benefits of embracing the latest technology to indefinitely reach one's audience.

There remains, however, some doubt about the wax cylinder recording being Whitman's actual voice. The recording quality seems too polished for the period, and both the origin and authenticity of the recording have been scrutinized and continue to be debated by scholars. For this reason, perhaps, I should not draw comparisons between Whitman's questionable recording and instructors who integrate open education resources [OER] to reach students by employing the most contemporary materials available.

Beyond examining Whitman's poetry and use of early recording devices, as a feminist scholar, I must also question whether he exemplifies feminist principles throughout his life before mobilizing his works within my own writing or classroom exercises. In *An Indigenous Peoples' History of the United States*, Dunbar-Ortiz (2014) reframes Whitman as a colonialist and racist who enthusiastically supported the United States' war against Mexico in 1846 as well as the two-year invasion and occupation of Mexico and "was also enamored of the violent Indian- and Mexican-killing Texas Rangers" (p. 130). According to Dunbar-Ortiz, "Whitman's sentiments reflected the established US origin myth that had the frontier settlers replacing the Native peoples as historical destiny, adding his own theoretical twist of what would later be called social Darwinism" (p. 118). Dunbar-Ortiz's reframing of Whitman's relationship with American history gives new perspective to the literary icon's arguably most famous poetic line: "I contain multitudes" (Whitman, 1982).

Despite the timely resonance of analyzing this national narrative, given the 2,000-mile US-Mexico border wall plan proposed by former President Donald Trump and

the vitriolic political climate and deep racial tensions that have boiled in the last five years, perhaps this is another reason why I should not begin an essay focused on feminist pedagogy by homing in on the works of a white male, particularly one with such a problematically complex, political history. Indeed, the analytical leaps needed to make such comparisons risk confusing an audience before the connection lands. Already, I have noted five white male authors in this essay introduction, countered by only two contemporary feminist authors. Perhaps I should follow in the path of Ahmed (2017), who introduces *Living a Feminist Life* by taking the following stance:

> In this book, I adopt a strict citation policy: I do not cite any white men. By white men I am referring to an institution. . . Instead, I cite those who have contributed to the intellectual genealogy of feminism and antiracism, including work that has been too quickly (in my view) cast aside or left behind, work that lays out other paths, paths we can call desire lines, created by not following the official paths laid out by disciplines. These paths might have become fainter from not being traveled upon; so we might work harder to find them; we might be willful just to keep them going by not going the way we have been directed. (p. 15)

Even as I write this essay, I struggle to select resources and put my ideas into words because of the persistent inclination to propose a pedagogy in step with Ahmed's strict policy. One worry is that I might have already lost several readers who expected that an essay on feminist pedagogy in gender, women's, and sexuality studies (GWST) courses would take an approach similar to Ahmed and strive for a narrative shorn of white male supremacy.

11.2 An Autoethnographic Approach

Feminist pedagogy emerged in the United States following the second wave of feminism. By the 1980s, feminists were creating a national shift in curriculum, learning environments, and pedagogy away from androcentrism, moving lessons beyond the specific political interests of white, heterosexual males from affluent backgrounds. Feminist scholars such as Peggy McIntosh underscored the absence of material on women's experiences and called for the very foundations of knowledge, the methods for creating knowledge, and for deciding what counted as knowledge to be questioned at all levels of education. Focusing on the need to teach about matrices of both privilege and oppression, McIntosh (e.g. 1989/2003) reflected:

> It seems to me that obliviousness about white advantage, like obliviousness about male advantage, is kept strongly enculturated in the United States so as to maintain the myth of meritocracy, the myth that democratic choice is equally available to all. Keeping most people unaware that freedom of confident action is there for just a small number of people props up those in power and serves to keep power in the hands of the same groups that have most of it already. (p. 195)

To bring a diversity of experience based on gender, race, class, ability, sexual orientation, and other markers of identity, McIntosh became one of the leading feminists to propose a model of curriculum transformation predicated on promoting an inclusivity of voices and participation.

Feminists of color quickly became central to the development of a liberatory feminist pedagogy. The feminist educator and cultural critic, bell hooks spent much of her prolific academic career spearheading the development of feminist pedagogy. Hooks (1988) argued:

> Feminist education—the feminist classroom—is and should be a place where there is a sense of struggle, where there is visible acknowledgement of the union of theory and practice, where we work together as teachers and students to overcome the estrangement and alienation that have become so much the norm in the contemporary university. Most importantly, feminist pedagogy should engage students in a learning process that makes the world 'more than less real.' (p. 51)

Through purposeful and continual attention to diversity and inclusion, feminist pedagogy aims to situate knowledge as a source of liberation, evoking social change in a continuation of the women's movement. Briskin and Coulter (1992) list the mega-questions on which feminist pedagogy focuses as "postmodernism, diversity, agency, resistance, multiple voices, centre and margin, power and authority, and the limits of political programs as the basis for a successful political practice (parallel to the limits of techniques as the basis for a feminist pedagogy)" (p. 7). Feminist instructors often need to push students beyond an expected comfort level to critically examine issues that they might otherwise ignore, avoid, and dismiss without deep consideration. This alternate approach to elevating marginalized and silenced voices presents specific challenges for both instructors and students. Hooks (1988) explains:

> My classroom style is very confrontational. It is a model of pedagogy that is based on the assumption that many students will take courses from me who are afraid to assert themselves as critical thinkers, who are afraid to speak (especially students from oppressed and exploited groups). The revolutionary hope that I bring to the classroom is that it will become a space where they can come to voice. Unlike the stereotypical feminist model that suggests women best come to voice in an atmosphere of safety (one in which we are all going to be kind and nurturing), I encourage students to work at coming to voice in an atmosphere where they may be afraid or see themselves at risk. The goal is to enable students, not just an assertive few, to feel empowered in a rigorous, critical discussion. Many students find this pedagogy difficult, frightening, and demanding. They do not usually come away from my class talking about how much they enjoyed the experience. (p. 53)

Feminist scholars and instructors must continually question their selection of the authors and resources used to support theories or ground class lessons. The ongoing dilemma for those in my position—those who facilitate conversations on the complexities of gender theory between students with novice and burgeoning feminist curiosity that is most often derived solely from Western mass media—is multi-faceted and cannot be tackled with a one-size-fits-all approach. In a world where politicians' and pop stars' tweets are broadcast to millions of viewers within seconds, and a running list of call-out culture's newly unearthed scandals is available 24/7, feminist instructors must also decide how to clear the way for deeply focused debates when new information or a new perspective on any given subject materializes that sheds light on the problematic nature of a pre-selected author or text. This requires feminist instructors to consequently make choices about which materials they will select, what methods they will use to strengthen student contributions to

class assignments and discussions, and how they will lead each class through an examination of the histories and institutions in the production of subject knowledge.

Feminist scholars and instructors have long argued that the translation of feminist pedagogy to online education environments is critical (Chick & Hassel, 2009). Adding to that charge is the need to consider how integrating OER praxis and feminist pedagogy align (Koseoglu, 2020). This autoethnography reviews the potential of OERs in relation to feminist pedagogy. The qualitative research method employed prioritizes my autobiographical experiences while implementing OERs in GWST courses. An important caveat here is that what follows is based largely on my own personal experiences and observations and on anecdotal evidence from students in the following three undergraduate courses: Introduction to GWST [both face-to-face and online], Gender and Representation: Feminist Mothering[1] (Feminist Mothering), and Gender and Representation: Body Image (Body Image). I use the term "genderful," as defined by Johnson and Weber (2011), to describe my pedagogical approach. Though their essay focuses on how masculinity is understood in their respective pedagogical situations, the meaningfulness of acknowledging gender and various forms of identity markers as inclusive spectrums aligns with feminist pedagogy in all the GWST courses I teach. Johnson and Weber assert "a genderful pedagogy that acknowledges plurality and works to appreciate that different bodies, practices, and identities can be identified as healthy and necessary" (2011, p. 139). My own pedagogical practice is shaped not only by feminist scholars but also by critical pedagogical theories, which foster student agency and nurture reflection and growth (Stommel, 2014). Additionally, I actively employ popular culture within class assignments and exercises, both as a teaching tool for developing students' critical analytic skills and for promoting and enhancing the understanding of complex theories and concepts.

Feminist pedagogy asks instructors to pivot instruction with the various identities of each student within each class as well as to consider how various student identities come together to form a collective class identity. Such an endeavor requires that feminist instructors give serious attention to how gender, race, sexuality, age, dis/ability, religion, nationality, and other social identities manifest in each class. Maher and Thompson Tetreault (2001) refer to this as "pedagogies of positionality." Feminist instructors must continuously expand ways to talk about the complexity of identity, asking students to acknowledge their power and privilege and—perhaps most saliently due to the reliance on OER—their positionality. Overall, my general observation is that by embracing OERs within GWST classrooms, feminist pedagogical goals are bolstered in the long run, though the switch to complete reliance on OERs requires an initial investment in time and energy on the part of the instructor. OERs can be particularly effective when empowering students to co-construct knowledge, learning from one another by introducing topics adjacent to the course themes that surface during the semester. However, OER usage is not without its drawbacks,

[1] This class was adopted as a recurring course in the Fall 2021 semester and is now simply titled "Mothering.".

which I will discuss further below, and my support of OERs is not to suggest that instructors should never require standard textbooks.[2]

11.3 Implementing Open Educational Resource Usage

Using OERs requires faculty to locate foundational course materials that are available for free through public digital libraries or in which access is available with already required student fees through their specific university library. When making OER selections, faculty must also ensure their courses are delving into the objectives they are designed to confront, often while teaching courses or completing other contractual obligations during the semester before implementing OERs. Valle (2019) summarizes this multi-faceted obstacle in the following manner:

> Professors don't assign books by major publishers or books with access codes because they want students to suffer—they do it because, more often than not, it's easier. As Vitez noted, an increasing number of universities are replacing full-time, tenured staff with adjunct professors. Adjuncts, many of whom are graduate students, are paid by the course, typically don't receive benefits, and occasionally find out they're teaching a class a few weeks before the semester begins. In other words, they don't necessarily have the time or resources to spend the summer developing a lesson plan or to work alongside librarians to find quality materials that won't come at a high cost to students. The result is a world where students and professors alike struggle to get by.

Thus, the adoption of OERs requires additional time and resources on the part of the instructor. Without sufficient support, this challenge will prevent instructors from using OER. While defaulting to a standard textbook may initially assist a professor in quickly scaffolding a course and ensuring that students in various sections receive a set of criteria required by the institution and department housing the course, such an approach simultaneously limits the instructor's ability to seamlessly revise course materials once the class has started. The outcome can result in a rigid daily syllabus. In this static approach, the instructor often fails to fully employ feminist pedagogy due to an inability to redirect class discussions to meet the interest of students where they are during the specific semester when they are enrolled in a particular GWST course. Experiencing this stasis several times led me to examine the use of OER. In 2019, I received a university grant which included open pedagogy training and the overhaul of course syllabi to exclusively use OERs in the aforementioned GWST courses.[3] The grant came with a small stipend equivalent to payment for a one-credit course. In line with Valle's argument, the grant afforded me the six months and dedicated librarian assistance needed to develop my lesson plans and ensure selected materials were correctly licensed. In these courses, textbooks would no longer be required, and all readings and screenings would be available via hyper-linked OER. Thus, after

[2] Instructors must also weigh the benefits of supporting women and minor owned presses and publishers by requiring select texts.

[3] The specific grant was the President's Fellows Hack Your Syllabus Grant awarded by Oklahoma State University.

a semester of preparing, I embarked on my OER teaching adventure in 2020. Of course, I had no idea that the world would be gripped by a novel coronavirus, and face-to-face classes would be shifted to virtual meetings midway through the spring semester in 2020, rendering the need for OERs more important than ever. Nor could I imagine that one day students would be masked and their desks would be separated a required six feet, making nearly all the planned class exercises impossible. Nor could I imagine the global protests that have occurred on a rolling basis for the last two years or the staggering health, race, and gender inequalities that have resulted from the pandemic and how those would spur our class discussions to new arenas.

One of the hallmarks of feminist pedagogy is the challenge of building community while decentring the role of the instructor. Thompson (2017) describes the need to re-socialize students not only at the beginning of the semester but also at the beginning of each class:

> Students typically enter the class feeling separate from each other. While they may come with and sit by a friend, most have been socialized to draw in once they get to class—to sit in their own chairs, open their own notebooks, think as individuals. The resocialization process to see themselves as part of a larger collective, to listen deeply to each other, to take care of each other intellectually and emotionally, has to be persistent—to help people remember the feeling of belonging and connection. (p. 88)

Community building can be particularly challenging within online classes, where identity is easily masked or skewed by the presence of a constructed, virtual avatar,[4] or classes where enrollment has been bloated to achieve certain academic quotas. Chick and Hassel (2009) describe online classrooms as "often quiet, distant, lonely, impersonal non-spaces... where learning too easily slips into the one-way transfer of information in virtual, independent study or correspondence courses" (p. 197). To facilitate community building, I spend time at the beginning of the semester ascertaining why students are taking a particular class as well as having them relate to each other. Even if initial responses are perfunctory, simple question-and-answer exercises offer a foundation for expectations as the class progresses. Students understand the expectation to relate to one another and the world in which they live. Understood in conjunction with solidarity and coalition, such a focus on community, as Hooks (1984) argues, lies at the center of a feminist value system.

Introduction to GWST courses satisfy the university's general education diversity course requirement, designated by the letter "D," which results in perennially high-enrollment. This means introductions take the entire first-class period; we typically do not address the course syllabus. During these introductions, I ask students to explain why they enrolled in Introduction to GWST. The most frequent response that I receive is "I'm here for my D." This does not dishearten me, though, because the second most frequent response is from students who describe in earnest how they think it will be refreshing to finally take a class that focuses on various diversity subjects. Over the years, I have found that these two types of students provide a

[4] I recognize too that the use of student avatars can be useful in virtual classrooms as a way for students to queer identity and result in enhanced engagement.

certain symmetry when building community within the classroom.[5] I continue to ask the question at the beginning of each semester for my own notes, but also so students can hear each other's responses.

I am not questioning whether they know what the required textbooks are, whether they have been able to purchase a copy and whether they brought their textbooks to class that day. As the semester progresses, I am not questioning whether I need to cut our class discussions short to get to the assigned readings from the required textbook to justify the hefty price tag students paid for the latest edition or even the reason why they are lugging it to class in the first place. Nor am I questioning whether I have wrangled enough class discussions in such a manner that we can make a direct connection to at least one of the essays in the textbook during most of our class meetings. After classes, I am not left contemplating whether students felt the transitions from one unit to another were disjointed because I did not provide appropriate scaffolding. Such scaffolding is routinely doled out by the instructor to connect pre-selected readings; it tends to be highly prescriptive, in direct opposition to the feminist pedagogy. Instead, the import of class discussion centers on students' voices and the connections they make collectively.

Even courses with high enrollment can allow for more varied voices to come out if students are given ample opportunity and encouragement to speak. Thompson relies on both "opening rituals" and "closing circles" in almost all classes, explaining:

> In a culture addicted to rushing, where superficiality is a frequent stand-in for intimacy, where multiple social upheavals have left us backed up emotionally, mentally, spiritually, many of us have stories that are caught in our throats. We need someone to listen to our stuttering, stammering, plea to be heard. (p. 44)

Though I have not utilized Thompson's exact rituals, I recognize the benefits of slowing the pace of the class, being present with students, and focusing on listening to each other. The time saved in the classroom when using OERs allows for our class focus to shift from the logistics of using textbooks to developing our class community. Even when using a textbook that is widely available for purchase at the university bookstore or from various online booksellers, inevitably, some students postpone obtaining the book until after the first day of class to hear the requirement from the instructor. Some will even wait until a couple of weeks into the semester to see if the instructor is actually going to assign readings from the textbooks, require the textbooks to be brought to class, and/or whether their grade will hinge on the reading assignments from the textbooks. Of course, some students employ this strategy due to the high cost of textbooks. Before switching to OER, I would receive one or two emails from students in each section pleading with me to scan the first chapters so they could complete the readings. They often divulge, unsolicited by me, that they would not be able to purchase the textbook before their student loans or scholarship monies were made available. Feminist instructors face the contradiction of working within an exclusionary, hierarchical power structure where the institutional requirement they

[5] I expect these responses to change in the years to come. When I first taught GWST courses over a decade ago, I routinely heard, "I'm here to meet women [girls, chicks, etc.]" or "I want to learn what women want.".

are implicitly expected to uphold runs counter to the social justice mindedness they are teaching (Hooks, 1994).

Then, there is the reality that some students are intimidated by the physical nature of the academic textbook, the amount of reading visually represented by the textbook, and/or the physical act of reading from a textbook. This might seem foreign to professors who have grown accustomed to seeing stacks of books and digging into a 300-page hardback for relaxation at the end of the day. Still, for some students, the stark contrast between their usual, terse written exchanges—a flashing billboard's brief copy or a friend's DM—and the prospect of potentially reading thousands of words or hundreds of pages in the coming weeks on top of course work in their other classes can overwhelm students before the class even starts.

A few semesters ago, I was delighted to teach an honors section on "Autobiographies by Women." This was an intimate class capped at 15 students. When I reviewed the course syllabus with the class, I explained that our goal would be to complete one book every two weeks. Thus, we would be reading eight books in the 16-week semester. Several of these class autobiographies by women were thin paperbacks such as Marguerite Duras' *The Lover* (1986) and Marjane Satrapi's *Persepolis* (2004). However, I later learned that two students dropped out after that initial class meeting because of the daunting task of reading eight books. My own love of reading and excitement for a class that catered to that passion clouded my ability to anticipate the different emotional responses that at least a couple of students—honors students, no less—had when they entered the class. In hindsight, I should have offered to assist students with personal reading schedules or spent one class period on this task in an additional community-building exercise at the beginning of the semester. I should have then foregrounded that I would be mindful of students' reading pace as we moved through the reading list, re-evaluating that goal if necessary. Perhaps those students would have felt they could handle the required booklist and successfully complete the course.

Additionally, apart from the amount of reading, some students struggle with the physical act of sitting down and reading from a textbook. This reality was articulated by a student who candidly explained why they were struggling to complete assignments from the textbook in our online Introduction to GWST course. From the student's perspective, the process of reading from a textbook was clunky, inefficient, and boring. They detailed how they would sit on their bed and start working on their computer. After logging on to the online classroom, they would watch my instructor video (approximately five minutes) and begin scrolling through the list of assignments for the week. The first assignment was usually a brief reading from that week's unit introduction. The student said they would look around their room and realize that they needed to get up, find their textbook, and then find the appropriate pages to read. This would take a couple of minutes if they did not get distracted. Once they began to read, going back and forth between the computer screen and textbook page quickly became exhausting. The student admitted they would usually give up reading and get a snack before approaching their reader response, explaining how their eyes and head were tired. Once snacking, they would check their cell phone, get distracted again, and never complete their homework assignment.

As an English major, I did not understand the student's perspective. I thought, "Yes. That is reading from a textbook. That is required in this online course." However, as a feminist instructor, I recognized that this student was divulging their reality, taking a risk in telling me their truth and that I needed to figure out how to be embodied with that student's reality to understand the physical toll of this seemingly simple process. Historically, feminist pedagogies have required adjustments to be made to address the barriers to women's education. They often build on Freire's work to address the changing nature and needs of education and to further engage students in the learning process. Of similar importance then is the necessity to recognize when the medium in which material for class lessons is being delivered, particularly in distance learning courses, is placing unnecessary demands on students' energy and time.

I, too, recognized that this student might not be alone in their experience. When I anonymously shared this perspective with students in the face-to-face section, they nodded their heads before I even finished the explanation. Even though they were not enrolled in an online course, they still felt that the use of the class textbook was unnecessarily taxing. Regardless of whether their exhaustion from reading textbooks was justified in my mind, the fact remained that semester after semester, students were not completing the assigned textbook readings. Even with a robust class community, discussions would fall flat if students were drained and had only skimmed their textbook assignments and/or did not bring their textbook to accompany the class discussion. If I asked questions drawn from the assignment, it quickly became apparent who did the reading when the same handful of students actively participated. Breaking students into smaller groups crumbled in a like manner. Group exercises resulted in one or two students doing all the talking, or the random group where no one had completed the reading and students simply stared at each other or unabashedly scrolled their cell phones. An increasing amount of my energy and class time was spent checking how many students read and how deeply they focused on the reading. I faced the prospect of giving pop quizzes or additional writing assignments due before class to ensure students' deep study of their textbooks. These options would leave even less room for intimacy and vulnerability during the following class discussions of the required readings. Not only did I need students' focus, but I needed their enthusiasm to explore the depths of our course lessons.

Integrating OERs aligns with feminist pedagogical goals and does not compromise the lessons students are expected to complete. The same amount of reading is required for each class, only the medium in which those assignments are delivered changes. Most often, highly anthologized essays are available through digital archives. For example, introductory feminist essays such as Adrienne Rich's "Claiming an Education" (e.g., 1977/1995) and Gloria Steinem's "If Men Could Menstruate" (1978) are freely available online through creative commons licensing. As more online learning platforms emerge, the immediate access to various digital feminist presses will only increase. Equality Archive notes the importance of offering multimodalities to learners with the goal to "imagine a feminist resource friendly to a generation whose access to information comes to them from their mobile phones, and at the same time, to offer direction toward more complex, detailed information available in books" (Eversley and Hurson, 2017, p. 157). When assigning an essay from such an

archive, students can browse lists of collected feminist data and find topics related to the class themes, then proceed in the direction of particular interest to them. Most students have experience with some amount of media literacy, and navigating through online data does not tax them the same way as relying on traditional textbooks. The added benefit of drawing on the excitement generated by exploring information presented in multiple modes facilitates the dialog between theory and practice.

In addition to bolstering students' connections to one another, the personal relationships that students could build with the course themes were particularly important in my OER course design. Thompson emphasizes, "Since many topics that are raised in feminist classrooms directly relate to people's lived experiences in the world, students need to be able to talk about how they relate to the course content" (p. 3). To continue building community and get students talking about course themes, I sought OER materials that tapped into their knowledge and exuberance for popular culture in the Introduction to GWST and Body Image courses. Paine (1999) emphasizes, "Students come to the classrooms with models of argument and selfhood that are derived from the mass media" (p. 159). Students construct who they are and whom they might become through the representations presented by mass media.

Mass media bombards our daily public and private lives. Often this influence starts at such a young age that students do not realize how much of an impact popular culture has on determining their individuality. Since popular culture also influences the literacy of a nation, students' reading and writing skills reflect the cultural standards. Daspit and Weaver (2000) highlight:

> From the moment that Big Bird introduces them as children to the letter *a* on *Sesame Street*, students begin developing a literacy about popular culture that may be deepened and refined in a composition course so that they can perceive the way that representation shapes culture and influences their lives. (p. 35)

While acknowledging the fact that today's American society is saturated with mass media, one cannot overestimate the amount of time students spend on gaming, social media, hookup apps, movies, television, pornography, and other media platforms. Integrating OERs harnesses the endless streaming of popular culture that already takes place and bridges the gap between the popular and scholarly.

Given the fact that students and instructors alike live in an age dominated by consumer capitalism and the products of capitalist culture, providing an opportunity to share what each other finds relevant with the class creates an avenue for class members and the instructor to connect to one another—as they often recognize the shared materials from their own personal exposure to the same popular culture icons—and eases their approach to what might otherwise be considered difficult theoretical class materials. GWST instructors routinely present icons that have become so ordinary and accepted in Western culture as strange and unique, asking students to question the kinds of knowledge present in their worlds. To achieve this goal, one must know how to open a perspective outside of popular culture from which to view the icons.

Feminist instructors are always on the lookout for methods of transferring contemplative energies from one focus (a television series or social media app) to another

(an intersectional feminist lens). I encourage students to analyze common objects as representations of their collective culture, using critical methodologies like rhetoric, ethnography, and semiotics. Ivinson and Murphy (2006) posit:

> As students participate in classroom practice they experience gender as a range of social possibilities or constraints about what they can legitimately say, do, write and behave as a boy or as a girl, as they attempt to realise the skills, know-how and practices that make up subject knowledge. Activity within classroom settings, situated within matrices of other social contexts, can either reinforce or resist the social norms that are maintained in other social arenas. Hegemonic social representations of gender may be reinforced, challenged or transformed through classroom practice. (p. 165)

By every day gradually incorporating popular culture into the classroom and pushing students to think critically about the world in which they live, my hope is that such thinking will be relevant outside of the classroom and be incorporated into the students' personal lives to create well-rounded, critical thinkers that will value themselves and the purpose they serve in the world today.

With the rise of media-literacy courses in high schools, for most students utilizing popular culture and critical pedagogy is not as novel an experience as it once was. Still, some theorists argue that teaching popular culture in the college setting is inappropriate or lacks scholastic value. Buckingham (1998) explains:

> The hyperbolic rhetoric of 'critical pedagogy' has come under attack not only from theoretical perspectives such as feminism, anti-racism and postmodernism, but also in light of actual classroom experience. The notion that teachers might 'liberate' students through rationalistic forms of ideological critique has been increasingly questioned, not only on the grounds of its political arrogance, but also because of its ineffectiveness in practice. (p. 23)

Additionally, Berube (1999) underscores, "Most of the outcry against teaching popular culture in college courses takes this form: The subject, we are told, is unworthy of serious study, lacking the textual and cultural density that defines the masterworks of the arts and humanities" (p. 1). This criticism adds to the already existing resistance to the teaching of what McIntosh (e.g., 1989/2003) refers to as "soft subjects" which feminist classes are routinely labeled within the academy. The presence of canonical knowledge assigned by the professor signifies what is traditionally classified as scholarly. Maher and Thompson Tetreault explain:

> The voices of the oppressed although now increasingly heard in academic settings, are framed and distorted by the view that legitimate knowledge is that which is white, male, heterosexual, and middle class. These other knowledges are seen as particular rather than generalisable, narrative and anecdotal, rather than scholarly and theoretical, "passionate" and "engaged" rather than reasoned and objective. (p. 19)

Feminist instructors must then overcome the multiple negative associations of teaching GWST courses, introducing popular materials, and breaking from traditional textbook usage to rely on OER.

11.4 Classroom Observations

One of the drawbacks of relying on OERs is that some students and colleagues consider the student-led nature of the course, along with the stereotyping of feminist classes and the elevation of those "cast aside or left behind" works (Ahmed, 2017), as undermining the scholastic merit of the course. Operating outside of the comfortable framework means that feminist instructors risk being dismissed or labeled unprofessional. Johnson and Weber detail one such experience:

> In my first semester in a gender studies department, I felt eaten alive by students who resented the difference that I represented as one of their professors. They demanded more conventionally legible forms of authority from me, both in my demeanor and in how I structured the course, and though some students seemed to appreciate the more fluid style I brought to the classroom, the overall learning environment was compromised by expectations that I present a professorial face more in keeping with that to which they were already acclimated by the larger university culture. (p. 145)

I have found this to be representative of class expectations in the Introduction to GWST course. Students expect and sometimes demand that I provide a daily syllabus at the beginning of the semester as well as provide strict criteria and deadlines for all assignments. I provide a set unit plan for the semester and multiple OERs each week. Then, students are welcome to supplement with their own OER selections to strengthen weekly class discussions. One benefit of teaching this course online is the ease with which students can hyperlink resources or embed pictures and charts directly into our discussion threads, disrupting the "one-way transfer of information" (Chick & Hassel, 2009, p. 197).

The approach I use in the Body Image and Feminist Mothering course is more fluid, allowing multidimensional forms of knowledge to emerge. The Body Image classes present a particular obstacle since approximately half of the students who sign up for them tend not to have taken other gender studies courses, while the other half are typically minoring in GWST and have taken Introduction to GWST, often along with an additional major-focused GWST course. These two groups of students proceed through the class simultaneously, but the divide can be acute at the beginning of the semester and can bifurcate discussions if the instructor does not strive to find common ground. I notice students are more apt to participate when given open-ended directives closely aligned with inquiry-based learning theory. An example of one such assignment used in the Body Image course instructs: "Locate sources on sex-positive and/or body-positive activism." When we meet for class discussion, I begin by asking something as simple as "Looking at the sources you found, how is sex-positive and/or body-positive activism defined?" Later in the class, I will further question: "How does sex-positive and/or body-positive activism go beyond mainstream movements that promote 'self-care' and encourage individuals to simply 'love your body'?" Students can join the conversation from various points, regardless of their level of understanding of the field of gender, women's, and sexuality studies. They can present their prepared materials or talk about their personal relationship with such activism or mainstream movements. To encourage students to fully acknowledge their

identity construction through the power of response is to encourage them to become critical thinkers in ways that enable students to address their own positionality. Often, they feel comfortable mentioning social media posts they have viewed or drawing a connection to popular culture representations of the assigned themes.

Somewhat surprising, students often do not take offense when someone voices a difference in opinion about their personal preferences in popular culture as they might be inclined to when discussing their opinions on sexuality, religion, political affiliation, etc. Even though popular culture is wrapped up with their individuality or personhood, they do not view it as a slight when another classmate openly admits to not being a fan of *Star Wars: The Clone Wars* (Filoni, 2008) or *Empire* (Strong et al., 2015, 2020), for example.[6] This opens the possibility for having discussions about polemical topics where students remove themselves ever-so-slightly from the subject matter because the discussion is filtered through an analysis of popular culture representation. For example: In the Body Image class, I introduced the series *The Handmaid's Tale* (Miller et al., 2017) and *Billions* (Koppelman et al., 2016). Students were familiar with these series, though more had watched *The Handmaid's Tale* (Miller et al., 2017) than *Billions* (Koppelman et al., 2016). As an instructor, I recommend gaining familiarity with sources before introducing them; however, students do not need to have viewed the entire series. Selecting a few video clips for class analysis draws students in, and everyone can participate in the initial class discussion. Since both series have original release dates of approximately five years prior, scores of academic essays have been written about them. However, even if I could locate a course textbook with articles on these series, it would not predict the myriad of different directions in which students could take class discussion. Having students locate their own OER through their university library databases on the series allowed them to investigate their personal relationships with subjects. Since *The Handmaid's Tale* (Miller et al., 2017) is based upon Atwood's (1985) novel by the same title, we were able to read excerpts in addition to watching video clips. These excerpts were widely available as OER since the original novel was published nearly 40 years ago.

A few brief selections on the dystopic storyline provided visionary feminist topics related to the course theme on body image, including censorship, dress codes, abortion, body shaming, maternal violence, reproductive health, and patriarchal regimes, among other intersections of gender and society. Of course, the feminist draw toward Atwood's novel is that the accounts in her storyline are drawn exclusively from historical events. The reality that disturbingly dark fiction based on historical fact simultaneously fascinates and horrifies students while bringing a necessary gravity to

[6] On the rare occasions when students did adamantly disagree with other students' popular cultural selections, the series or movie in question was one that was purposefully controversial such as *Shameless* (Wells et al., 2011) or had become politicized within mainstream, as in the case of *Cuties* (Doucouré, 2020). Still, students' resistance to these shows did not rise above remarking, "I refuse to watch that!" followed by an explanation. That is to say, the student who shared that they watched a particular show was not targeted or ostracized during class discussions, even when the majority of students voiced opposition to the show or to watching it.

our discussions.[7] Students' interest was also piqued by Asia Kate Dillion's portrayal of Taylor Mason on *Billions* (Koppelman et al., 2016). Mason is the first non-binary character on North American Television. When I introduced this information to students, many were excited by the juxtaposition of Mason against the backdrop of American high finance, expectedly presented as revolving around white male power and privilege. Our concluding class discussion led to the unanticipated call for sex education and anti-bullying campaigns across American high schools.

Even when subjects arise of which I do not have extensive knowledge, I am able to engage in deep listening as the class leads the discussion. This happened when a few students wanted to address sports, admittedly an area of popular culture with which I do not concern myself. Students wanted to discuss football, gravitating to Colin Kaepernick and his infamously defiant act of taking a knee. When we gathered that his return to NFL seems unlikely, most students stated this was unfair. One student made the statement that it would be difficult to remain in a sport that had treated the player so poorly. Another student connected that treatment to how Serena Williams must feel playing tennis. During this entire exchange, I was quietly following the student-led "desire lines" (Ahmed, p. 15). After another minute or so of talking about Williams, a student asked if anyone had seen "that cartoon" depicting Williams. The student made a grimacing face as if their daring to mention such a defamatory image would reflect negatively on them as opposed to the illustrator or publishers. A few in the class chimed in, and within seconds another student had pulled the cartoon up on their cell phone. I was able to search for it on the class computer and project the image for the entire class to see (Held, 2019). We spent the remainder of the class discussing the explicit racism and sexism not only in the image but also in the sport of tennis. Perhaps making the realization for the first time, a student summated, "It is not just tennis. Think of how many sports are almost exclusively for white players—hockey, ice skating, gymnastics, ballet…".

As the class went silent, I noticed our class time was almost over. I told them, "I have a reading about Serena Williams. I've never taught it before, but after hearing your thoughts today, I'm curious what you will make of it." Students could sense my genuineness; I wanted to learn from them. Before they left, I projected the jacket cover of Rankine's *Citizen: An American Lyric* (2014). As students stared at Hammond's (1993) haunting illustration "In the Hood," I could feel their curiosity swell; they wanted to understand. In the final minutes, I read the following passage from the back of the book:

> You take in things you don't want all the time. The second you hear or see some ordinary moment, all its intended targets, all the meanings behind the retreating seconds, as far as you are able to see, come into focus. Hold up, did you just hear, did you just say, did you just see, did you just do that? Then the voice in your head silently tells you to take your foot off your throat because just getting along shouldn't be an ambition.

[7] I include trigger/content warnings (Kubala, 2020) at the beginning of the semester and then routinely throughout the course, particularly when introducing new units. Students are encouraged to do likewise when introducing OER and provided with multiple examples to follow.

The class silently mulled over the myriad tensions at work within the passage. I told them that I would scan the chapter on Serena Williams, and together we would try to understand Zora Neale Hurston's poetic line, "I feel most colored when I am thrown against a sharp white background," used as a refrain throughout Rankine's book (2014). Beyond Rankine's excerpt, I did not clearly understand what direction the class was heading. I was no longer concerned; I felt confident students could take the reins.

11.5 Recommendations for Feminist Open Educational Resource Usage

Since implementing OERs, over 500 students have enrolled in the GWST courses that I have taught. I have not had a single student voice an issue with the fact that the class does not require students to purchase a textbook. The resounding response has been positive. I have, however, had the comments on my course evaluations that claim that the class is biased, indoctrinating students, or needs to be canceled. Still, these negative assessments were standard before the implementation of OERs and do not specifically take issue with individual essays, assignments, or selected screenings.

The closest a student has come to commenting negatively on the use of OERs was when I received a direct message in our online classroom from a student who raised an issue with what they perceived as my one-sided selection of feminist texts within our Health and Reproductive Justice Unit. This student stated they were disappointed that the materials addressing abortion were not 50/50: pro-life vs pro-choice. They felt my selections tended to favor the pro-choice side of the debate. They then added that I should consider that, given the demographic of Oklahoma State University, most students identify as pro-life and would appreciate more feminist texts that uphold that position.

Though I was almost certain the student wanted me to respond by noting how they were likely correct about the demographics of students on campus and then recommend a few pro-life feminist reading suggestions to achieve their desired 50/50 balance, their recommendation for additional pro-life materials did not reflect a concrete understanding of contemporary feminist theories. I needed to point them toward a deeper understanding of feminist politics. I responded to the student by thanking them for sharing their thoughts and expressed that they were welcome to post additional feminist materials that would help balance the discussion in their mind. I reminded the student that rather than viewing the debate as binary, perhaps, we are better served by trying to gather as many various perspectives as possible, recognizing that abortion is merely one issue under the broader feminist political movement of reproductive rights and social justice. I further advised that they return to Hooks (2000/2003). We had read the excerpt "Feminist Politics: Where We Stand" during the first week of the semester, though that had been over ten weeks prior at

that point. In my email, I linked the essay, and I accentuated the following example that Hooks (2000/2003) provided to illustrate lifestyle feminism:

> If feminism is a movement to end sexist oppression. And depriving females of reproductive rights is a form of sexist oppression. Then one cannot be anti-choice and be feminist. A woman can insist she would never choose to have an abortion while affirming her support of the right of women to choose and still be an advocate of feminist politics. She cannot be antiabortion and an advocate of feminism. Concurrently there can be no such thing as "power feminism" if the vision of power evoked is power gained through the exploitation and oppression of others.

I then suggested we could have a conference to continue discussing the topic. I hoped to perhaps frame abortion as defined by Rich (1976): "Abortion is violence: a deep, desperate violence inflicted by a woman upon, first of all, herself. It is the offspring, and will continue to be the accuser, of a more pervasive and prevalent violence, the violence of rapism" (274). I was planning to suggest that they enroll in the upcoming Feminist Mothering course since I was currently reading Ross's (2017) *Reproductive Justice: An Introduction* in preparation for further discussions on the broad scope of health and reproductive justice. Unfortunately, like so often happens in virtual classrooms, my comment and request to meet went unanswered.

When relying heavily on class-selected OER, feminist instructors need to be mindful of the inclination of students to select materials that reflect the demographics of their personal communities and reinforce the arguments deemed favorable or desirable by the dominant culture. Though they may simply be making selections based on their own interests, feminist instructors should continuously push students past their personal comfort zones and introduce materials to which they have never been exposed. Thompson emphasizes, "[S]eeing only each other's similarities runs the risk of flattening tremendous power differentials" (2017, p. 19). Though I did not classify the student's feedback as a critique on the use of OERs in the GWST classroom, the impulse on the part of the student was to question the biased nature of the selected OER. This questioning is beneficial; however, the instructor and selected OERs often become the targets at which students direct their dissatisfaction or disagreement with feminist theories. Whereas, in classes centered on readings from a textbook, these emotions might otherwise be directed toward the editors or authors of the textbook. Then again, perhaps students would still question the bias behind the instructor's selection of the textbook.

I was delightfully surprised when the opposite happened in the Feminist Mothering course relying on OER. Students introduced a wide array of materials from topics they had never thought about before the class. Disruption from the pandemic pumped an urgency into our class discussions, and the course took a sharp turn toward politics.[8] The class purposely sought out information that propelled other students to

[8] The first semester I taught Gender and Representation: Body Image, I titled the course Gender and Representation: Body Politics. While I still maintain that the original title was more fitting, it became apparent that students—even GWST minors with an interest in the subject—were avoiding the class due to an aversion to politics in general. When I asked students why they did not sign up for the class, I received comments like "I don't like politics," "I'm sick of politics," or "I think a class on politics would make me irritated.".

talk about social privilege so they would have fuel for future conversations beyond the classroom—as partners building feminist households and parents raising future feminists. When one student posted a link to an article on the Wall of Moms' Protest Group (Blum, 2020) originating in Portland, Oregon, which sprang forth during the Black Lives Matter protests, I witnessed students in the class joining online communities and relating their experiences back for the benefit of class members. They were tired but energized. They soaked up everything we could find in those early days of lockdown to assist themselves and other mothers wading through the "new normal."

Between the Spring and Fall 2020 semesters, I spent a significant amount of time gathering information on the pandemic and mothering. I started the next Feminist Mothering course confident that students would benefit from the plethora of news articles and feminist reflections on the growing gender disparities that had emerged within family units during the pandemic. Several students in the class had recently taken Introduction to GWST and were familiar with the expectation for students to suggest topics and themes for our class discussions. This allowed for a level of comfort and openness from those students at the beginning of the semester. When I broached the topic of the pandemic and the various resources I had gathered, my suggested options were immediately met by the reality that students, several of whom were mothers or found themselves newly engaged in mothering practices due to the pandemic, adamantly did not want to discuss the pandemic. Frankly put—they were over it! Instead, this class wanted to spend an additional week examining our "Gender Creative Families" unit, which includes topics focused on raising children who identify as gender-neutral/non-binary/transgender, creating gender fluid or gender-creative families, and constructing home environments that resist homophobia, transphobia, and bullying. They spent most of their energies imagining futures rife with equality within their partnerships, families, households, and communities. I reminded myself of Paine's argument, "At the heart of critical thinking lies the ability to distance oneself from one's world, to step back and critically think about thinking, one's own thinking and one's community thinking" (p. 157). The students' resistance to any discussions about the pandemic illustrated that they were not in a place where they could distance themselves enough to critically think about the pandemic and the feminist theories addressing the scores of hardships mothers had been facing daily for over a year at that point. Once again, I was glad I was not limited to a pre-selected textbook. I was able to refresh the supplemental materials from the lesson on *Billions* (Koppelman et al., 2016) used in the Body Image class and locate a couple of readings and videos on mothering gender-creative children. The endeavor was undemanding due to the increasing popularity and media attention of this topic in the last decade; however, the experience taught me that in order to pivot with students' specific interests in each class and allow for co-constructed lessons with students, both critical components of feminist pedagogy, instructors must allocate time to drafting lessons and gathering additional sources throughout the semester, recognizing that some of these lesson plans will never be used. This requirement might be additionally burdensome to new instructors and instructors who are balancing heavy course loads. I continue to hold on to my pandemic materials for a future Feminist Mothering course—a future semester where students express

a desire to delve into the subject and reflect on the ramifications and the collective trauma of living through that experience. I accept, too, that I do not know what topics students will want to address in future classes any more than I know what events will shape our tomorrow.

11.6 Conclusion

Implementing OER praxis and feminist pedagogy requires additional labor and energy on the part of the instructor, which might prevent some instructors from making the switch, especially given how feminist instructors necessarily problematize every text and subject selection, questioning how it aligns with multi-faceted feminist values. With additional attention given to new instructors and instructors with heavy course loads, OER usage can streamline feminist pedagogical goals if the university and departmental support are provided. The co-construction of lessons between instructor and students that OER praxis affords empowers students to select, interact, and reflect on a broader scope of cultural, political, and social meanings and understanding. Such analysis will be relevant outside of the classroom, on into the students' personal lives as they learn the value of questioning their own thought processes and the purpose they can serve in an ever-changing world.

Even as I polish the final drafts of this essay, Russian tanks are rolling into Kyiv, and Volodymyr Zelensky has recorded a farewell address to European Union leaders and the Ukrainian people he vows to fight alongside. There is a ringing in my ears. I find it hard to concentrate while being inundated with headlines questioning World War III and nuclear weaponry; I am certain students feel similarly overwhelmed, helpless, and despondent. I question whether I should show them a video I stumbled upon of a Ukrainian woman hailing Russian soldiers occupying her street. I cannot see her face, but her hair is grey. The soldiers seem young, from what I can tell. I cannot decipher whether she addresses them in Russian or Ukrainian.

From reading the transcript, I gather that she is telling them to take the seeds in her outstretched hands—sunflower seeds, the national flower of Ukraine—and put them in their pockets "so at least sunflowers will grow." She curses them, "you will lie down here with the seeds." I contemplate what connections students could make with the feminist theories we have been reading this semester, perhaps with our ecofeminism or ethics of care units. Perhaps they will gravitate to analyzing the biopower behind the woman's diminutive protest. The soldier's ironic restraint, "Let's not escalate this situation. Please go away." The land they both claim for different reasons. Or something else, something not captured in the video. The larger geopolitical backdrop. The biased media coverage. Perhaps the video is fake, only acted out to engender pathos from viewers. Perhaps they will voice their personal emotional response. Perhaps I will share how I started to weep—while sitting before a beautiful, warm fire halfway across the globe—and perhaps I will divulge that I could not tell if I was crying because I was so upset with what was about to happen to millions of people or if I was worried about what might possibly happen to the

handful of people sleeping down the hall as a result of all the things I cannot control. Perhaps students will understand what I am trying to teach them and why, given the current tension, this specific lesson is more vital now than ever before…but then again…perhaps not.

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Chapter 12
The Wikipedia Education Program as Open Educational Practice: Global Stories

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Abstract Wikipedia provides an opportunity for students to engage not only in the consumption of Open Educational Resources (OER) but also in their production. This Open Educational Practice (OEP) has been the cornerstone of the Wikipedia Education Program—a loosely coordinated, simultaneous global effort to integrate Wikipedia into higher education classrooms. In this chapter, the authors will provide an overview of the work that has been done globally across time and selected case studies of work undertaken in Serbia, Israel, the United States/Canada and Brazil to support college and university students writing articles in the Serbian, Hebrew, English and Portuguese Wikipedias, respectively. The overview will rely on data from multiple sources: scientific reviews, non-academic case reports and unprecedented descriptive statistics on recent education programmes and their impact. Case studies will touch on how engaging in Wikipedia as an OEP integrates into course design, how cultural institutions (i.e., university libraries and museums) collaborate with the programme, and how the Wikipedia Education Program might be framed as promoting knowledge equity.

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12.1 Introduction

By its own definition, Wikipedia is free content, the multilingual online encyclopaedia written and maintained by a community of volunteers through an open collaboration model using a wiki-based editing system. It has gained huge popularity among all Internet users, from average readers that want to get acquainted with a topic to subject matter experts, researchers and scientists. According to Alexa, the leading web traffic analysis site, Wikipedia has consistently ranked among the top 15 sites and has been the top not-for-profit site for several years. Wikipedia has several sister projects, including Wikimedia Commons, which contains millions of free multimedia files and Wikidata, a knowledge database of structured linked data. These projects are a part of the Wikimedia Movement, a global open knowledge movement spearheaded by the Wikimedia Foundation, a non-profit organisation headquartered in San Francisco, California.

Wikipedia and higher education have a long history together, which will be explained in the following section. Academic research demonstrates that Wikipedia is not only an efficient learning environment (Evenstein Sigalov & Nachmias, 2017; Petrucco & Ferranti, 2020) but also an Open Educational Resource (OER). UNESCO defines OERs as "teaching, learning or research materials that are in the public domain or released under a copyright license that allows free use, adoption and distribution of the material" (UNESCO, 2002). Wikipedia, with its content under a CC-BY-SA license, fits this description. And with more than 58 million articles across more than 300 language versions, Wikipedia is by far one of the world's largest OERs, with its younger sister project, Wikidata, ranking high as well. A 2018-study has found that Wikipedia is the most popular OER for students of environmental studies, used by 95% of students (Petiška, 2018).

Ehlers calls for a shift from OER to a second phase in the Open Education movement, Open Educational Practices (OEPs), which he defines as "practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path" (Ehlers, 2011, p. 4). Wikipedia, with its "anyone can edit" philosophy, presents an exceptional opportunity for OEP. Students can edit articles on Wikipedia as a class assignment, thereby empowering them as producers of open knowledge rather than just consumers. This consumer-to-producer shift is at the heart of OEP and forms the centrepiece of Wikipedia Education Programs. As McDowell & Vetter (2022b) note, using Wikipedia pedagogy is OEP. Using the Association of College and Research Libraries (ACRL) Framework for Information Literacy in Higher Education, they identify how teaching with Wikipedia

gives students critical information literacy skills with social justice implications (McDowell & Vetter, 2022b).

The sheer diversity of educational systems, cultures and Wikipedia projects worldwide has created different circumstances for developing Wikipedia in education. In some cases, Wikipedia and other Wikimedia projects could thrive in academic settings, whereas in others, progress has been limited due to various factors. With four case studies from four different continents, we aim to exemplify the thriving symbiosis between the Wikimedia movement and local education systems. We explore best practices and success stories from around the world and offer insights into possible models for implementing Wikipedia into the higher education curriculum.

12.2 Background

12.2.1 History of the Wikipedia Education Program

Wikipedia, "the most gigantic and successful realization ever known of the original Enlightenment project" (Kaufman, 2021), has been inexorably intertwined with education from its beginnings. Many early contributors to the encyclopaedia were students, and it became one of the most popular reference materials, despite many instructors' admonishments to not use it (Bayliss, 2013; Head & Eisenberg, 2010). It was only natural, then, that more formal collaborations between Wikipedia and universities began to emerge. We trace three distinct periods of engagement with higher education institutions: (1) an individual volunteer-driven phase, (2) the formalisation of the Wikipedia Education Program and (3) expansion driven by Wikimedia organisations worldwide. We will briefly discuss each phase.

12.2.1.1 Phase 1: Individual-Driven Phase (2001–2010)

Many who contribute content to Wikipedia ("Wikipedians" or "editors") have connections to education, either as students or instructors. Both Wikipedia and academia share a mutual goal of educating people, so perhaps it is unsurprising that editing Wikipedia appeals to those in academia. In Wikipedia's early years, content quality was haphazard, sourcing was often nonexistent and rules and guidelines were still being drafted. Much of the work in the early part of this phase was driven by individual contributors rather than any kind of formal class assignment in which students received credit for writing Wikipedia articles. As Wikipedia grew in popularity, however, the community developed stricter rules and guidelines to increase the content quality. These rules had a two-fold effect on Wikipedia's connections to education: (1) with higher quality, referenced content, more and more students started using Wikipedia as a reference and (2) these rules made it harder for newcomers to

start editing (Ramjohn & Davis, 2020). A few professors began to see the possibilities of class assignments with Wikipedia (Beasley-Murray, 2008; Cummings, 2009; Konieczny, 2007; Wadewitz et al., 2010; Wannemacher & Schulenburg, 2010). As university instructors and Wikipedians, they had the unique ability to control the curriculum in their classes, enabling them to assign their students to edit and guide students through the labyrinth of Wikipedia rules and guidelines. Around the world, these instructors began to show the benefits of integrating Wikipedia into the classroom for both Wikipedia content development and student learning. So did educators researching the use of Web 2.0 platforms, Wikis and specifically Wikipedia as a learning platform for improving skills and literacies (Boulos et al., 2006; Parker & Chao, 2007; Voss, 2005).

12.2.1.2 Phase 2: Formalisation of Wikipedia Education Program (2010–2013)

Wikipedia instructors assigning their students to edit Wikipedia became a trend, and Frank Schulenburg, then the Head of Public Outreach for the Wikimedia Foundation, noticed this. Wikipedia's growth numbers, which had exploded in the mid-2000s but had subsequently started dropping precipitously, were alarming, and the Wikimedia Foundation was seeking ways to increase the number of active editors (Schulenburg, 2015; Ramjohn & Davis, 2020). Schulenburg sought grant funding to create a team of staff tasked with formalising a support structure so that instructors need not be Wikipedians themselves to teach with Wikipedia (Davis, 2018). An initial pilot focussed on United States public policy courses resulted in increased engagement on the part of the students and quality content on Wikipedia (Roth et al., 2013), which led to resource investment in terms of creating a formalised programme. The Wikimedia Foundation created the Wikipedia Education Program and made significant investments in creating an infrastructure that supported class assignments. Examples include technical support, such as creating a Visual Editor and a content translation tool; support communications, such as brochures, handouts and online training modules that could be translated and localised; and community building, which included creating an education track at the global Wikimedia conference, Wikimania, as well as a monthly Wikipedia & Education newsletter.

This formal support led to an explosion of programmes operating around the world. Although this chapter focusses on higher education, the Wikipedia Education Program was a loose collection of local initiatives to engage students in OEP across numerous age groups. Higher education has been among the most successful, with programmes in dozens of countries worldwide. In some countries, the work of teaching with Wikipedia as an OEP was explicitly tied to other open education activities. The programme is flexible enough to be internationalised in a context-appropriate way for each country, institution and instructor.

12.2.1.3 Phase 3: Global Expansion (2013–Present)

The creation of this formal support structure enabled the expansion of the Wikipedia Education Program to various initiatives worldwide. A new group of volunteers emerged to continue supporting global programme leaders. Now known as the Wikipedia & Education User Group, this collaborative group offers mentorship and opportunities to share learnings among programme leaders worldwide. An open-source technical platform, known as the Programs & Events Dashboard,[1] was developed by Wiki Education and is a key piece of digital infrastructure used by many programmes globally. The Wikimedia Foundation's education team shifted its attention to projects like "Reading Wikipedia in the Classroom", which are more focussed on using Wikipedia in educational settings. Today, individual instances of the Wikipedia Education Program are present in dozens of countries (Evenstein Sigalov & Nachmias, 2017; Outreach Wiki, n.d.). Some are run by Wikimedia affiliate organisations (chapters, thematic organisations and user groups), which continue to focus on content creation in collaboration with local institutions and instructors. Some are run through colleges or universities, some have paid staff and some are led by volunteers only. In some countries, there might be just one or two courses teaching with Wikipedia each year. In others, there may be hundreds of courses. The common thread in all these programmes and initiatives is that students are adding openly licensed content to the world's largest OER, Wikipedia and, in doing so, they are engaging in OEP.

12.3 The Study

Wikipedia in higher education has been expanding extensively in its 21 years of existence. While there is extensive academic research on using Wikipedia as an educational platform that induces learning, existing research is mostly focussed on one country, region, or initiative. Our goal is to offer a more global overview, examining what can be learned from an international perspective about incorporating Wikipedia into higher education. By examining a selection of case studies from four diverse locations, this chapter explores how Wikipedia has been used, as well as commonalities in use, including challenges, benefits and lessons learned, in the hope, that this would benefit future adopters of the format.

To achieve this goal, our research questions are:

(1) How has Wikipedia been incorporated into higher education in different countries around the world?
(2) What are some of the common challenges that derive from these cases?
(3) What are some of the common benefits of using Wikipedia in higher education?
(4) What are some lessons learned from the joint experiences around the world that would benefit future adopters of the format?

[1] https://outreachdashboard.wmflabs.org/.

12.4 Methodology

In order to answer these research questions, we investigated Wikipedia's value for learning from a global perspective via multiple country case studies. This methodology required an in-depth examination that draws on multiple sources for information (Creswell, 1998), and thus a mix-method approach was adopted.

12.4.1 Participants

In choosing countries to be representatives of global efforts in this research, a special effort was made to choose countries where Wikipedia has been incorporated into higher education for at least a decade. Emphasis was also placed on choosing countries representing geographic and linguistic diversity. Four countries were identified as having an established record of implementing Wikipedia into higher education that was also diverse enough to be examined: Serbia, Israel, US/Canada and Brazil.

12.4.2 Data Collection and Analysis

For each country, data has been gathered from 3 main sources: (1) Online documentation and metrics: internal Wikipedia pages that curate information about courses incorporating Wikipedia assignments as part of their assessment model, which is known to the different language Wikipedia Communities and/or supported by them; data from a now-disabled Education Program MediaWiki Extension and data from the Dashboard course management software; (2) Interviews: semi-structured interviews with staff members of Wikimedia affiliates and related organisations, as well as volunteers who have supported Wikipedia in higher education in different countries; (3) Personal experience and academic research of this chapter's authors regarding incorporating Wikipedia into the academic curriculum. The case studies were then coded and analysed to identify common challenges, benefits and lessons learned.

12.5 Results

12.5.1 The Case Studies

12.5.1.1 Case Study #1: Serbia

Wikimedia Serbia is one of the oldest Wikimedia chapters—it was founded in December 2005 as the fifth Wikimedia chapter overall. Efforts by volunteers and

Wikipedians in Serbia in the education sector began several months prior when Wikipedia co-founder, Jimmy Wales, visited Belgrade, where he held a lecture at the Faculty of Philosophy, University of Belgrade. That visit spurred a line of thinking that implied potential in cooperating with academic institutions. Two opportunities to officially connect with academic institutions presented themselves near the end of 2005. Firstly, Đorđe Stakić, the founder of Wikimedia Serbia's Education Program, held an open lecture about Wikipedia at the Faculty of Mathematics, University of Belgrade. Also, several volunteers held a lecture about Wikipedia to students of a private university. The idea that was being hatched at the time was for students to write their term papers as articles on Wikipedia instead of on paper, as had been the well-established practice (Stakić, Tasic et al., 2021a, b). That collaboration did not prove to be fruitful, but, in 2006, Wikimedia Serbia was contacted by a professor from the Faculty of Physical Chemistry, and after two workshops with students, articles finally started appearing on Wikipedia. Additionally, the professional connections of Stakić made it possible to start the project at the Faculty of Philology as well, which also proved seminal (Stakić, 2009).

These initial successes created models and templates for most future collaborations. Throughout the years, more partnerships appeared, where word of mouth and previous accomplishments were key factors for making new connections. The diversity of collaborations meant that students of various backgrounds were being reached and content was being created, with knowledge equity always in mind. At first, the partnerships included only universities, but in 2011 the first collaborations with a high school started (Stakić, 2014). One of the major milestones in the development of the Education Program happened in 2012, when the academic board of Wikimedia Serbia was formed, which was tasked with the development of the programme. This body was quite active in setting up new collaborations, conducting workshops and evaluating produced articles. Additionally, the Serbian Wikipedia community created a policy revolving around contributions by students, giving them special significance (Stakić, 2014).

In 2014, Wikimedia Serbia organised an international EduWiki conference, a meeting focussing on education within the Wikimedia world. Also, Wiki Ambassadors were introduced as a means to ensure programme sustainability. Finally, in 2014, Wikimedia Serbia received its first state-sanctioned accreditation for conducting seminars on professional development for elementary and high school teachers, with the topic of Wikipedia in education (Ratković et al., 2019, 2020). Another milestone was the creation of the Education Program Manager (EPM) position in early 2015. That paid position was created to alleviate the workload from volunteers and make all efforts in this programme more professional. Even though the EPM now deals with establishing and maintaining partnerships, most projects still rely on volunteer activities, for running workshops, communicating with students and evaluating work.

Wiki Librarian was launched as a separate project in 2015 and still continues in 2022. It focusses its activities on the library network of Serbia and fosters content creation and curation on several Wikimedia projects. It includes university students in many of its activities (Stakić et al., 2021a, b). In the summer of 2016, another

project was launched: Edu Wiki Camp. The idea was to gather senior high school students and freshmen university students in a remote location and, through an array of presentations, workshops and discussions, enable those students to become more knowledgeable about Wikimedia and its Education Program, with the hope that some of the participants would become Wiki Ambassadors.

Over the years, Serbia's Education Program has seen stability and robustness in its operations. Strategically, it has always been among the highest priorities within Wikimedia Serbia, which is demonstrated by the fact that the first staff member for specific programmes was hired to that end. The number of institutions that Wikimedia Serbia partnered with over the years, as well as several participants, can be seen in Fig. 12.1. Wikipedia and Wikimedia Serbia have also been recognised as important participants in developing Serbia's OER infrastructure ("Current State of Open Educational Resources in the 'Belt and Road' Countries", 2020, p. 180).

Among the various activities that Wikimedia Serbia promotes in the field of education, one merits a special focus: Wikipedia in Schools is the flagship project and includes collaborating with schools at all levels of education. While having limited success with elementary school students and some better results with high school students, the project's full potential has only been achieved in universities and colleges. There are many ways a single project can take shape. The main learning objective for any collaboration is for students to learn basic editing skills, both in technical and encyclopaedic terms. The following considerations are always discussed with a coordinator (professor or teaching assistant) before the project commences since these usually determine the amount of investment of Wikimedia Serbia resources (Stakić, 2015):

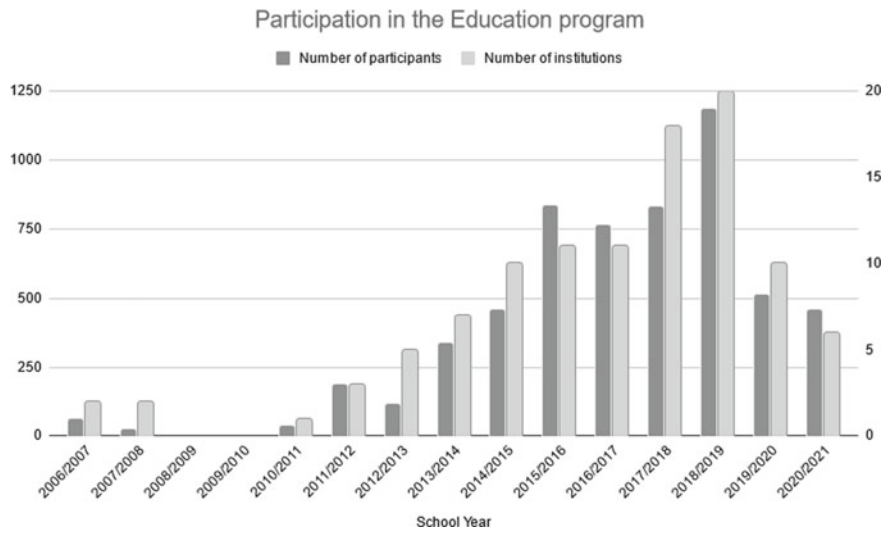

Fig. 12.1 Participation in the Education Program in Serbia per year

- **Wikimedia projects:** While most activities are done on Wikipedia, there have been projects that focus on Wiktionary, Wikimedia Commons and Wikidata. This depends on the academic course itself, coordinators' affinity, students' competencies etc.
- **Language editions:** While most projects are conducted in the Serbian language Wikimedia projects, some might be conducted in other languages, especially when working in a philological context. In these cases, Wikimedia Serbia offers very limited support.
- **Type of activity:** Most projects are focussed on writing articles or significantly improving them, but various other tasks could be performed as assignments: fixing typos and other errors in existing articles, uploading media files, using media files in articles, editing Wikidata entries, adding references to unreferenced text sections and evaluating other students' work. Additionally, regardless of the activity type, the minimum number of activities needs to be set, e.g. several articles or number of kilobytes of text added.
- **Temporality:** Since most university courses are one semester-long, coordinators need to fit the project within the curriculum and determine the timeline, reserving plenty of time for all the necessary activities.
- **Grouping:** In most projects, students work individually, but sometimes groups of two or more students are tasked with creating a larger set of contributions.
- **Grading:** Coordinators often give points for completed assignments, with a gradient of possible points in relation to the quantity and quality of the work done. At times, the points are given as extra credit, and sometimes the coordinators forgo the points and offer this activity only to interested students, and, in those cases, fewer students write better articles. Grades usually help with student motivation for completing the task, so they are frequently employed.

The activities for a new project usually commence with a meeting between a representative of Wikimedia Serbia (usually the EPM, but sometimes another staff member, a Wiki Ambassador or a Board member) and a coordinator, where the parameters of the cooperation are determined, as outlined above. A timeline is prepared, and introductory and practical workshops are set up. Those workshops are usually in-person, and, depending on the number of students, there can be a varying number of them. More recently, online workshops have become a more practical way of training students. These workshops contain a theoretical part, explaining the inner workings and policies of Wikipedia and a practical demonstration of article creation. Afterwards, the students are given several weeks to several months to complete their assignments and then the evaluation phase concludes the activities.

Many projects, especially those deemed successful, are repeated, either in a different course led by the same coordinator or in the same course in a different school year. Once a collaboration is proven successful, each iteration becomes easier to manage by both sides, and, in some cases, it becomes self-sustainable, meaning minimal support from Wikimedia Serbia is needed. Naturally, some collaborations fail or do not meet expectations for various reasons, including not giving students enough time for assignments, giving students too much work, coordinators'

disinterest or lack of time and unclear communication. Wiki Ambassadors greatly improved the quality of the overall programme and lowered the pressure on key volunteers and, subsequently, the EPM. Wiki Ambassadors are experienced students (usually 3rd or 4th year) tasked with fostering activities and helping fellow students within their locale (but also increasingly for other locales). With such a title, they would be singled out and thus experience further motivation to work diligently with peers and coordinators, if possible.

The attitudes of the Serbian Wikipedia community towards the activities of the Education Program have varied throughout the years. While these activities initially did not get much attention, when they started scaling up, there were some protests, with most of the criticism pointing towards article quality. These comments resulted in changing perceptions within the wider Serbian Wikimedia community, one of the consequences being a much greater focus on quality by Wikimedia Serbia: this meant improvements in the content of the workshops and continued support during the assignment period, but also in the final evaluations. The introduction of the Visual Editor helped with quality assurance since students started paying more attention to content rather than the technical aspect of editing, wiki syntax being confusing to most new editors. Additionally, assignments that offer an option of translating articles from other languages (mostly English Wikipedia) fare better than articles that need to be created from scratch. Research has confirmed that students prefer writing articles on Wikipedia rather than regular term papers (Stakić et al., 2021a, b).

Content created over the years has been great and now makes a significant portion of the overall contributions towards Serbian Wikipedia. The number of megabytes of text created through Wikimedia Serbia's Education Program since the beginning is given in Fig. 12.2.

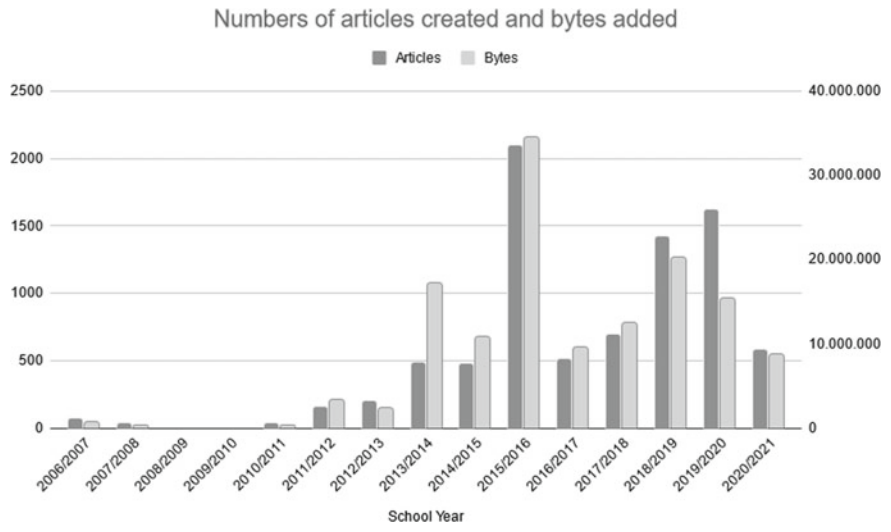

Fig. 12.2 Number of articles created and bytes added in Serbia per year

12.5.1.2 Case Study #2: Israel

Introduction and scope

Incorporating Wikipedia into higher education in Israel started in 2006, and, for the first 7 years, the main model has been "Alternative Assessment", expanding existing articles or writing new ones in Wikipedia as an academic assignment that provides credit. This model is still the most common in Israel (and worldwide). In 2013, a new model was introduced, in which writing Wikipedia articles is the "Main Assessment" within an academic for-credit course dedicated to Wikipedia and its sister projects. Each model is briefly reviewed below while describing its main uses and lessons learned. Data was gathered from (1) WikiProject Wikidemic Papers—a Hebrew Wikipedia internal project that curates information about academic courses incorporating Wikipedia assignments; (2) two interviews with the Academic Relations Manager at Wikimedia Israel, and three interviews with Hebrew Wikipedia volunteers supporting academic courses and (3) research conducted by one of this chapter's authors. While focussing on documented examples known to the Hebrew Wikipedia community, the data presented does not cover all activities in Israel. Other activities out of this chapter's scope include incorporating Wikipedia into K-12 education in Israel, including in Arabic-speaking communities, and the inter-relations between activities in Israel and other countries.

Alternative Assessment Model: contributing to Wikipedia as an academic assignment

Integrating Wikipedia into the academic curriculum in Israel began in 2006, with two courses where students expanded Wikipedia articles. Every year more institutions joined, and to date, all universities experimented with the alternative assessment model. Some tried and discontinued, while other projects flourished into long-term collaborations, with some milestones mentioned hereafter. In 2010, a unique collaboration between Ben-Gurion University's Africa Center and Wikimedia Israel expanded beyond academia when students travelled to Cameroon, equipped with laptops with Offline Wikipedia, to be left in villages as learning resources. In 2011, Haifa University started using Wikipedia assignments at the Faculty of Humanities, with both students and faculty undergoing Wikipedia training. As of the last update of September 2018, 30 courses took part in the projects, with 336 articles written. Additional notable achievements include: (1) a majority of women editors, a critical metric considering Wikipedia's gender gap (Ford & Wajcman, 2017; Hargittai & Shaw, 2015; Konieczny & Klein, 2018; Wagner et al., 2015); (2) involving Arabic-speaking students in contributing to Wikipedia and (3) a Wikipedia "help-desk" offered by the university's library.

With the growing demand, a natural professionalisation process began at Wikimedia Israel (WMIL). A 2013 strategic decision focussed WMIL activities on educational outreach, leading to free online courseware on editing and encyclopaedic writing. In 2016 an Academic Relations Manager was hired to address increased requests for collaboration. WikiCampus, an initiative at IDC Herzliya University,

launched in 2016–2017, included 13 courses with Wikipedia assignments, but the project's scope was later reduced for various reasons. Other activities in a variety of academic institutions followed all across Israel. Figure 12.3 showcases the number of courses that participated annually.

Figure 12.4 demonstrates the number of expanded articles and new articles annually.

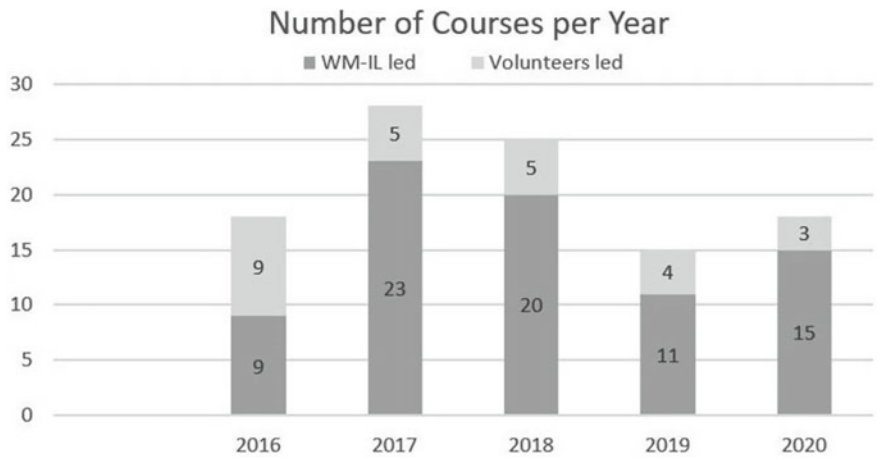

Fig. 12.3 Courses per year (2016–2020)

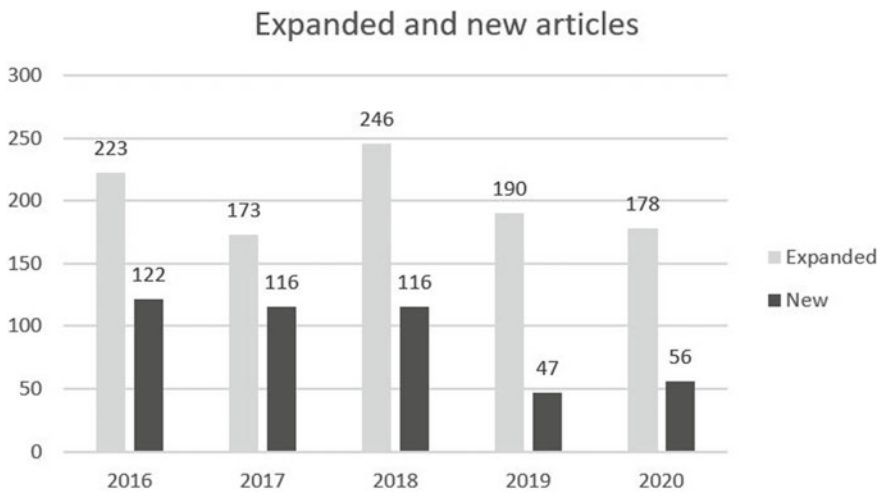

Fig. 12.4 Expanded and new articles per year (2016–2020)

A direct correlation between the number of courses and the number of articles expanded is not always possible. This is affected by variables such as type of assignment, students per course, and support received. Articles' quality is out of the scope of this discussion.

From the interviews conducted stemmed four main insights on implementing the alternative assessment model:

- **A Wikipedia assignment is not suitable for every course nor every faculty member:** courses suitable for implementing Wikipedia assignments include, for example, those in which students' grades are already assessed via a written assignment and those focussed on developing writing skills and digital and academic literacies.
- **There is no "one solution fits all":** implementation has to be tailored for every case: format and scope must be adapted to the course's objectives, students' skills, faculty members and other staff support, the scope of the assignment and how it will be assessed. Some key points to consider include the number of students, level of literacy and whether work is done individually or in groups.
- **Implementing a Wikipedia assignment requires preparation and time investments from all stakeholders:** the process is more successful when faculty members are interested and pledge to transfer the context and importance to their students. Students need to get used to a new platform, so it is advisable to set small, tangible milestones with points of assistance along the way and incorporate a practical workshop session.
- **When it works, it is fabulous:** when done right, results include an active, interactive and meaningful learning process; knowledge retention; improved skills and literacies; a positive learning experience and a positive social impact.

Main Assessment Model: a for-credit course that focusses on Wikipedia and Wikidata

Since 2013, the School of Medicine at Tel Aviv University (TAU) has been offering a for-credit, elective course focussing on Wikipedia (Evenstein Sigalov & Nachmias). The 13-week, semester-long course teaches how to contribute medical-related content to Wikipedia and its sister projects. The course used to be a live synchronous course, but during COVID-19, it was transformed into a hybrid online format, offering both synchronous and asynchronous sessions.

The course had 5 main goals: (1) Create medical-related content in Wikipedia, thus contributing to OERs; (2) Help students improve academic skills, critical thinking, digital and data literacy, collaborative skills, medical communications skills and lifelong learning competencies; (3) Addresses knowledge gaps and gender gap, focussing on knowledge equity; (4) Create an engaging and positive learning process, focussing on active learning; (5) Make the course model adaptable and scalable for reuse in other disciplines, institutions and countries.

Since the launch, 330 students with varying backgrounds and mother tongues participated in the course, resulting in 428 new medical articles, or 13% of all medical content in Hebrew Wikipedia—viewed over 7 million times. More than 1,220 articles

were edited, and students also contributed to Wikimedia Commons and Wikidata. Since 2015, at least 50% of the articles have focussed on Women's Health, a category that did not exist before the course. Half of the students were female in most cohorts, which helped reduce Wikipedia's gender gap. Overall, students reported a unique and positive learning experience, gaining and improving skills with lasting impact beyond the course (Evenstein Sigalov & Nachmias, 2017; Mendes et al., 2021).

In 2015, a second course, focussing on informed consumption of information and collaborative knowledge creation in Wikipedia, was offered to all TAU undergraduates. The 101 students who graduated from the course's 3 iterations wrote 260 new articles, with over 5 million page views and 3,120 articles expanded. Half of the articles were about notable women in history, and a special focus was made on shrinking the gender gap and other knowledge gaps in Wikipedia. A 2019 research project about the second course focussed on examining the outcomes, assessment model and students' perception of their learning experience. Here too, students reported a positive learning experience, and it was shown that the assessment model, especially peer-review, could predict course success. The article was accepted to be presented at the AERA conference in 2020 (Evenstein Sigalov & Cohen, 2020).

A third improved 2018 campus-wide course was the first in the world to feature Wikidata, and it has won the Data Literacy community award at the 2021 Wikidata Conference. Academic research about its efficacy and evolution during COVID-19 is currently being conducted. The core course model of all 3 courses has inspired similar courses, such as the one developed in Armenia's Medical School in Yerevan.

Final insights

Significant experience has been accumulated in 15 years of implementing Wikipedia assignments into the Israeli academic curriculum, a practice that is continuously and consistently spreading. More faculty members use Wikipedia as a learning platform to help improve students' skills and generate social impact. However, much must be done before Wikipedia becomes a pedagogical tool every faculty member uses. Some academic institutions still treat Wikipedia with the suspicion that stems from a lack of familiarity (Bayliss, 2013). There is still a need to continue experimenting, expand academic research on Wikipedia in higher education and empirically examine various cooperation models to inform faculty and policymakers. An important aspect of Wikipedia assignments is their positive social impact. TAU is now incorporating mandatory courses emphasising social involvement, and Wikipedia is well-aligned with such a premise. Collaborating with the Open Education community might also help promote such work. Libraries, and academic libraries, in particular, are natural allies and can spread the word to more faculty members, as has been the experience in Israel and worldwide. An important trend yet to arrive in Israel is that of academic institutions hiring a "Wikimedian-in-Residence", serving the institution, collaborating with other institutions, and promoting initiatives targeting students, faculty and the general public. So what else is there to do? Continue experimenting; design for success (Hegarty, 2015); fail; iterate; try again; innovate, explore and share insights with the international community. And most importantly, delve with students into a joint, fascinating journey, at the end of which everyone wins.

12.5.1.3 Case Study #3: The United States and Canada

The formal programme in the United States began in Fall of 2010 with a small pilot of 14 courses. All focussed on one subject area: US public policy. Canada, whose higher education system is very similar to that of the United States, joined the programme shortly after. Today, more than 650 courses include Wikipedia assignments each year throughout the United States and Canada, supported by a non-profit Wiki Education. A discussion of the scale of the programme, its learning objectives and how Wikipedia's knowledge equity is addressed in the programme follows below.

The programme by numbers

After the small pilot focussed on US public policy, hosted at the Wikimedia Foundation, showed promise for both increasing the quality of Wikipedia content and engaging students in a service-learning project, the programme began to grow. By the second academic year of the programme, more than 100 courses were participating. These numbers stayed fairly constant for three years, partly because the Wikimedia Foundation had identified that the programme showed promise, but it was no longer part of its strategic focus. During the 2013–14 academic year, the programme became an independent non-profit organisation called Wiki Education. Several staff from the original programme joined the new organisation, ensuring continuity in support. The programme flourished, bolstered by an organisation devoted exclusively to growing the connections between Wikipedia and academia.

Through partnerships with academic associations in the United States like the American Sociological Association, the American Chemical Society and the National Women's Studies Association, as well as a dozen more, Wiki Education reached instructors teaching in those disciplines, causing the number of courses to grow. This active outreach to academic communities was key in creating demand for teaching with Wikipedia support. Investments into technical resources like the Dashboard course management platform, built by Wiki Education and a series of online training modules and other support resources, enabled the dramatic growth. These automated tools help Wiki Education's staff manage and monitor thousands of students editing at once. Figure 12.5 demonstrates the total number of new classes and returning classes per year.

Ensuring students have a positive learning experience and that Wikipedia simultaneously gets high-quality content has sometimes proven challenging. Wiki Education constantly monitors and refines its support materials to address issues as they arise. Overwhelmingly, students have a positive experience and the content added to Wikipedia is of high quality. By the 2019–20 academic year, more than 800 courses had integrated Wikipedia assignments into their curriculum each year. During the COVID-19 pandemic, the number of new courses joining the programme decreased, leading to a drop in the overall number of courses supported, but still, more than 700 courses participated that year. One unique aspect of the programme is the sheer scale at which it operates: with somewhere between 12,000 and 16,000 students editing Wikipedia each year as part of the programme, Wiki Education is responsible for

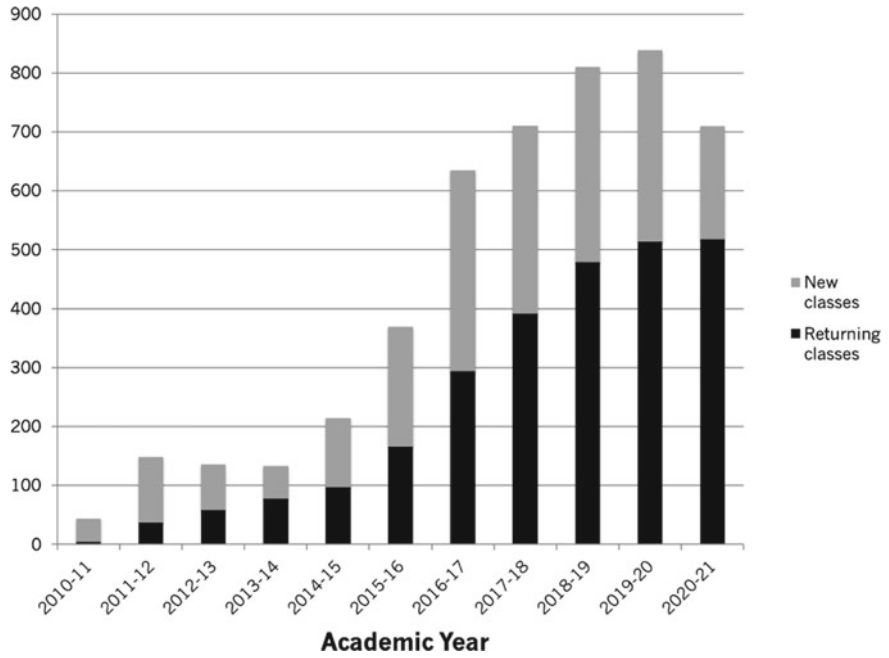

Fig. 12.5 Number of new classes and returning classes per year in the US and Canada

19% of all the new active editors to English Wikipedia (Davis, 2020). Below are some statistics summarising the key activities and impact of the United States and Canada since 2010:

- More than 5,100 courses have included Wikipedia assignments;
- More than 103,000 students have edited Wikipedia as a class assignment;
- Students have added more than 85 million words to Wikipedia, nearly twice as many as the last print edition of *Encyclopædia Britannica*;
- Students have improved more than 115,000 Wikipedia articles and
- Each term, student work is viewed hundreds of millions of times.

Learning objectives

Editing Wikipedia is OEP: Students write openly licensed educational material used by millions of people worldwide. But editing Wikipedia also meets other learning objectives for students. In the fall of 2016, Wiki Education commissioned researcher Zach McDowell to investigate the student learning outcomes from Wikipedia projects. The paper resulting from his research demonstrates clear positive outcomes for critical thinking, source evaluation and research, public writing and literature review skills (Vetter et al., 2019). This data is matched by more recent results from Wiki Education's internal surveys of instructors (Blumenthal, 2021). These learning objectives can be adapted by instructors to meet their course goals.

Wiki Education's Dashboard software[2] includes an assignment design wizard that guides faculty through creating a course page that details the assignment. Based on the selections the instructor makes in this wizard (e.g. should students work independently or in groups), the resulting course page is customised to meet each instructor's needs. Additional discussion prompts about Wikipedia and the construction of knowledge and authority, for example, can be added to the course page if this is relevant to the instructor's learning objectives.

Focus on knowledge equity

In 2017, the Wikimedia movement adopted a new strategic direction that included the concept of "knowledge equity", which stated: "As a social movement, we will focus our efforts on the knowledge and communities that have been left out by structures of power and privilege. We will welcome people from every background to build strong and diverse communities. We will break down the social, political, and technical barriers preventing people from accessing and contributing to free knowledge".[3] Scholars have noted that because Wikipedia policies followed the structures of knowledge production typical of the Global North, or "Western logocentrism", as McDowell & Vetter put it (McDowell & Vetter, 2022a), inequities exist in how information about historically marginalised topics is portrayed (Ramjohn, 2022). Adopting knowledge equity as a strategic direction reified work Wiki Education was already doing to increase the diversity of content and contributors on Wikipedia.

Wikipedia's gender gap, in both content and contributors, has received considerable media attention (Harrison, 2019). According to the 2021 Community Insights Report from the Wikimedia Foundation,[4] only 22% of contributors in Northern America identify as women. Less well-known is the gap related to race and ethnicity. According to the same study, 89% of US editors identify as white. And while only 4.8% of the global population lives in Northern America, the study found that 18% of Wikipedia editors are from this region (Wikimedia Foundation, 2021). This data means the typical Northern American Wikipedian is a white male; a gap in coverage naturally follows this contributor gap. Only 19% of biographies on the English Wikipedia are of women, and while this is celebrated because it used to be 15% in 2014, it is still cause for concern.

Wiki Education is one of several groups ensuring that progress is being made. In contrast to the 22% of women contributors in the existing editing community, 67% of Wiki Education's programme participants identify as women, and an additional 3% identify as non-binary or another gender identity. And while 89% of existing editors identify as white, only 55% of Wiki Education's programme participants do (Davis, 2021). These diverse contributors add significant diversity to Wikipedia's coverage. Through Wiki Education's programme, students have added thousands of biographies of historically marginalised people, added new articles about important but previously ignored topics and added perspectives missing from older articles.

[2] https://dashboard.wikiedu.org/.

[3] https://meta.wikimedia.org/wiki/Strategy/Wikimedia_movement/2017/Direction.

[4] https://meta.wikimedia.org/wiki/Community_Insights/Community_Insights_2021_Report.

Through this OEP, Wiki Education is helping improve knowledge equity in content and contributors of the English Wikipedia.

12.5.1.4 Case Study #4: Brazil

This section presents the origin and evolution of Wikimedia education projects carried out in Brazilian universities from 2011 to 2020. In Brazil, the Wikimedia education literature has mostly focussed on case documentation, centring on motivations, methodologies and impact (Azevedo, 2013; Ferla et al., 2020; Marques & Louvem, 2013; Varella & Bonaldo, 2020). This section is different. It provides a national programme overview with aggregated descriptive information and discusses findings in relation to the highly unequal education environment in Brazil, including, in particular, regional inequalities.

The data systematisation in this section is unprecedented and compiles information from three databases[5]: the portal "Wikipédia na Universidade",[6] the Education Program Extension tool and the Outreach Dashboard. The portal was the first attempt to list education programmes in Brazil and was mostly used from 2011 to 2014. It was officially deprecated in 2020 and is maintained only for historical reasons. The Education Extension was the main technology used by educators to coordinate their wiki programmes and get aggregated data for their impact from 2014 to 2018. A negative aspect of both "Wikipédia na Universidade" and the Education Program Extension is that they almost exclusively compute contributions to Wikipedia. That is, they leave out sister projects in the Wikimedia ecosystem. The Programs & Events Dashboard is the current technology for coordinating and controlling education programmes on Wikimedia, which is widely used by Brazilian educators. Data from Brazil is compiled in the "Brazil Wikimedia Education Program"[7] and computed from programmes completed before December 31, 2020. It is worth noting that education programme tracking is not mandatory and is dependent on the educators' decision to track their work, so it is likely that programmes are underreported.

The earliest Wikimedia education programme in Brazil was launched in February 2011, according to the portal "Wikipédia na Universidade". It was led by Maria José Vicentini Jorente from the São Paulo State University Department of Science Information, and 51 students and 5 education ambassadors participated. Education ambassadors were experienced Wikimedians who voluntarily tutored students involved in education programmes. Tutoring resources listed on the course page included a training module originally created in English in January 2011 and then translated into Portuguese. The first documented Wikipedia edit from an education programme in

[5] We thank Sage Ross for providing access to the backup of the Education Extension, and Éder Porto and Verônica Stocco for their support in providing figures for this section.

[6] Available at: <https://w.wiki/4Wtg>. Accessed on December 17, 2021.

[7] Available at: <https://outreachdashboard.wmflabs.org/campaigns/brazil_wikimedia_education_program/programs>. Accessed on December 17, 2021. Some activities listed were not included as they are not education programmes per se, but rather technical workshops and editing events (edit-a-thons).

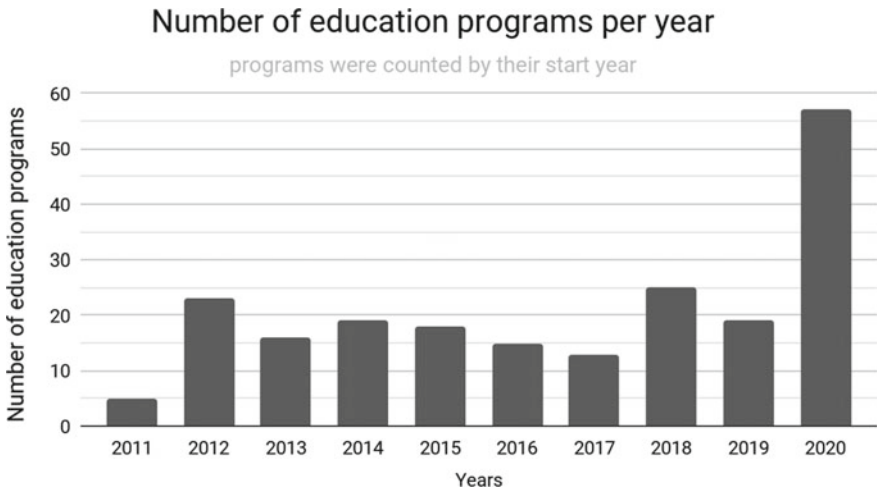

Fig. 12.6 Number of education programmes per year in Brazil

Brazil was in the article "Comunicação ciberespacial" (Cyberspace communication), on August 24, 2011.[8]

From 2011 to 2020, 210 Wikimedia education programmes were organised in Brazilian universities, as can be seen below in Fig. 12.6. The number of programmes has remained relatively similar from 2012 to 2019, on average, 18.5 programmes per year. There was a peak in 2020, with 57 programmes being completed. This peak is likely related to outreach activities led by the Brazilian Wikimedia affiliate, which hired a part-time education programme officer in 2020 and ran monthly meetings with a network of educators,[9] and to growing interest in digital teaching methods in the context of the COVID-19 pandemic.

Education programmes were organised in 35 universities from 2011 to 2020, and it is important to note that they occurred almost exclusively in top-tier universities in the country's wealthiest regions. Brazil is divided into five regions: the Southeast and the South are the wealthiest. The North, Central-West and Northeast are the poorest. In total, 185 programmes were organised in the South and Southeast regions, whereas no programme was recorded in the North region and only one in the Central-West region. Leading institutions included the University of São Paulo (USP), systematically reported as the best university in Latin America, the Federal University of Rio Grande do Sul (UFRGS), the Faculdade Cásper Líbero (FCL) and the Federal University of the State of Rio de Janeiro (UNIRIO), which, respectively, accounted for 63, 37, 27 and 10 of the total programmes. A noteworthy exception is the Northeast region, with 24 programmes, mostly due to education programmes run at the State University of Santa Cruz (UESC) in Ilhéus. The activity peak in 2020 was not associated with greater institutional or regional diversity. Eighty-seven

[8] Available at: <https://w.wiki/4Wtc>. Accessed on December 17, 2021.

[9] Available at: <https://w.wiki/TvJ > . Accessed on December 17, 2021.

university professors ran Wikimedia education programmes in Brazil from 2011 to 2020. Seventeen professors organised 108 education programmes in this period, thus indicating a high level of activity concentration in particular cases. Leading Wikimedia educators in Brazil include Valério Melo, Juliana Bastos Marques and Fabio Azevedo, respectively, from UESC, UNIRIO and UFRGS.

Wikimedia education programmes in Brazil have gone through shifts in terms of cohort size and programme duration. The median cohort size from 2012 to 2019 was 18. This was 6 in 2020, as shown in Fig. 12.7. From 2011 to 2019, most education programmes were at least 100 days long. In 2020, 75% of programmes ran for less than 100 days, as seen in Fig. 12.8. A large and long programme normally involved Wikimedia volunteer support, technical savviness for editing control and high Wikimedia awareness, as presented by Moraes and collaborators (Moraes et al., 2016). Changes in cohort size and programme duration are possibly related to a renewed understanding of Wikimedia assignments in the Brazilian classroom, moving from a class-wide, semester-long model to a typical small-group, short-but-intensive programme. This new typical programme could be more prone to institutional and regional diversification, as class-wide programmes are likely harder and more costly to set up and coordinate.

From 2011 to 2019, education programmes in Brazil were almost exclusively on Wikipedia in Portuguese. In 2020, there was increased Wikimedia-project diversity, with programmes being led on Wikidata, Wikiversidade (Wikiversity) and Wikilivros (WikiBooks). There has been no significant variation in content views across the years: on average, pages edited in the context of Wikimedia education programmes in Brazil have been viewed by 56.6 million people per year, demonstrating the social impact of this programme. It is important to note that this data only accounts for

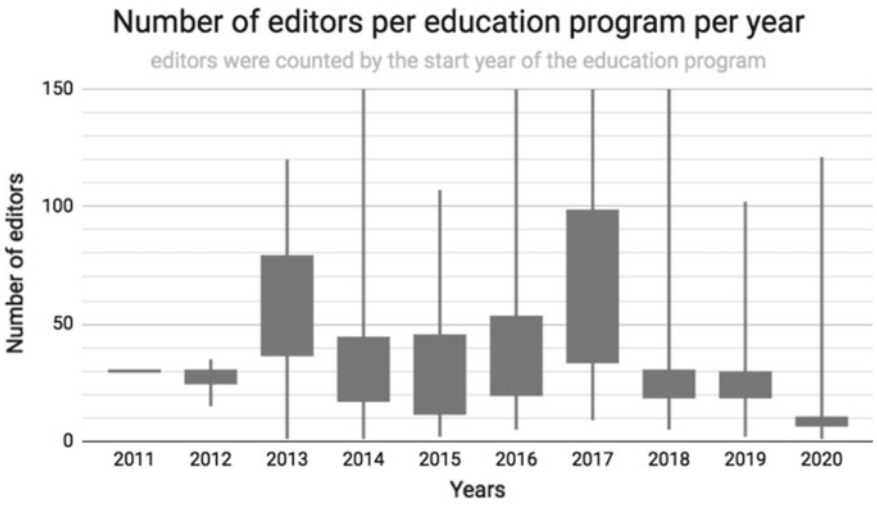

Fig. 12.7 Number of editors per programme per year in Brazil

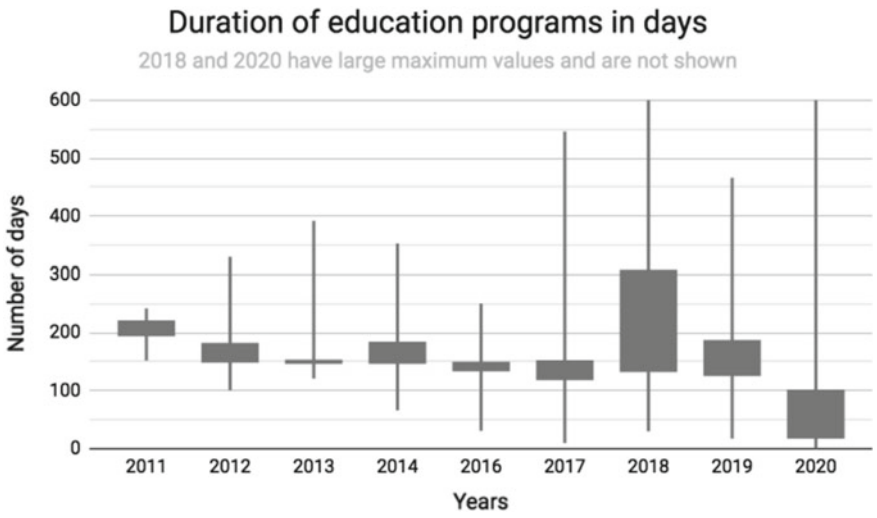

Fig. 12.8 Duration of education programme in days in Brazil

views during the period in which programmes were running, not for those being updated after their completion, so the lasting social impact is even greater.

To summarise, Wikimedia education programmes in Brazil have mostly been run in wealthier regions, particularly by highly committed professors in high-ranked universities. The typical model from 2011 to 2019 was a long and large programme. In 2020, there was a shift to small and intensive programmes, eventually easier to set up and potentially more prone to be replicated in more diverse contexts.

12.5.2 Common Challenges

There have been challenges in sustaining educational practices in the Wikimedia ecosystem across the four cases. While some challenges are similar, such as the need for good support for student editors, especially as the level of interaction is reduced when activities move online, case analysis indicates that each country has also dealt with unique challenges relating to its context and language. In Israel, for example, the Hebrew Wikipedia community is a relatively small one (as expected from the small number of Hebrew speakers globally). While Wikimedia Israel does prioritise education outreach and has dedicated staff to support this work, there still seem to be limited financial resources to support this type of work. This might contribute to disengagement, as it requires planning, time allocation and creativity since there is no replicable formula for all contexts. Moreover, while online resources are available to support educators today, that has not always been the case, and, by comparison, there is significantly less material in Hebrew than in English. Conversely, the English

Wikipedia community is large and is a more challenging place for newcomers to thrive in.

Increasing the number of Wikimedia education initiatives has been a common challenge for Serbia, Brazil and Israel. In Serbia and Israel, it has been important to scale up successfully, increasing the quality and number of programmes. In Brazil, the challenge has been to increase the number of programmes without accentuating the gap between universities in wealthier and poorer regions. Establishing a strong community around Wikimedia and education has been a recurrent challenge in all countries. There is little opportunity for partnerships when the Open Education or OER community is small (Serbia) or almost non-existing (Israel). There has been a feeling of isolation among educators in Brazil, as the number of professors engaging with Wikimedia is small, and little interaction among them has normally occurred. Finally, the COVID-19 pandemic has negatively impacted Wikimedia education programmes in North America, Serbia and Israel. In the United States and Canada, the pandemic has led to plateauing of what had been steady growth in participation. In Israel, it has led to extreme workloads, a need to simplify demands from students and a reluctance from new educators to engage in trying to implement Wikipedia assignments into their curriculum during the pandemic.

12.5.3 Common Benefits

Analysing the results from the four countries participating in this research revealed relatively similar benefits of Wikimedia education initiatives. A major benefit is the significant amount of content added to Wikipedia through programmes, especially as activities on Wikipedia may be focussed on closing content gaps (knowledge gaps, gender gaps, etc.). Even one elective coursework may have a huge social impact, as seen in Israel. Moreover, as all topics need work, improving content on Wikipedia is meaningful in all disciplines.

Another set of benefits relates to the 21st-century skills students gain when they engage in Wikimedia assignments. They improve their academic and digital literacies (i.e., understanding sourcing and citing, developing critical thinking, especially for distinguishing reliable content and misinformation). Students also improve their collaborative skills, particularly in online communities. As they work on improving content related to their field, they improve not only their understanding of the topic but also their ability to communicate it clearly to a broader audience, thus improving their communications skills. Finally, engaging with Wikimedia projects is an opportunity to raise students' awareness of various issues, including copyright, knowledge gaps and bias and, generally, to make sure they become more informed as digital citizens.

Wikimedia education initiatives in higher education are also an opportunity for tackling knowledge equity, which, as mentioned above, was adopted as part of the Wikimedia Movement's strategic direction in 2017. Adopting knowledge equity as a strategic goal was central in creating a shared, global focus in activities conducted

by various Wikimedia affiliates and other Wikimedia Movement stakeholders. As noted in this chapter, this work already existed in some countries before adopting the strategic direction, yet in a more sporadic manner. The shared strategic focus helped intensify the global and accumulated social impact. Different education initiatives have focussed on knowledge gaps, especially around gender (i.e., writing on notable women and working with female students). A relevant illustration is what has happened in Israel, where education programmes have not only worked on improving content in Hebrew but also in Arabic and other languages.

12.5.4 Common Lessons Learned

General guidelines, or lessons learned, may be distilled from the analysis of Wikimedia education initiatives in the four countries participating in the research. Though these guidelines may not serve all contexts, they provide a high-level understanding of what constitutes successful initiatives. The first key element is to have a support system for each initiative. This may include either volunteer support, or staff support for more established affiliates and organisations, as in the case of Wiki Education in the United States and Canada. The support system comprises supporting both educators as they design and implement Wikipedia into their courses and students during and after the course. The support may translate into providing online resources, offering training to faculty and students, giving technical support and answering real-time questions. It seems that welcoming educators and students in an organised, functioning setting reduces the workload needed for planning, coordinating, controlling and tutoring.

Moreover, it seems impossible to scale up Wikimedia in education without online resources, including documentation, tracking platforms (like the Dashboard) and growing a community around it. Outreach campaigns, for instance, through academic associations, local conferences and the development of a network for educators and a network of Wikipedia volunteers to support initiatives, seem key. Furthermore, positive interactions with the Wikimedia community are paramount, and they are easier to stimulate in a structured environment when expectations, roles and responsibilities are clearer. In all cases, developing a community of practice around Wikimedia and education is seen as important for scaling up programmes. The sense of belonging that this kind of community fosters is relevant for the initial engagement of instructors, mentoring and retention. A Wikimedia education community is also relevant for sharing first-hand experiences and reporting on successes and lessons in running programmes.

Finally, it is important to stress that Wikimedia programmes are not suitable for all educational contexts, and it is important to verify that there is a high alignment between the learning objectives of the course and faculty. Our findings show there have been educational initiatives in a wide range of topics and disciplines, Wikimedia projects (not exclusively Wikipedia), and possible models of engagement (from small

assignments to full academic courses) to achieve a wide range of learning objectives. Additionally, as contexts for education programmes differ, there have also been multiple approaches to scaling efforts: in Serbia, the bottom-up approach for universities has worked better than the top-down approach; in other cases, there have been successful activities with both bottom-up and top-down approaches. Finally, it appears that Wikimedia education programmes have also been an opportunity for broader partnerships and collaborations. This is especially true with cultural institutions, such as libraries, archives and museums, which have provided support and resources for students and instructors. For students, the connection to partners has strengthened the understanding that editing Wikimedia has a social impact and has further encouraged their engagement.

12.6 Conclusion

We set out to discuss the implementation of Wikipedia and Wikimedia projects into the higher education curriculum as a form of Open Education Practices that promote the creation of OERs. We also intended to give a global perspective of engaging with Wikipedia by providing the context and trajectory of Wikimedia education programmes in four countries: Serbia, Israel, the US/Canada and Brazil. In the four cases we presented, Wikimedia education programmes have steadily increased over time, over at least a decade. Typically, pioneering educators have incorporated wiki projects into their classroom activities, especially as part of their assignments, and, as a community of practice emerged and a support structure was organised, education programmes have scaled up. While we demonstrated that there might be local-related, context-dependent or language-related challenges, we also showed that many challenges are similar in all contexts, so learning from existing programmes is key. Moreover, we demonstrated that there are shared benefits to collaborating with Wikimedia projects as a teaching and learning platform. Benefits seem to be similar across different languages, contexts, disciplines and models of engagement and usually include improved skills and literacies, in addition to thematic knowledge relating to coursework.

We have also shown that contributing to Wikipedia fosters active learning, a sense of responsibility towards knowledge and better awareness as digital citizens of critical topics of our time, from misinformation and fake news, to bias, knowledge gaps and knowledge equity. As the Wikimedia environment evolves, more opportunities for instructor engagement with collaborative projects arise. A recent Wikimedia project, Wikidata, is a free and open knowledge base in which students can develop new sets of skills, most notably around data literacy, while participating in data curation and extraction. As the cultural sector engages more actively with Wikimedia, particularly libraries, archives and museums, possibilities for partnerships might emerge. We hope that the global perspective offered here inspires more educators, faculty members and decision-makers in diverse educational institutions and settings to engage with

Wikimedia projects in the classroom, experiment with the students, and do work that has a positive social impact and encourages free access to information for all.

Acknowledgements The authors would like to thank their global colleagues who also support teaching with Wikipedia in higher education classrooms in other countries, the instructors who have integrated Wikipedia into their syllabi, the students who have learned how to edit Wikipedia as a class assignment, the fellow Wikipedians who make Wikipedia the high-quality resource it is today, and Wikipedia's readers for motivating all of us to continue building a resource containing the sum of all human knowledge.

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Chapter 13
Open Educational Resources for Literacies, Diversity, Equity and Inclusion: The Case of Integrating Wikidata into Higher Education

Shani Evenstein Sigalov, Anat Cohen, and Rafi Nachmias

Abstract The first, for-credit, elective course in the world to feature Wikidata, available to all undergraduates on campus, was launched at Tel Aviv University (TAU) in 2018. This innovative course was adapted from a Wikipedia-centric course model applied at TAU twice: at the School of Medicine (since 2013); and scaling up to accommodate a multi-disciplinary audience campus-wide (since 2015). The third course featured not only Wikipedia but also Wikidata, Wikipedia's younger sister project, to scale up again and allow broader social impact and a greater focus on diversity, equity and inclusion (DEI). Wikidata is an open, multilingual knowledge base containing structured, linked data and is the largest "big data" platform humanity created, based on Tim Berners-Lee's vision of a Semantic Web. The new course aimed to facilitate a collaborative construction of free knowledge, or rather Open Educational Resources (OER), via both Wikipedia and Wikidata. This is part of an Open Pedagogy approach to teaching and learning, focusing on Renewable or Non-Disposable Assessment. It aims to improve participants' academic, digital and data literacies, and make them better critical thinkers regarding consumed information, raising awareness of issues such as copyrights, knowledge gaps, biases and fake news. The course highlighted issues such as social impact, the Gender Gap and DEI. Items created in the course were viewed hundreds of thousands of times, noting a positive social impact. This chapter investigates the course design and implementation, while focusing on Wikidata's integration into the academic curriculum, and highlights the benefits and challenges for students and faculty. Findings will focus on **(1)** course outcomes, **(2)** students' perception of their learning experiences and **(3)** benefits of using Wikidata as a learning platform in higher education. Finally, the

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course will be discussed from a wider educational perspective, presenting insights regarding re-use, scaling possibilities and suggestions for further research.

Keywords Open educational resources (OERs) · Open pedagogy · Wikidata in higher education · Wikipedia · Active learning · Collaborative learning · Social impact · Gender gap · Equity · diversity & inclusion (DEI) · Renewable or non-disposable assessment

13.1 Introduction

In 2018, a new innovative course was launched at Tel Aviv University (TAU)—the first, for-credit, elective course in the world to officially feature Wikidata.[1] The course was approved by the University's Rector and made available to all undergraduates on campus. It was adapted from a similar course model previously applied at TAU twice: at the School of Medicine (since 2013)[2] and then scaling up to accommodate a multi-disciplinary audience on campus (since 2015).[3] Both courses featured Wikipedia. In an attempt to scale up again and focus on a broader social impact, equity, diversity & inclusion and data literacy skills, a third course based on the same model was designed. The course featured not only Wikipedia but also Wikidata, Wikipedia's young sister project, which is an open, multilingual knowledge base that contains structured, linked data launched in 2012. The new course aimed to facilitate a collaborative construction of knowledge, or rather Open Educational Resources (OERs, discussed below in Sect. 13.2.1), via Wikipedia, one of the 10 most viewed websites in the world, and Wikidata, one of the largest "big data" platform humanity created, based on Tim Berners-Lee's vision of a Semantic Web (discussed below in Sect. 13.2.4).

The chapter offered here investigates the design and implementation of the new course while highlighting the benefits and challenges for students and faculty, the course's social impact, and specifically focusing on the integration of Wikidata into the academic curriculum. The research findings will be based on the results from three iterations of the course (2018–2021) and will explore three main aspects: **(1)** the course's outcomes (including its social impact); **(2)** the students' perception of their learning experiences; **(3)** the specific benefits of using Wikidata as a learning platform and integrating it into higher education. Finally, the course will be discussed from a wider educational perspective, presenting insights regarding re-use, scaling possibilities and suggestions for further research.

[1] Link to course description at TAU website (in Hebrew).

[2] Link to course description at TAU website (in English).

[3] Link to course description at TAU website (in Hebrew).

13.2 Background

13.2.1 OERs in Academia

In the past decades, we have witnessed the continued development of the Internet, the World Wide Web and the growing ubiquity of computers and related technological developments, so much so that in 2013 UNESCO started developing the concept of "Internet Universality", approved in 2015,[4] in which they recognise that:

> The Internet is much more than infrastructure and applications, it is a network of economic and social interactions and relationships, which has the potential to enable human rights, empower individuals and communities, and facilitate sustainable development. The concept is based on four principles stressing the Internet should be Human **r**ights-based, **o**pen, **a**ccessible, and based on **M**ultistakeholder participation. These have been abbreviated as the R-O-A-M principles. Understanding the Internet in this way helps to draw together different facets of Internet development, concerned with technology and public policy, rights and development. (UNESCO, 2015)

Following the ROAM principles, UNESCO introduced in 2018 the "Internet Universality Indicators" (IUIs), a framework meant to help countries, governments and other stakeholders to assess their own national Internet environments, as well as to promote policies that support the values associated with Internet Universality (UNESCO, 2018). During the same years, UNESCO was not only reflecting on the state of the Internet but about global goals for humanity towards 2030. In 2015, they introduced a framework called the "Sustainable Development Goals" (SDGs).[5] The SDGs are a collection of 17 global goals designed to be a "blueprint to achieve a better and more sustainable future for all" and were approved by the UN's General Assembly in 2017.[6] Out of the 17, goal number 4 is focused on "Quality Education", with the full title being "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UNESCO, SDG 4). UNESCO's SDG 4, then, highlights the importance of open and equal access to education and educational resources (UNESCO, SDG 4). More specifically, it highlighted the role of **Open Education** (OE), sometimes referred to as **Open Education Practices** (OEP), **Open Pedagogy** (OP), or simply **Open Educational Resources** (OERs), in achieving this SDG (Jha et al., 2019; Lane, 2017; Ossiannilsson, 2019; Tlili et al., 2020; Urbančič et al., 2019). However, what do all these terms really mean?

As the Internet grew, so did the Open Knowledge Movement, and with it, the adoption of OE, OEP, OP and OERs in education systems and Academia (Cronin & MacLaren, 2018; Evenstein Sigalov & Nachmias, 2017; Hegarty, 2015; Lin, 2019). As many researchers note, the academic literature reflects a variety of definitions for these terms (Cronin & MacLaren, 2018; Paskevicius & Irvine, 2019; Wiley & Hilton, 2018). While it is outside the scope of this chapter to fully explore these different definitions, the literary review of the topic offered by Cronin & MacLaren was used for

[4] https://en.unesco.org/themes/internet-universality-indicators/background#2015.

[5] https://sdgs.un.org/goals.

[6] https://en.wikipedia.org/wiki/File:A_RES_71_313_E.pdf.

initial definitions. Beginning with **Open Education**, they explain that despite the term being used for decades, there has been "difficulty in precisely defining the concept" (Cronin & MacLaren, 2018; p. 127). They begin by noting that "Open education is defined broadly as encompassing resources, tools and practices to improve educational access, effectiveness, and equality worldwide" (Cronin & MacLaren, 2018; p. 127). They later explain that the term "often carries the weight of describing not just policy, practices, resources, curricula and pedagogy, but also the values inherent within these, as well as relationships between teachers and learners" (Cronin & MacLaren, 2018; p. 127). They continue by noting that while Open Education has a long historic context, the term **Open Educational Practices** has emerged only since 2007 (Cronin & MacLaren, 2018). As noted, definitions of the term "vary widely, ranging from those centred on the creation and use of OER to broader definitions of OEP, inclusive of but not necessarily focused on OER" (Cronin & MacLaren, 2018; p. 128). As for **Open Pedagogy**, they note that all researchers describe it as "emergent scholarly practices that espouse OER use/production, open learning and teaching, collaboration (in the form of networked participation) and empowering learners to co-create knowledge" (Cronin & MacLaren, 2018; p. 133).

Despite various definitions, there seems to be an agreement in the literature that the developments mentioned above of the Internet, technology and the Open Knowledge Movement have led to "exponential growth" (Lin, 2019) in the use of **Open Educational Resources** (OERs) as a form of OE, OEP and OP (Blumenstyk, 2015; Cronin & MacLaren, 2018; Hegarty, 2015; Lin, 2019; Paskevicius & Irvine, 2019; Wiley & Hilton, 2018). The term OERs was defined by UNESCO back in 2002 as "teaching, learning, or research materials that are in the public domain or released with an intellectual property license that allows free use, adaption, and distribution" (UNESCO, 2002). Thus, an OER is defined primarily (though not exclusively) by its license, with Creative Commons licenses being the most widespread. For some educators, the main incentive for using OERs is minimising textbooks' cost—still a financial burden in many countries (Hegarty, 2015; Lin, 2019). Some want to create a ubiquitous, mobile learning experience by accessing materials anywhere, anytime (Hegarty, 2015; Lin, 2019). For others, the preference for OERs is part of a wider pedagogical, if not ideological, perception that values OERs not only as a means of knowledge equity but also as means to acquire relevant skills, competencies, capacities and literacies in a world where learners are also digital citizens (Cronin & MacLaren, 2018; Evenstein Sigalov & Nachmias, 2017; Hegarty, 2015; Lin, 2019; Wiley & Hilton, 2018). Using emerging open technologies for both knowledge acquisition and knowledge creation entails gaining relevant skills for twenty-first-century learners.

It seems as though, regardless of the incentives, various organisations, governments, institutions, policymakers, educators, researchers and free knowledge advocates have been striving to create OERs for teaching and learning purposes (Lin, 2019). But is it working? Recent research indicates these efforts have yielded some results, and the use of OERs has increased in the past decade (Lin, 2019). However, "readily accessible materials do not guarantee successful teaching and learning with

OER" (Lin, 2019). Moreover, researchers have indicated that the awareness and adoption of OERs are still relatively low. Educators and researchers have been calling for more empirical research, such as the pedagogical efficacy of OERs use, the efficacy and quality of using OERs for teaching (Allen & Seaman, 2014; Annand & Jensen, 2017; Hilton, 2016), or assessing whether the use of OERs complements Open Pedagogy practices.

13.2.2 Wikipedia as a Learning Platform

In this context of Open Pedagogy, since its inception in 2001, Wikipedia has become the largest, open and free encyclopaedia in human history, and due to its license, also the largest OER ever created collaboratively. This volunteer-based project once frowned upon by many, especially in Academia (Bayliss, 2013), has matured to become a key resource for information. With numerous global collaborations with governmental, cultural, educational and academic institutions, Wikipedia and its sister sites serve over 1.5 billion unique devices per month,[7] including those offline, with the aid of tools such as Internet-in-a-box,[8] "a low-cost digital library, consisting of a wireless access point with storage, which users nearby can connect to" (Wikipedia). During the COVID-19 pandemic, Wikipedia received numerous acclaims from organisations (including the World Health Organization, which also formally collaborates with the Wikimedia Foundation[9]), researchers (McDowell & Vetter, 2020), activists and individuals, celebrating it as a beacon of reliable information, in a web filled with fake news and deep-fake. Information from Wikipedia and Wikidata has become increasingly visible in leading social platforms such as YouTube,[10] search engines such as Google and various AI agents like Siri and Alexa.[11]

In the last decade, many educators have been using Wikipedia and integrating it into their curricula (Aibar et al., 2015; Dooley, 2010; Evenstein Sigalov & Nachmias, 2017). Initially, Wikipedia was used to teach better information consumption skills and then started to be utilised as a platform for collaborative knowledge construction. But why? To what end? And what can research reveal about its benefits as a teaching and learning platform?

Wikipedia strives for quality, up-to-date, neutral and well-referenced articles, offering unique educational opportunities for teachers and learners (Evenstein Sigalov & Nachmias, 2017; Herbert et al., 2015; Konieczny, 2007, 2016). Wikipedia's pedagogical potential has long been investigated as a Web 2.0 platform, allowing

[7] https://wikimediafoundation.org/.

[8] https://meta.wikimedia.org/wiki/Internet-in-a-Box.

[9] The WHO announces a formal collaboration with Wikimedia Foundation during COVID-19.

[10] Announcement of YouTube using Wikipedia in CNN.

[11] A Wired article about the use of Wikidata by Alexa/.

users to consume information, participate in its creation and share knowledge. Educators and researchers have focused on the ability to actively and collaboratively involve learners in the construction of knowledge (Aibar et al., 2013, 2015; Boulos et al., 2006; Evenstein Sigalov & Nachmias, 2017; Konieczny, 2016; LaFrance & Calhoun, 2012; Mareca & Bordel, 2019; Mendes et al., 2021; Minguillón et al., 2018; Naismith et al., 2011; Ramanau & Geng, 2009; Seitzinger, 2006), while helping its users develop skills, such as digital literacy, collaborative skills, critical thinking and academic literacy (Bordel & Mareca, 2019; Di Lauro & Johinke, 2017; Eteokleous et al., 2014; LaFrance & Calhoun, 2012; McKenzie et al., 2018; Selwyn & Gorard, 2016; Soler-Adillon et al., 2018; Staub & Hodel, 2016; Vetter et al., 2019; Zheng et al., 2015). Many educators are experimenting with Wikipedia as an alternative assessment method, substituting traditional assignments such as tests or papers usually read-only by faculty. This type of Open Educational Practice, a form of assignment (and assessment) that contributes to the world and the greater good beyond the classroom, has been referred to as a Renewable Assignment or Non-Disposable Assessment (Wiley & Hilton, 2018).

While it has been used in the classroom for at least 15 years, Wikipedia is still relatively new in higher education (Chao, 2007; Evans, 2006; Evenstein Sigalov & Nachmias, 2017; Franklin & Harmelen, 2007; Konieczny, 2007; Schaffert et al., 2006). As Konieczny explains, it seems that Wikipedia is gaining acceptance among academics and educators only slowly and grudgingly (Konieczny, 2016). Although some progress has been made, and a growing number of educators are seeking to incorporate Wikipedia into their curriculum (Evenstein Sigalov & Nachmias, 2017; Konieczny, 2016), it seems that academia has only started exploring Wikipedia's potential and is yet to formalise the means to promote "deeper learning and integration of learning experiences from both inside the classroom and out" (Chen et al., 2005; p. 96), and instructors are still uncertain on how to integrate wikis into the classroom for effective collaboration (Allwardt, 2011; Elgort et al., 2008; Konieczny, 2014, 2016; Naismith et al., 2011; Ramanau & Geng, 2009).

Considering educators' endeavours to tap into Wikipedia's potential as a pedagogical tool (Bayliss, 2013; Boulos et al., 2006; Jaroslaw P. Janio, 2014; Kummer, 2013; LaFrance & Calhoun, 2012; Naismith et al., 2011; Ramanau & Geng, 2009; Seitzinger, 2006), a new course model for integrating Wikipedia into academic curricula was designed and implemented at the Tel Aviv University (TAU), Israel, in 2013. This new model led to a for-credit, semester-long, elective course in which adding content to Wikipedia is used as the main assessment model. In this chapter, we will share insights from applying this model to a course created at TAU in 2018, featuring not only Wikipedia but also Wikidata (discussed below).

13.2.3 Semantic Networks as a Learning Platform

In 2003, educators started exploring the Semantic Web (see 2.4 for more details) by looking at needs relating to education, e-learning and life-long learning (Anderson &

Whitelock, 2004; Koper, 2004; Naeve et al., 2006). However, research focused on using *the technology* to advance education rather than exploring the *types of learning and uses* it enabled. As noted above, there is an abundance of research on Web 2.0 applications as learning platforms and pedagogical frameworks that support learning; however, almost none deal with Web 3.0, the next evolution of the Web, which could be explained as another layer of structured linked data that could be queried to answer specific questions, and could be read by both humans and machines (see more below). While waiting for new research and innovative pedagogical frameworks to emerge, three existing frameworks have been identified as relevant. The first is **Constructivism** which "describes how learning happens" (Parker & Chao, 2007). Knowledge and meaning are "constructed rather than given" (Parker & Chao, 2007) through a "discussion with peers and teachers, and through reflection" (Higgs & McCarthy, 2005). The second is **Collaborative Learning**. Per Wheeler et al., engaging deeply with "learning objects" and web-based discussion and communities bring forth significant benefits for the "development of professional practice" (Boulos et al., 2006; Wheeler et al., 2005). Finally, **Self-directed learning**, and more recently, **Huetagogy**, was developed by Hase and Kenyon in 2000 and shifted focus and control from the teacher to the learner (Anderson, 2016), from instructing and testing competencies towards learning in new and unfamiliar contexts, as a life-long process (Blaschke, 2021; Hase & Blaschke, 2021; Moore, 2020). As Hase and Kenyon put it, "heutagogy looks to the future in which knowing how to learn will be a fundamental skill given the pace of innovation and the changing structure of communities and workplaces" (Hase & Kenyon, 2000). From these frameworks emerge four main aspects that influence learning in a Semantic Web environment, specifically with Wikidata: (1) user's motivations; (2) user's skills; (3) the technological platform itself and (4) the community built around this technology. However, what exactly is Wikidata? How do data curation and extraction processes work, and how do they affect learning, knowledge acquisition and research?

13.2.4 Wikidata: A Quick Overview

In 1998, Tim Berners-Lee published a vision for an advanced Semantic Web, referred to sometimes as "Web 3.0" or "Linked data" and part of "Web 3.0", which "realises the vision of evolving the Web into a global data common, allowing applications to operate on top of an unbounded set of data sources, via standardised access mechanisms" (Bizer et al., 2009). According to this vision, "the traditional Web… should be extended to a Web of Data where not only documents and links between documents exist, but [also links among] any entity and any relation" (Färber et al., 2015) in a way that "machines would be able to participate and help" humans (Berners-Lee, 1998). Value is created by integrating structured data from many sources (Gruber, 2008) and meaningfully connecting pieces of information. This new version of the web allows both humans and machines to harness the power of a quality, up-to-date and well-referenced knowledge base of linked data.

Of the attempts to realise Berners-Lee's dream, Wikidata, Wikipedia's sister project, is considered to be one of the most successful and most sustainable. Wikidata came to existence in 2012 after a few Wikimedians wanted to answer a question that Google searches failed to address: "What are the 10 largest cities with a female mayor?" (Erxleben et al., 2014; Krötzsch et al., 2007). Denny Vrandečić, a computer scientist, had developed Wikidata, which is a free, multilingual, open database that stores structured, linked data and could be read by both humans and machines; a free and open "Big Data" knowledge base. On October 2022, Wikidata celebrated its 10th anniversary, and marking an important milestone for the project—over 100 million items. Wikidata is not only the largest semantic knowledge base in existence but also one of the world's largest OER.

Wikidata's potential stemmed initially from extracting massive amounts of data from Wikipedia. The existence of a huge structured, linked database means one can query it and receive relevant and accurate answers, especially compared with traditional search engines. Wikidata's ability to give exact answers makes it a fertile ground for learning and research opportunities for "applications in all disciplines, but especially in science, technology and art" (Vrandečić & Krötzsch, 2014). It appears that Wikidata offers an opportunity to address the information overload that characterises the digital age. It is changing the interaction between people and knowledge. It offers a variety of new learning opportunities, not only due to the accurate answers to questions that were very difficult, if not impossible, to answer in the past but also due to the ability to present data results visually. Thus, it is possible to create a timeline of Leonardo Da Vinci's works (Fig. 13.1) or a map of the birthplace of women physicists in history (Fig. 13.2) at the click of a button.

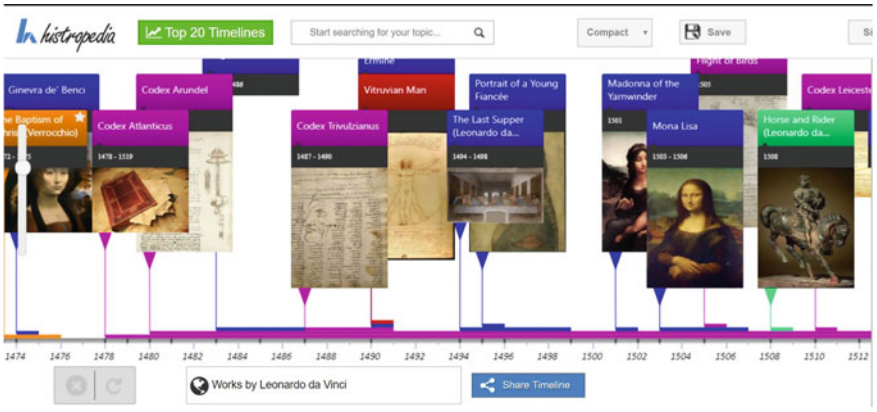

Fig. 13.1 Works by Leonardo Da Vinci in a timeline from Histropedia, a platform based on WD

Fig. 13.2 A map of the birthplace of women physicists in history

13.3 The Study

It seems that Wikidata has great potential and is a significant step towards fulfilling Berners-Lee's vision for a Semantic Web (Erxleben et al., 2014; Vrandečić & Krötzsch, 2014). However, with scale and success also comes great responsibility. Individuals, researchers and organisations are already using Wikidata, as do applications, including Artificial Intelligence (AI) agents, such as Siri and Alexa. In a world where younger generations get immediate, assumed-to-be-correct answers from AI agents, it is up to educators to assure they are equipped with the right skills, including Data Literacy, to assist them as digital citizens. For reference, Data Literacy is an additional term with multiple definitions in the literature (Gummer & Mandinach, 2015; Koltay, 2015; Mandinach et al., 2015; Mandinach & Gummer, 2013; Schield, 2004; Stephenson & Caravello, 2007; Wang et al., 2019), and it is outside of our scope to fully explore it within this chapter; but some basic definitions would refer to the ability to "understand, use and manage data" (Qin & D'Ignazio, 2010), or "the ability to understand and use data effectively to inform decisions" (Mandinach & Gummer, 2013). In a world of Information Explosion, Big Data, AI and Machine Learning, it is critical to assist learners in developing critical thinking related to data. This process could, among other things, include issues relating to data modeling, data analysis, data verifiability, date completion and systematic data bias. Furthermore, what better place to explore this potential than Academia? To that end, a new course was designed and has been implemented at TAU since 2018. So far, the course has had 3 iterations, with a 4th one wrapping up in June 2022.

Since contributing to Wikipedia and Wikidata in a dedicated academic course is a relatively new concept, mainly the implementation of Wikidata into the academic

curriculum, there is a lack of research regarding the course design and implementation, including the effectiveness of the teaching and assessment models, the course outcomes and the students' perceptions of their learning experience. Accordingly, the research questions addressed in this research are:

1. What did the course design process entail, including main goals and learning objectives, design guidelines, general structure and assessment model?
2. Considering the course design, what were the course outcomes, including its social impact?
3. Considering students' perceptions of their own learning experience and course outcomes, what were their perceptions of the learning experience?
4. Considering that using Wikidata as a teaching and learning tool is relatively new, and in reviewing the course design and goals, course outcomes and students' experience, what are some of the challenges and benefits of incorporating Wikidata into the academic curriculum?

13.4 Methodology

13.4.1 Participants

One hundred forty-five students participated in the study and enrolled in 2018–2019, 2019–2020 and 2020–2021 academic year's spring semesters and completing the course requirements (n = 145). Participating students came from different disciplines, faculties and programs at TAU, ranging from the faculty of Exact Sciences to the Arts and Humanities. As the course was part of a cross-campus elective course that students had to choose courses from at any time during their undergraduate studies, students also varied in year-level, ranging between 1st year to 4th year in their undergraduate studies. Out of 145 participants in all three years, 71 were female (49%). It should be noted that this rate is much higher than usually found among Wikipedia editors, where women constitute a minority, usually around 20%. In Israel, the rate is slightly higher at around 25% but still far from satisfactory. The Wikimedia Foundation has been focusing some of its efforts on understanding, tracking and actively acting to minimise the gender gap[12,13,14] and it seems that educational collaboration is one avenue to support this work, as demonstrated below. Finally, students came from varying backgrounds and spoke various mother tongues. While most students were Hebrew native speakers, each class included Arabic native speakers, Russian native speakers and a small group of additional languages, such as French

[12] https://wikimediafoundation.org/news/2018/09/21/advancing-gender-equity-conversations-with-movement-leaders/.

[13] https://wikimediafoundation.org/news/2022/05/09/journey-to-make-wikipedias-technology-more-equitable/.

[14] https://wikimediafoundation.org/news/2022/05/09/journey-to-make-wikipedias-technology-more-equitable/.

and Spanish, leading to a diverse cohort in this respect. As the course was an elective, students voluntarily chose to enrol and participate in the accompanying research by filling out the end-course questionnaire. The questionnaire included a specific question of consent to participate in the research and follow-up interviews. All personal data about students were anonymised to keep students' privacy, so there was no ethical concern regarding forcing students to construct knowledge or participate in the research.

13.4.2 Data Collection and Analysis

Data was collected throughout the 3 years mentioned above in Sect. 13.4.1 and analysed between October 2021 and April 2022. A mixed-method approach was adopted in this research and used to collect and analyse data from three main sources: (1) final course grades, which include all the grading components (as will be elaborated on hereafter), used mainly to answer the second research question on course outcomes; (2) a post-course questionnaire, used mainly to answer the third research question on students' perception of their learning experience and (3) end-course in-class students' presentations, reflecting on their learning experiences, used mainly to answer the fourth research question on benefits and challenges to using Wikidata in academia. Research Design principles were adopted to answer the first research questions, which relied on the course faculty's experience designing the course.

Analysis of overall performance and quality evaluation

An evaluation of students' overall performance throughout the semester was conducted at the end of the course and included a quality analysis of the articles created in Wikipedia and their Wikidata projects, mainly items added and written queries. It is important to note that, unlike English Wikipedia, Hebrew Wikipedia does not employ articles quality ranking system. Considering the numerous factors required for quality ranking, it was outside the scope and resources of the faculty to perform a comprehensive qualitative analysis of the articles. Quality was therefore measured using an assessment tool (rubric) designed for the Wikipedia-focused courses that preceded this one, which students also used during peer-assessment and self-assessment. The rubric was then expanded to include a quality assessment of engaging with Wikidata based on the assignment's requirements.

The rubric emphasised using high-quality references to both Wikipedia and Wikidata statements and on all the themes discussed in the course. This included topics such as neutral, non-biased and inclusive point of view; balanced and coherent arguments in an approachable language, rather than using jargon and adhering to the Wikimedia community rules of encyclopaedic writing, including technical aspects of using the platform and considerations of copyrights. In general, students were encouraged to present meticulous and well-thought-out work that is self-aware of the responsibility of writing accurately when the information becomes instantly available to the general public, including the worrying implications of having non-referenced

or inaccurate information. In evaluating the quality of students' work, the latter point was evaluated as diligently paying attention to the small details that make a well-written Wikipedia article or a well-modelled Wikidata item. For evaluating the Wikidata project, students' work quality was specifically evaluated based on the accuracy and inclusion of the query they created, their use of visualisation options to explore the data, as well as the quality of the items added to Wikidata, which included high-quality references and well-designed and modelled items.

Beyond the quality assessment via the rubric mentioned above, which focused on the application of topics discussed throughout the course, students' overall performance was also evaluated considering their collaborative efforts. This included peer review, group work, contribution to in-class and online discussions in forums, talk pages, class presentations and overall active participation in the course. It is worth noting that it was naturally harder for non-Hebrew native speakers to contribute content in Hebrew to Wikipedia, so for those students, more weight was attributed to effort and adhering to encyclopaedic writing guidelines rather than to article fluency or grammar. For the Wikidata project, knowing more languages assisted students, as they could contribute data in multiple languages, ending in richer items added by the non-Hebrew natives.

Post-course questionnaire

This questionnaire that students completed at the end of the course were based on a course evaluation form from the Wiki-Med course (Evenstein Sigalov & Nachmias, 2017). This questionnaire was later perfected in the second course at TAU, which took place between 2015 and 2017 (Evenstein Sigalov & Cohen, 2020). At the end of the semester, participants completed a questionnaire online made of two sections: the first focusing on students' learning experience, perception of contributing to Wikipedia and Wikidata, self-perceived knowledge after the course and overall assessment of the course. The second section asked the students to review the course's staff and specific sessions. In the first section, students numerically ranked various aspects of the course on a 1–5 Likert scale. There was a space for optional free-text comments. In the second section, students ranked the lecturers and their related sessions with optional free text.

It should be noted that end-of-course questionnaires were only filled out by students in the first and third iterations of the course. As COVID erupted during the second iteration of the course, it was decided not to add to the students' workload. Out of the total of 104 students who completed the first and third iterations of the course, 75 students (72%) filled out the questionnaire (52% of the entire cohort of 145 students). The average age of students was 25, with 61% male and 39% female. 66 students (88%) were Hebrew native speakers, 5 (7%) spoke Arabic and 4 spoke other languages (5%). Hence, regarding mother tongue, the questionnaire data faithfully represents the whole class, though, regarding Gender, the questionnaire cohort was a bit skewed towards males and did not represent the almost equal females participating in the entire cohort.

End-course presentations

In all three courses, the last lesson was dedicated to students' presentations. In this lesson, the students took to the stage (physically in the first iteration and virtually in the 2nd and 3rd ones) to present their work to the class, reflecting on their learning process throughout the course. The presentation was mandatory and graded as one of the course requirements, with a full score awarded for participating and presenting a reflection of the learning experience. Students' presentations were recorded and later coded and categorised to extract benefits and challenges experienced during the course, specifically focusing on the Wikidata module. As mentioned, all personal details were omitted to preserve students' privacy and were used only to reflect on their overall learning experience.

13.5 Results

13.5.1 Course Design

Designing and implementing a new course model that focuses on knowledge creation in 2 Wiki projects (Wikipedia and Wikidata) is a complex and continuous task. It is important to remember that there has been no worldwide precedent for a similar academic course. While there have been experiences of using Wikipedia assignments in the classroom, and even some with Wikidata, there has been no consistent academic effort to create a semester-long course based on using Wikipedia and Wikidata as a learning platform. The course model aspired to be flexible enough to be adapted and scaled as needed. The course accommodated students from various disciplines and backgrounds while speaking various mother tongues. We also had to address the fact that resources were limited, with only one faculty member working on supporting and assessing the students. In addition, the course model had to address the sometimes-conflicting needs and agendas of faculty, students and the Wikimedia community—the three main stakeholders relevant to the course. Finally, the course design had to consider the emergence of the COVID-19 pandemic, which influenced both the course structure (assignments and overall workload on students) and students' engagement and learning experience and, in turn, the course's overall social impact.

13.5.1.1 Main Goals and Objectives

The course design had several goals and learning objectives. First, it aspired to engage students in knowledge consumption and knowledge creation processes by utilising various Wikimedia projects, focusing on knowledge construction in Wikipedia, and, more specifically, in Wikidata, and, as a by-product, learning about the Web's evolution. Second, it aimed at creating high-quality content on Wikimedia projects, thus

expanding OERs available to learners and the public. Third, it strove to improve students' academic and digital skills, collaborative and communications skills and data literacy. We also wanted to assist students in developing a better ability to assess information online, specifically issues such as copyrights, gender and knowledge gaps and bias, while teaching the importance of diversity, inclusion and knowledge equity. An additional important goal was for the course to have a positive social impact while championing the concept of giving back to the community in an academic setting, as mentioned above in the Renewable Assignment model by Wiley & Hilton. Moreover, finally, it was important for us to ensure students have a positive learning experience.

13.5.1.2 Design Guidelines

Several design principles were defined in constructing the syllabus and curriculum of the course to reach these goals:

- **Active learning and collaborative work**: The growing trend of students skipping lectures became an even greater challenge during the COVID-19 pandemic. While online learning became a daily routine, it left students feeling disconnected, suffering zoom fatigue and having difficulty concentrating (Usher et al., 2021). Therefore, a focus was placed on sessions with interactive elements, involving students in discussions, small-group work and active Q & A portion in each synchronous session. Peer assessment was also incorporated, providing constructive feedback and a way for students to engage more with their peers.
- **Student-centric, focusing on deep understanding, iteration and reflection**: Wikimedia projects are a complex online space with their own culture, norms and at times unique language expressions, and there is a steep learning curve, which causes many newcomers to refrain from editing and engagement with the community. The course met students where they were, allowing a longer and deeper learning process, time to digest, experiment and improve and reflect on students' own journey. This is especially important compared to the "alternative assessment" model. This umbrella term includes any alternatives to standardised multiple-choice testing (Gipps & Stobart, 2010), in which a Wikipedia assignment is implemented into the academic curriculum, which usually does not have enough time for such a complex process.
- **Engaging the Wikimedia community:** Various local and global Wikimedians contributed to the course's success, acting as guest lecturers and mentors. This exposed students to the diversity of volunteers composing the Wikimedia Movement and ensured the course was well-supported by the community, both locally and globally.
- **Embracing Diversity, fighting bias and promoting knowledge equity**: In order to offer readers "the sum of all human knowledge", Wikipedia requires the inclusion of diverse voices and a neutral point of view. However, Wikipedia remains biased (Ford & Wajcman, 2017; Hargittai & Shaw, 2015; Konieczny & Klein,

2018; Wagner et al., 2015), with only about 20% of women contributors and a majority of Western white males.[15] This, in turn, influences topics covered in Wikipedia and caused an inherent bias that is part of the existing content. The course's design raised awareness of knowledge gaps and knowledge equity (Ramjohn & Davis, 2020), specifically the Gender Gap, with students writing about their chosen notable women from the Women-in-Red Wikipedia list.[16]

- **Having a positive social impact:** As mentioned above, one important aspect of the course design was that the course outcomes would include new materials that will serve not only the students but also future learners and the general public. Creating new, sustainable OERs that will remain after the course ends, as described in the Renewable Assignment model (Wiley & Hilton, 2018), has proven to be one of the most important motivators for students' active participation in the course.
- **Re-use:** Creating a model that could be adopted, scaled and applied by educators, faculties and academic institutions worldwide as part of the Open Education movement. It was specifically important for us to develop a model that does not require a substantial monetary investment, and the chosen model includes one early career academic that was paid to lead the course, as well as one senior faculty member in an advisory role (also leading one session in the course). This model allowed a relatively low investment, but could also work with a senior faculty member leading the course while hiring a teaching assistant to do most administrative and academic chores (including grading), as is customary in many academic courses. Naturally, institutions with a higher budget will be able to offer such courses at a scale, allowing more students to participate. Courses with over 150 students may require two teaching assistants.

13.5.1.3 General Structure and Assessment

Each iteration of the course consisted of 13 sessions. The semester-long course was designed to have two main modules, the first focusing on Wikipedia and the second on Wikidata, with each module including six sessions. The last session of the semester was dedicated to students' presentations, reflecting on their learning experience, which in turn assisted instructors in improving future iterations. There were two main assignments in the course, one after each module, the first focusing on writing an article in Wikipedia, and the second a project in Wikidata. Because of the limited faculty resources, a methodology of a peer evaluation process after the first assignment was adopted. A similar model has been reported to give the same results as a teacher's assessment (Sadler & Good, 2006) and has been implemented by Coursera in its Massive Open Online Courses (MOOCs) (Piech et al., 2013). The peer evaluation process was specifically attached to the Wikipedia assignment

[15] https://meta.wikimedia.org/wiki/Gender_Diversity_Mapping; https://wikimediafoundation.org/news/2018/09/21/advancing-gender-equity-conversations-with-movement-leaders/; http://web.archive.org/web/20110713180348/; http://www.wikipediasurvey.org/; http://wikipediasurvey.org/docs/Wikipedia_Age_Gender_30March2010-FINAL-3.pdf.

[16] https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Women_in_Red.

not only because it is a complex process that requires iterations and reflections and staff could not assess students' work during the semester but also because this was part of the course's learning objectives to create a community of learners and to help students develop their collaborative and communication skills, including how to give and receive constructive feedback. The second assignment related to Wikidata has changed in every iteration of the course. This is not only since there was a learning curve for faculty in fine-tuning what would be a good way to assess students' learning but also like the new COVID-19 reality that emerged during the second iteration of the course, had a drastic effect on the course design, and the overall workload of the course on students had to be reassessed.

As mentioned, COVID erupted during the second iteration of the course, and the course had to be adjusted quite rapidly and without much preparation to address new needs and requirements. It went from being conducted synchronously in class to being conducted online, via Zoom, partly synchronously and partly asynchronously. Thankfully, many of the course learning units were already online, and active online learning was already part of the course's structure and design, but it was nevertheless a big change to implement while a semester was ongoing. This structural change, mostly imparted due to the new COVID reality, impacted students' engagement in the course and new ways had to be incorporated to ensure engagement and collaborative work. Moreover, the workload of the course had to be reduced, as strain on students increased during COVID. Many were not accustomed to online learning, did not have quiet spaces for learning nor access to a stable internet connection and had to deal with higher levels of anxiety relating to health issues and work. This meant we had to reduce the course requirements to meet students where they were at. We allowed them to work in small groups rather than individually as in previous similar courses. These changes affected the number of new articles and new Wikidata items created, thus decreasing the course's potential social impact compared to courses where students worked individually. More time also had to be allocated to the reality of assigning students to work in small groups, which is something the course faculty had to address. These changes were necessary to allow students to engage with one another and ensure they could handle the course workload. It is also important to note that the course still had a visible social impact, as Wikipedia articles focused on writing articles about notable women in history, and in the Wikidata project, students were encouraged to add items to female faculty members from TAU. In this manner, the course addressed the need for high-quality content that would help shrink the gender gap in Wikimedia projects and online. As students' articles are visible on Wikipedia and Wikidata, students had an extra period to revise and resubmit articles, items and queries when necessary. The emphasis was on creating quality articles and items to serve future learners and the general public.

Assessment of students' performance included:

- 10% engagement and submission of small tasks along the course, participating in peer review etc
- 40% assessment of the Wikipedia article
- 40% assessment of the Wikidata project

- 10% presentation reflecting on their learning experience in the last session.

Considering Hegarty's framework, it seems that the course model included all eight attributes required to implement OERs successfully (Hegarty, 2015). It was indeed planned and designed for success. However, did it work in practice?

13.5.2 Course Outcomes

One hundred forty-five students graduated from the course in its 3 iterations between 2018 and 2021. Table 13.1 showcases the number of students per cohort, the final averages for the first and second assignments and the final course grade.

It is important to note that while the first assignment was consistent and focused on writing a new Wikipedia article in all cohorts, the second assignment was not. In the course's first iteration, students had a choice to either write another Wikipedia article or do a Wikidata project. Only a small number of students opted for the Wikidata project, so as of the second iteration, a Wikidata project became mandatory for the second assignment.

For the Wikidata project, students were asked to find a topic they like; write a query to see which items are already covered in Wikidata; search for online, reliable sources or databases they can extract information from; explore existing Wikidata Projects related to the topic and existing, similar, high-quality items already modelled in Wikidata and come up with a consistent data model for adding new information; add at least 5 new items per person in a group (groups ranged between 2 and 3 people maximum and were consistent throughout the whole semester), with at least 10 new statements each (each with relevant references), according to their data model; when data creation is done, run the query again and visualise the results in a meaningful way and, finally, write a one-page report about their experience. Students were encouraged to choose topics related to the gender gap and other knowledge gaps but were free to work on anything with enough notability and academic relevance. An example of

Table 13.1 Average grades per year

	Total number students	Female	Male	Avg. grade for 1st assignment	Avg. grade for 2nd assignment	Avg. final course grade
2018–2019 cohort	51	23	28	90	85	89
2019–2020 cohort	41	20	21	90	82	88
2020–2021 cohort	53	28	25	86	83	83
Total	**145**	**71**	**74**	**88**	**84**	**86**
Totals in %	100%	49%	51%			

such a project was submitted by a Life Sciences student majoring in Biology, who decided to focus her project on female researchers from her department. Focusing on those reaching professorship, her investigation of their coverage yielded only three results. The student was able to extract information from the faculty's website but ended up reaching out to many of her faculty in the present and past days, receiving their CVs, free licensed pictures and a list of their notable articles. Adding details about them and their research to Wikidata was doubly meaningful. Not only did it actively help reduce the academic gender gaps and increase the visibility of these female researchers, but it did so on a global scale. As Wikidata is multilingual, students' contributions were not limited to Hebrew but have made these researchers and their research more visible to the whole world. AI agents extract that info, so when anyone globally searches for something about them, they will be shown the structured information added by that student. Not only that but having structured linked data available encourages the creation of Wikipedia pages in other languages. A win–win.

As previously mentioned, this cohort was the first semester of COVID eruption, so despite appreciating the course agenda and understanding the advantages of creating OERs, students found the course to be challenging in terms of workload. This was especially so for the second assignment relating to Wikidata, which required more staff support. It also explains the drop in average for the second assignment compared with the first one. Insights from the first experience of mandatory Wikidata assignments were implemented in the 3rd iteration of the course, where instructions regarding what is expected from students in the project were sharpened and became clearer to students. When tried initially, students found it hard to find external databases to rely upon, and quite a lot of their time and energy went into searching for reliable databases. To simplify the process, in the third iteration between the years 2020–2021 (and the second year of the Wikidata mandatory project), students were encouraged to focus more specifically on female faculty members from TAU, relating somehow to the first article they wrote in Wikipedia. That helped focus them and not waste time searching for reliable external databases.

All in all, although instructions were clearer and more focused, and although contributing to Wikidata is technically easier than a Wikipedia assignment, students still found the Wikipedia assignment easier, as they were more familiar with the platform (even as consumers). As reflected in both the end-course questionnaire and students' reflections in the last session, while students found that adding information to Wikidata is fairly easy, especially compared with Wikipedia, it took them time to get used to the platform and to the type of work that needs to happen. Working with data, then, was still found to be challenging. Staff support was still required to assist students in digesting the requirements of the project, and while the average is slightly higher, it is still lower than the average grade for the Wikipedia assignment. Feedback from students again helped fine-tune what and when faculty interventions may be helpful, and during the 4th iteration of the course between 2021 and 2022, a whole session was dedicated to simulating a similar project with students. It not only assisted in bringing more clarity, focus and understanding of what is expected from students but also helped to reduce the overall staff support.

In terms of course outcomes during the 3 iterations of the course, 1,190 articles and items were created; 2,550 articles and items were edited; 5,980 references were added; 2,340,000 words were added and 78 media files were uploaded to Wikimedia Commons. These articles and items have been viewed over 7,480,000 million times during the courses (more after they finished), demonstrating another aspect of the social impact of the course. Course outcomes could also be tracked via the Wikimedia Foundation's Programs & Events Dashboard.[17]

13.5.3 Students' Learning Experience

Seventy-five students (52% of the total cohort of 145 students) from the first (40 students) and third (35 students) iterations (cohort of 2018–2019 and 2020–2021) filled out the end-of-course questionnaire, where students were requested to rate certain aspects of the course from 1 to 5 (1 being the lowest and 5 the highest). There were additional questions that were not mandatory, and students were invited to provide additional feedback in free text format. Students from the cohort of 2019–2020 were not asked to fill out the end-course questionnaire, as it was the semester of COVID-19 eruption, and the overall strain on students was high. Considering that this is a cross-campus course, with participants from varying backgrounds and disciplines coming to the course with different expectations, as well as that this course was running for the first time during the 2018–2019 academic year, we did not expect the highest ratings. We defined success as "any ranting above average" (anything ranked above 3). It was encouraging to learn that for many aspects of the course, the majority of students ranked 4 (agreed) or 5 (strongly agreed).

Regarding the course structure, tasks and session types: when asked if the course was well organised, 66 students (88%) ranked the course 4 or 5, with a class average of 4.5. When asked if the course was effective, 55 students (73%) ranked the course 4 or 5, with a class average of 4.1. When asked whether sessions followed a logical flow, 63 students (84%) ranked the course 4 or 5, with a class average of 4.3 and 4.5 on the question of whether different sessions were coordinated with each other. When asked whether there was a balance between the different types of sessions (lectures, workshops, guest lectures), 58 students (77%) ranked it 4 or 5, with a 4.2 class average. Relating to tasks in the course, when asked if tasks were clear, 65 students (87%) ranked 4 or 5, with a class average of 4.4. On whether tasks enhanced material understanding, 58 students (77%) ranked 4 or 5, with a class average of 4.3. Moreover, when asked if class feedback helped material understanding, 57 students (76%) ranked 4 or 5, with a class average of 4.2. Interestingly, though not surprisingly, when asked if working in small groups assisted material understanding, 49 students (65%) marked 4 or 5, with a class average being 3.8, indicating that some students did not like the small group work and preferred to work individually. This was confirmed

[17] https://outreachdashboard.wmflabs.org/campaigns/from_web_20_to_web_30_from_wikipedia_to_wikidata/programs.

during the last session of class, where students presented reflections on their learning experience in the course.

Regarding general questions assessing the course and the learning experience: when asked if the course was interesting, 68 students (91%) ranked 4 or 5, with a class average of 3.9. When asked if they had a positive learning experience, 59 students (79%) ranked 4 or 5, with the class average begin 4.0. The same numbers (59 students, 79%, class average of 4.0) were ranked when asked about the level of satisfaction when articles were uploaded to Wikipedia. The high level of satisfaction was also apparent in supporting questions, such as "did you share with family and friends?", which yielded 71% of students ranking it 4 or 5; "How important is it to contribute to the community via academic courses", which 75% of students ranked 4 or 5; "Overall course quality", which 59 students (79%) ranked 4 or 5 and finally, "Would you recommend the course to others?", which 52 students (69%), ranked 4 or 5.

Examining the additional comments left, students' free text reported on a unique and gratifying learning experience, expanded horizons, feeling they have done something meaningful and are better equipped to deal with information and data online. Many reported that this course had exposed them to new topics such as copyrights, inherent bias, knowledge gaps and the gender gap. Students are specifically excited about Wikidata, as virtually all were oblivious to its existence. For most, the course was the first encounter with not only Wikidata but also with the concept of Data Literacy, and many reported a sense of "discovering a new world", available for further exploration. Most students reported a shift in perspective regarding information online. For those who self-identified as "technologically challenged" at the beginning, the course offered a chance to improve their basic computer skills and more advanced skills, including understanding code and even programming themselves in the SPARQL language (used to query Wikidata). Overcoming the challenges and learning a new programming language to query Semantic Networks, specifically Wikidata, have proven to empower, and for many, this experience resulted in a higher perception of self-efficacy.

13.5.4 Benefits and Challenges

As reported in the previous two sections, the overall course outcomes and students' learning experience are encouraging. Though the assessment was satisfactory from the faculty's perspective, the data regarding students' learning experience was based on only 52% of the total participants. Clearly, more iterations are needed for the course to become more stable while addressing and implementing necessary changes extracted from both students' feedback and faculty insights; and additional data and research are needed in order to get a better understating of the student's perception of their learning experience, as well as making sure the course is constantly improving and is meeting its stated goals. In the meantime, the students' presentations reflecting on their learning experience in the course during the last session also helped to shed

light on the specific challenges that hinder learning and the benefits that encourage learning. Students' presentations were recorded, and the main challenges and benefits extracted, coded via software called "Dedoose" for Qualitative/Mixed-Method research and grouped into categories to better understand the learning experience in the course. Specific attention was given to the interaction with Wikidata—this was a new component implemented into the academic curriculum, and it was highly important for faculty to understand its implementation in more detail. Table 13.2 summarises the main challenges and benefits from students' perspectives:

While there may be more challenges and benefits to engaging with Wikidata as a learning platform, in the context of an academic course, the faculty is in high agreement with students' reported challenges and benefits. Challenges reported have already been implemented in the 4th iteration of the course in the academic year of 2021–2022 and will continue to be investigated.

Table 13.2 Challenges and benefits from students' perspective

Challenges of interacting with Wikidata	Benefits of interacting with Wikidata
Unknown, complex platform	Allows engagement with data, tells stories with data
Requires skills for engagement in both adding and extracting data	Data visualised and easily explored
Modelling challenges and biases	Allows innovation and exploring new frontiers
Inconsistent modelling makes it harder to find info when querying	More fun/interesting to engage with and has a real impact on the world
Many internal tools are hard to find, track and learn	Allows quality assessment, research and data-driven solutions that could be beneficial in the future
Impact unclear and therefore hard to induce motivation for participating	Sense of pride for producing something tangible, durable
More clarity and connection between sessions and the final project	Improved data literacy and other skills
More time for practice is needed	Helps to overcome language barriers, even going beyond human languages
	Allows working with a cross-disciplinary, global community to engage and learn from
	Allows humans–machines collaboration and use of tools to scale work
	Allows flexible modelling and reconciling different sources of information
	A sense of expanded horizons and being more informed digital citizens

13.6 Discussion and Conclusion

Despite the expected "labour pains", it is clear that Wikidata holds exciting opportunities as a learning platform for educators and learners. The course model presented here, while new, has been considered a success by faculty, students and the Wikimedia community, and its main goals were achieved, namely making students better consumers of information; sharpening skills; offering a new, scalable and adaptable pedagogical model; offering students a positive learning experience and, of course, creating quality online content under a free license that could be used by future learners and the general public and minimising knowledge gaps and bias, or in other words, inducing social impact through an academic course.

New technologies should be "systematically evaluated to ascertain their benefits and limitations" (Boulos et al., 2006). While we continue to adapt the course based on students' feedback and faculty insights, more educators must experiment with the platform. They should explore not only this model of engaging with Wikidata in more institutions, contexts and countries but also additional models of implementing Wikidata into academic work. This is especially important as the number of participants directly impacts overall class contribution, which in turn affects the morale, good will and support of all stakeholders. Therefore, it is necessary to find new, innovative ways to scale, increasing the number of students and its social impact while keeping the course manageable. This study and previous research focused on Wikipedia in higher education (Evenstein Sigalov & Nachmias, 2017) demonstrated that an elaborate peer-evaluating methodology could be used for scaling, as it assists with faculty workload.

Further research is required to understand how to best utilise peer evaluation in regards to Wikidata without overwhelming students with too many assignments. While peer evaluation induced learning, considering the course workload, it is imperative to explore other ways of engagement and assessment. Such new models can reduce the workload and number of assignments while sustaining the positive effects of collaborative learning and constructive feedback. The course model should also be tested in other settings, such as MA and PhD studies, and be expanded to full courses dedicated to Wikidata (rather than half Wikipedia and half Wikidata), as well as explore ways to engage with Abstract Wikipedia[18] and WikiFunctions,[19] Wikipedia's newest sister project, which is highly connected to Wikidata and expands its ability and range.

Finally, despite its limited scale, we hope this study will encourage more educators, OER experts and academic institutions to implement similar course models with positive social impact. We specifically hope it will inspire others to incorporate Wikidata into the academic curriculum in additional educational and academic contexts. Researching Wikidata's potential for education outside the scope of this study indicates it has the potential to revolutionise the way we learn, teach and conduct research. We are now designing a fourth course that will solely feature

[18] https://meta.wikimedia.org/wiki/Abstract_Wikipedia.

[19] https://en.wikipedia.org/wiki/Wikifunctions.

Wikidata, and we hope to launch it during the coming academic years. No doubt, additional research will be required to assess the efficacy of using Wikidata as the main topic in an academic course. However, we continue to explore this course model as we have found evidence for its effectiveness and impact on both students' learning and the general public, viewing and making use of these newly available OERs. That said, this course model is by no means the only way of implementing Wikidata into the academic curriculum, nor creating OERs and inducing social impact. While this model was found to be effective and meaningful to students, it is less common (and will probably remain so), mainly as it is harder to get it approved in academia. We reached this point after years of more humble experimentations with other models, including alternative assessments. Taking a step back from this course model and looking at its outcomes, it is important to recognise that it is merely one possible model among others. These might include hiring a Wikimedian-in-Residence (done at the University of Edinburgh[20] and other universities in the UK and the US); or facilitating edit-a-thons focusing on knowledge gaps in collaboration with the local academic library or other GLAMs (Galleries, Libraries, Archives and Museums). However, whatever the chosen model of working with Wikidata to create OERs and induce social impact is, the most important realisation is to keep exploring, experimenting, failing, improving and iterating and continue the quest for new ways of learning and open knowledge for all.

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Chapter 14
Open Educational Resources in the English for Academic Purposes Context

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Abstract Since the introduction of open educational resources (OERs) in higher education, many university lecturers have developed or adopted them for their students. Most studies in the field have concluded that OERs can reduce the costs incurred by students and lead to positive learning outcomes. This study attempts to extend the current body of knowledge about OERs by examining the challenges and opportunities associated with developing and adopting them in an English for Academic Purposes (EAP) context. We conducted in-depth individual interviews with 14 EAP teachers who have experience adopting or developing OER materials at a Hong Kong university. The results suggest that quality, copyright, technology, and students' needs influence the development and adoption of OERs. The teachers also found that the use of OERs is affected by customisation, accessibility, cost, and how they differ from traditional materials. However, they indicated that they need more resources and training opportunities from administrators in order to develop OERs. Some of our findings can be explained by the fact that EAP is a discipline in which practitioners can easily locate and adopt OERs developed by other stakeholders, such as libraries. In addition, this study examines evidence from the interviews and provides practical suggestions for how the OER movement can move forward. These suggestions include providing multidimensional training, developing a course-based materials repository, and conducting continuous professional research. This study offers a new perspective on the OER movement, as it indicates that the requirements and challenges associated with each individual discipline must be examined

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for the better promotion of OERs; it also provides insight into the viewpoints of EAP teachers.

Keywords Open educational resources · English for academic purposes · Higher education · Teacher training

14.1 Introduction

Open educational resources (OERs) are resources that are freely available on the Internet with few legal, financial, and technical restrictions (Hylen, 2021). This implies that teachers can usually locate and use OERs without paying a subscription fee, facing any technical challenges (e.g., problems with adapting the file or source code), or obtaining consent (i.e., license restrictions). One common OER framework is the 5R framework presented by David Wiley (2014)—a pioneer in OER—which indicates that they can be retained, reused, revised, remixed, and redistributed. This framework helps to define the concept of "open" in OER. Since the introduction of OERs at a conference hosted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2002, the development, sharing, and adoption of OERs have become widely prevalent. There are OER projects and repositories worldwide, including those in Australia, the United States, the United Kingdom, Canada, and Europe (Pelletier et al., 2021). A few practical examples of OERs include the Australian Politics and Policy Open Textbook Project and the Zero Textbook Cost Initiative. The former provides textbooks on the website of the Sydney Open Library (https://open.sydneyuniversitypress.com.au/) and allows users to read them for free. The latter was initiated by The College of Cantons and also provides users with free access to course textbooks (https://www.canyons.edu/ztc).

Digitally accessible OERs have long attracted attention in the higher education (HE) sector (Jung & Lee, 2020; Jung et al., 2017). Due to the unprecedented challenges brought about by the pandemic, HE practitioners began to see an imminent need to search for appropriate OER materials to effectively deliver courses online (Huang et al., 2020; Pelletier et al., 2021). OERs allow educators the flexibility to adopt free materials from one or multiple sources for their classes (OECD, 2007; UNESCO, 2002). Some obvious strengths of OERs include cost reduction and the improvement of educational quality (Tillinghast et al., 2020). However, the implementation process can be challenging (Schaffert, 2010). Teachers struggle with issues such as identifying high-quality OERs, finding enough OERs to cover the scope of their curricula, managing copyright issues, achieving sustainability, and keeping track of links that disappear (Kaufman & Campana, 2019). This chapter examines how Hong Kong teachers adopt and experiment with OERs in an EAP course with over 2,500 students. We present suggestions to overcome the challenges of implementing OERs in language courses based on our findings. This study contributes to the body of knowledge in the field by improving the understanding of adopting OER in an

EAP context. It concludes with the research and pedagogical implications of OER adoption.

14.2 Literature Review

Recent studies have shown that OERs are increasingly being developed, applied in HE, and positively impacted (Jung & Lee, 2020). One reason for this is that, as textbook prices increase—and having access to a textbook can impact students' grades (Prasad & Usagawa, 2014) or ability to complete a course (Gale, 2016; Hilton, 2016)—OERs can provide a free alternative.

In English language teaching, most institutions and centres rely on mass-produced materials (e.g., course textbooks) in courses on English for Academic Purposes (EAP), which is defined as "teaching English with the aim of assisting learners' study or research in that language" (Hyland, 2006, p. 1). The use of these mass-produced materials is not very successful in facilitating authentic language acquisition (Tomlinson, 2012). Numerous authors have noted the shortcomings of published coursebooks (Chao, 2011; Kohnke, 2019)—such as the fact that the target language is not contextualised, salient, and/or encountered frequently (Maley, 1998, 2016). They focus on teaching linguistic forms rather than acquisition and development (Tomlinson, 2010). This has led to EAP teachers frequently engaging in "re-design" work: "tweaking, adjusting and adapting materials to suit particular needs" (Samuda, 2005, p. 235) and providing rich and meaningful exposure to language (Day & Bamford, 2004). For example, they develop new materials or adapt existing content to provide students with more practice with grammar points, guidance on pronunciation, and familiarity with the words in reading passages.

Studies comparing students who use traditional and open textbooks have discovered no significant differences in terms of grades or course completion (Allen et al., 2015; Choi & Carpenter, 2017; Croteau, 2017; Fialkowski et al., 2020; Fischer et al., 2015; Hendricks et al., 2017). Instead, the findings indicate that implementing open textbooks may allow students to take more courses concurrently and graduate earlier (Fischer et al., 2015).

Furthermore, numerous studies suggest that students use traditional textbooks and OERs side-by-side (Hendricks et al., 2017). However, they perceive OERs to be of higher quality (Everard & Pierre, 2014; Hilton et al., 2013; Jhangiani & Jhangiani, 2017)—significantly higher than required course materials and readings (Cooney, 2017). This is an important finding, as students' investment, commitment, and participation in a course are critical for positive learning outcomes (e.g., course completion). OERs have been shown to enhance students' engagement in and satisfaction with their courses (Cooney, 2017; Rowell, 2015), as they can be personalised.

Another benefit of implementing OERs is that teachers can use them to share resources. Additionally, they can update, customise, and revise them collaboratively instead of developing new materials every semester. However, while permitting teachers to choose from different forms of OERs (e.g., lecture materials, textbooks,

quizzes, websites, massive open online courses [MOOCs] and small private online courses [SPOCs]) offers autonomy, it can also be a burden because of the time required to become familiar with these options. Thornbury (2000) recommends that teachers should not be dependent on commercial textbooks; however, they need help adapting materials (McDonough et al., 2013), as it is often not part of their repertoires and is not "easily picked up" (Samuda, 2005, p. 236). Tsui (2003), in a seminal study on teacher expertise, found that teachers often could not decide "whether activities were well designed" (p. 213). Additionally, EAP teachers must consider the forms of technology (e.g., e-textbooks, apps, websites, MOOCs, SPOCs) that will optimally teach the target language (e.g., fluency, accuracy, appropriacy) and digital skills. Therefore, it is important to allocate appropriate resources (both human and monetary) when choosing OERs so that they can be adopted and employed properly (Jung et al., 2020).

Despite the strengths of OER in HE, the decision to adopt them has been primarily left up to individual teachers. Padhi (2018) found that OERs are chiefly adopted in India because they improve teachers' job performance, and teachers find them easy to access and adapt. Mtebe and Raisamo (2014) found that Tanzanian teachers' decisions to use OERs can be explained by their expectation of the effort it will require. Belikov & Bodily (2016) examined the reasons why OERs are adopted in the United States and found that cost savings, pedagogical benefits, and institutional support are the key factors. In the United Kingdom, teachers support adopting and adapting OERs for altruistic reasons (i.e., because of the free open access to legacy materials) (McGill et al., 2013). These examples explain why teachers in various cultures use OER. Further research into the use of OER in additional contexts is necessary.

Scholars have also explored how educators adopt OERs. Wiley et al. (2014) in the United States, de Hart et al. (2015) in South Africa and Padhi (2018) in India found that most teachers adopt the same OER regularly without modifying the materials. In HE, textbooks are primarily published in a print format, and OERs have not yet been widely adopted. In addition, not all socio-economic groups can access them equally. Students may not have adequate Internet access at home or may lack a laptop, desktop, or tablet they can use to obtain and complete assignments. Other challenges are links that no longer work and issues related to quality, copyright, data security, and privacy. These problems will have to be resolved to make OERs sustainable and widely adopted by teachers and students.

14.3 Methodology

This qualitative study explored EAP teachers' perspectives on adopting OERs for use in a large-scale EAP course in Hong Kong. It employed an interpretive approach using semi-structured interviews to reveal the full complexity of the teachers' views and the strategies and steps they employ (Creswell, 2008).

14.3.1 Context of the Study and Participants

All participants in this study teach a compulsory, three-credit EAP course offered by a public English-medium university in Hong Kong. In earlier studies, undergraduates in Hong Kong were not aware of OERs. However, with the improvement of the information and communication infrastructure—which, according to Li & Wong (2014), is helpful in implementing OERs—subsequent studies have indicated that students perceive OERs to be useful to supplement course textbooks and assignments (Cheung, 2019). While the perception of students is beyond the scope of this paper, these studies reveal that Hong Kong students are generally aware of OERs, and they are not new to them.

All first-year students at the university in this study are required to complete a three-credit, 13-week EAP course: English for University Studies. This includes students from various disciplines, including Applied Science, Business, Engineering, Health Science, Hotel Management, and Design. The learning objectives of the course are that students can (1) incorporate sources into academic essays and presentations; (2) paraphrase and summarise a variety of written and spoken texts; (3) develop expository essays effectively; and (4) give academic presentations. The course includes three assessments: an in-class academic essay, a take-home essay, and an in-class presentation. Moreover, to supplement the standardised notes distributed through the university-wide learning management system, students are expected to extend their learning and succeed in the course by accessing OER materials through links provided in the course material. For example, in the course material on referencing, there are links to YouTube videos on referencing (hosted by the research site) that students can watch to supplement what they have learned during class. Other examples include videos on presentation skills, web-based activities on reporting verbs, and PDF worksheets on academic style. Approximately 2,500 students participate in the course each year.

The participants of this study were selected from over 40 teachers who teach this course. They were invited to participate because they had experience developing or implementing OERs. Fourteen participants (seven men and seven women) who met the criteria agreed to participate in the study. Table 14.1 outlines the participants' demographic information. Only six participants had prior OER development experience; three had no previous materials development experience at all. They had between four and 20 years of teaching experience. All of the participants signed a consent form and were assigned pseudonyms.

OERs were not new to the participants in this study, as the research site is heavily engaged in OER development. It has developed a MOOC about applying for jobs in Asia, which is hosted on EdX, and a SPOC on grammar. In addition, the research site hosts a YouTube channel with more than 280 videos, of which more than 90 were designed for the aforementioned EAP course. The self-access centre at the research site also provides a range of free and open materials, including interactive EAP/proficiency-based activities and PDF worksheets. The participants in our study had been directly involved in developing materials for these OERs or were made

Table 14.1 Demographics of Interviewees (N = 14)

#	Pseudonym	# Years of EAP teaching experience	# Years of material development experience	# Years of OER development experience
T1	Joseph	5	1	0
T2	Marvin	4	0	0
T3	Rachel	8	2	0
T4	Alexandra	10	4	1
T5	Julie	9	3	0
T6	Robert	11	5	1
T7	William	3	0	0
T8	Anna	14	4	0
T9	Bob	9	3	0
T10	Lauren	20	7	4
T11	John	8	3	2
T12	Evan	15	5	3
T13	Delilah	6	0	0
T14	Molly	12	5	4

aware of them in formal meetings. For the EAP course, teachers are provided with standardised notes but can also design additional materials using OERs. Therefore, our participants were well aware of the use and development of OERs.

14.3.2 Data Collection and Analysis

This qualitative study used individual semi-structured interviews conducted in English to gain insight into issues (Creswell, 2008). The interviews lasted an average of 32 min and were audio-recorded. The following open-ended questions were asked in the interviews:

- In your opinion, what constitutes OERs?
- Do you know where to find OERs?
- What are the advantages of OERs (for teachers and students)?
- What are the disadvantages of OERs (for teachers and students)?
- What skills do we need to develop OERs?
- What support do we need from the administration to develop OERs?
- How can we make OERs sustainable?
- How motivated are you to develop OERs?
- What is the main challenge you have faced in developing materials?
- Overall, how would you rate your experience developing non-OERs versus OERs?

The rich data collected were subjected to thematic analysis in line with Braun & Clarke's (2006) six-step analysis framework. First, we transcribed the recording and sent a copy of the transcription to each of the 14 participants. We then familiarised ourselves with the data by (re)-reading the transcriptions. Then, each author independently conducted the first round of coding and collated the codes into themes. After this, we employed the code-recode strategy suggested by Anney (2014) to improve the reliability of the findings. Thus, the first round of coding was followed by re-coding one and a half weeks later. After the re-coding, the results were nearly identical, indicating that they were dependable. We then generated a "thematic map" of the analysis. This was followed by refining the themes and creating an "overall story of analysis" (Braun & Clarke, 2006). In the final step, we chose representative excerpts for the final report. We also performed the second member check (Nowell et al., 2017) by providing each participant with a copy of the results (e.g., themes and representative quotes). The participants did not request any amendments. In the following section, we will discuss the findings of the interviews.

14.4 Results

We began by asking the participants about the types of OERs that they use. The materials mentioned most frequently were MOOCs, followed by worksheets/PDFs. The items mentioned least frequently were e-textbooks. Other resources mentioned by the participants included SPOCs, websites, and apps.

After exploring the nature of OER materials, we examined the opportunities and difficulties teachers face in developing and adopting OERs in the EAP context. A total of 88 responses were coded using the previously-described thematic analysis approach. Ten recurring themes were identified. The most frequently-discussed themes were the needs of students, time, and accessibility. Other recurring themes included the differences between OERs and traditional materials, copyright, quality, technology, customisation, cost, and necessary skills.

To further conceptualise and illustrate the recurring themes, the research team developed the thematic map in Fig. 14.1 based on whether the participants described a theme as being related to OER development, adoption, or both. This figure resulted from axial coding and the aforementioned six-step coding process. Participants made frequent references to four themes (the needs of students, technology, quality, and copyright) when discussing both the adoption and development of OERs. They typically mentioned the remaining themes when discussing either the development or adoption of OERs; these themes were grouped accordingly.

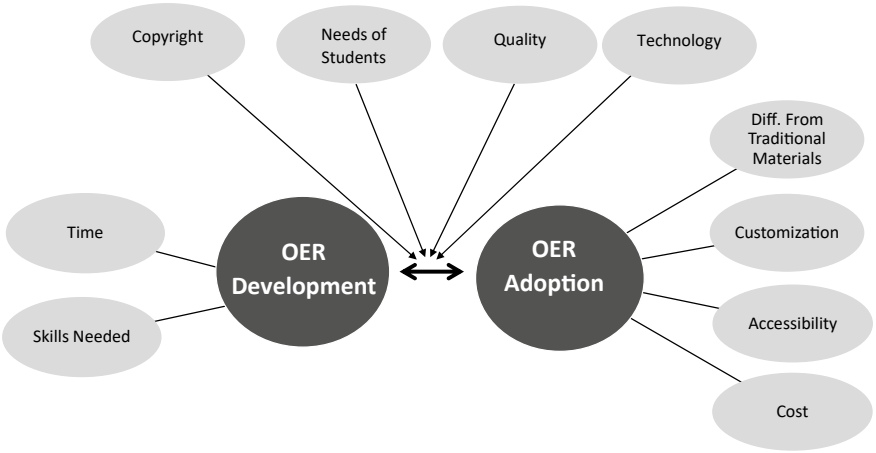

Fig. 14.1 Relationships of themes to OER development and adoption

14.4.1 Themes Affecting Both Development and Adoption

Four themes were related to both the development and adoption of OER: the needs of students, technology, copyright, and quality. When interviewees described adopting OERs, they discussed wanting to "personalise [the materials] depending on their [students'] needs" [T2 Marvin]. This means that teachers hope to use available OERs and modify them to match the content of their lesson plans. The participants often referred to the needs of their own students rather than those of students in general. This was strongly connected with the theme of customisation. However, the participants believed that if they were to develop OERs, they would have to consider diverse needs "as students will be from all over the world" [T4 Alexandra]. In other words, the participants said that they would develop OERs that could be used by all students, not only the students in their classes.

Technology is another key factor affecting both OER adoption and development: the interviewees were worried about the need to use technology both to develop new OERs and design activities based on existing OER materials: they noted that they would need to understand and perhaps use unfamiliar forms of technology. For example, Anna [T8] mentioned the need to think of ways to "maximise the learning with the e-book". This could mean utilising e-book technology for a particular activity. The teachers believed that developing OERs may not mean presenting all materials in a document (e.g., a PDF file); rather, they may need to use unfamiliar technology to develop interactive activities.

Copyright issues and the quality of OERs were of lesser concern. However, a few interviewees were apprehensive that "sometimes the quality [of materials] might not be great" [T3 Richard]. They also discussed the quality of the materials they would develop: "Our name will be on it, and our reputations are important" [T8 Anna]. However, they discussed the concept of quality in general and did not provide details

on how they defined it. When they discussed developing OERs, the teachers also expressed concern about copyright issues related to using OERs and copyrighted images, especially in the EAP context. They noted that language teaching materials require images: "Find[ing] suitable images that I can use freely without copyright protection is the main disadvantage [of developing OERs]" [T9 Bob].

These four themes (the needs of students, technology, quality, and copyright) were identified as the primary challenges related to the development and adoption of OERs. The following sections describe challenges and opportunities exclusively related to either adoption or development.

14.4.2 Themes Affecting Open Educational Resource Adoption

When interviewees described the adoption of OERs, the key challenge that they mentioned was accessibility. This theme was often mentioned in a negative sense. Because OERs are hosted online, teachers cannot ensure their accessibility over time and often lose access to them: "One day, the link is working; the next day it's broken" [T1 Joseph]. Given this unreliability, "you continuously have to check before walking into the classroom if it is working" [T1 Joseph].

However, they noted that many opportunities were inherent in the adoption of OERs in the classroom. A key opportunity was the ability to reduce costs for the students by obviating the need to buy expensive textbooks and/or materials. However, they mainly discussed costs in general terms; they did not mention any specific cost reduction needs or particular significant costs in their teaching contexts. Besides cost reduction, they mentioned that OERs allow teachers to customise and differentiate materials. In general, the teachers thought that OERs could be retrieved and modified to fit their teaching and learning purposes because they could "decide when to update, what to update, and perhaps what to delete". William [T7] expressed a common sentiment: "I feel more in control of the content I'm teaching." As previously mentioned, the idea of customisation seems closely related to the theme of students' needs because teachers generally customise materials for their students.

Another interesting theme was that teachers believed that the differences between OERs and traditional educational materials in terms of delivery (e.g., interactive online pages vs static PDFs) and country of origin (e.g., materials from U.S. universities) could motivate students to learn more effectively. For example, when teachers assign OERs designed in other parts of the world, students "are more motivated as they can see what students are doing in other countries" [T5 Julie]. This was an unexpected theme and deserved further discussion. Overall, the teachers were optimistic about adopting OERs, while they seemed more pessimistic about their ability to develop OERs.

14.4.3 Themes Affecting Open Educational Resource Development

The teachers tended to believe that developing OERs takes more time than they are provided. It takes "time and effort" to develop these materials, Bob [T9] said, and "it is not just, 'let's do this'" [T11 John]. The participants also did not feel that they had the skills needed to develop OERs because it requires "excellent skills to develop quality materials" [T8 Anna], and it is "very time-consuming and challenging to figure out different activities" [T9 Bob]. Some participants also related this theme to technology because they were unfamiliar with the technical skills needed to develop meaningful OERs. This may include the technical skills to develop an interesting activity that can allow learners to engage meaningfully with an OER (e.g., the interactive feature of an e-book). A noteworthy idea that emerged from the data was that the challenge of developing teaching materials was not exclusive to OERs. One respondent said explicitly that the challenges inherent in developing OERs "were no different" from those associated with developing traditional materials [T4 Alexandra].

14.5 Discussion

14.5.1 Features of OERs in EAP

While the key purpose of this study is to examine the opportunities and challenges in OER adoption and development, the materials identified as OERs by EAP teachers also deserve attention. Most EAP teachers in the current study described OERs as online materials, including MOOCs, SPOCs, and online worksheets. Some common types of OER—such as e-textbooks (see the lists of OERs in Allen et al., 2015; Choi & Carpenter, 2017; Croteau, 2017)—were seldom mentioned. The EAP teachers in the current study may be accustomed to using OERs developed for EAP courses, such as YouTube videos and the MOOCs/SPOCs created by the unit at the research site. Students in this course are offered PDF notes for free, and no textbook is required.

Furthermore, most teachers have access to online materials that they can freely adapt for their students. This process aligns with the concept of OERs as defined by the OECD (2007) and UNESCO (2002), which is explained in greater detail in the introduction of this chapter. More importantly, free resources related to EAP, including guides for referencing skills, the use of sources, and essay writing skills, are available from libraries and other reputable institutions (such as the Purdue OWL Writing Lab). Therefore, EAP teachers are used to considering all open online materials to be OERs. The ready availability of OERs in the EAP context seems to be related to the participants' perceptions of challenges and opportunities, which are discussed in the following section.

14.5.2 Challenges and Opportunities of Using Open Educational Resources in English for Academic Purposes

14.5.2.1 Cost-Savings

The participants in our study considered cost savings to be a strength of OERs but found them less critical than teachers in non-EAP contexts (Belikov & Bodily, 2016; Fischer et al., 2015; Tillinghast et al., 2020). This can be considered a potential opportunity for using OER in EAP. A possible explanation for cost savings is that the participants already have access to OERs for the EAP course they teach, including PDF notes and more than 90 videos on a YouTube channel tailor-made for the course. The library also offers EAP materials, such as referencing guides. Thus, EAP students usually do not need to rely on OERs because they have access to a sufficient number of free materials. This may explain why the teachers in our study considered cost savings a benefit but not a critical one.

14.5.2.2 Customisation

However, the teachers in the current study repeatedly mentioned the importance of finding and repurposing OERs to meet their students' needs, which provides both challenges and opportunities. For example, when teachers explain the mechanics of referencing in an EAP context, they may consider whether an open-access online video on academic referencing can help them achieve their key objectives. While customisation has been reported as a benefit of OERs in this study and other studies (e.g., Padhi, 2018), our findings suggest that there is so much material available that teachers' focus has shifted to identifying appropriate materials and determining how to repurpose them. For example, a simple search for academic writing yields a range of resources—including videos, PDF guides, and websites—published by reputable sources such as the American Psychological Association (https://apastyle.apa.org/), the BBC (https://youtu.be/LEi8Cs2z0Q4), SAGE Publications (https://uk.sagepub.com/en-gb/eur/mastering-academic-writing), The Hong Kong Polytechnic University (https://literacy.elc.polyu.edu.hk/), The University of British Columbia (https://scwrl.ubc.ca/) and Griffith University (Australia; https://www.griffith.edu.au/library/research-publishing/academic-writing). Choosing which materials to repurpose can be challenging when there are so many reliable sources.

14.5.2.3 Copyright

The participants also raised the possibility that they could run into copyright issues when designing materials to meet their students' needs. Discussions of copyright issues in previous studies of other disciplines (e.g., Kaufman & Campana, 2019)

mainly concerned OERs in general and did not address the need for copyright-free images. Although copyright-free images are available in the engineering context (e.g., illustrations of engineering processes), finding copyright-free images for EAP is not easy. Using images affects students' interest, motivation, satisfaction, and engagement (Cooney, 2017; Rowell, 2015). Therefore, this is an issue specific to meeting the needs of EAP students.

14.5.2.4 Time and Skills Needed for OER

Additionally, teachers struggle to attain the resources needed to develop OERs, including time, skills, and technology. They want to ensure that their materials meet their students' needs but feel they are not equipped to do so. Jung et al. (2020) stressed that financial and human resources are needed in OER development, which is reinforced by our study. Even though the participants had experience with MOOCs and the open online materials embedded in the course, they would still require training and support to develop materials. This suggests that the "initial OER" stage described by Jung et al. (2020) can be quite extensive. Furthermore, it can not only involve developing OERs but also locating and repurposing them for individual classes. Therefore, providing resources for OER development and adoption should not be a short-term but a long-term process.

14.5.2.5 Differences from Traditional Materials

Another interesting theme that emerged from this study was that OERs could demonstrate how institutions around the world introduce content. Past studies reported that participants (students and teachers) perceive OERs to be of higher quality than traditional teaching materials (Everard & Pierre, 2014; Hilton et al., 2013; Jhangiani & Jhangiani, 2017). Similarly, EAP teachers in the current study reported that using EAP materials from other countries, such as the United States and the United Kingdom [T5 Julie], can motivate students. They can see what students at other universities are learning and compare themselves to these students. For example, if students are taught how to format citations using worksheets designed by their teacher, they may view the task as a course requirement. However, if they are given worksheets developed by a reputable university, they realise that the formatting is required internationally and be motivated to learn. This perspective on quality is a valuable observation not previously reported in the literature. Integrating international OERs can positively impact student satisfaction and engagement by increasing investment, commitment, and participation in EAP courses (Cooney, 2017; Rowell, 2015).

14.5.2.6 Accessibility and Customisation

Accessibility remains a crucial concern of teachers who adopt OERs. Additionally, as reported in this study and previous research, customisation is key to the successful use of OERs (Kaufman & Campana, 2019). Therefore, it is unsurprising that our participants stressed the importance of two aspects of accessibility: access to resources and the ability to modify them. In terms of access, they indicated they needed to check that the resources they used remained available over the term. The "broken link" issue, previously reported by Kaufman & Campana (2019), is important because teachers want to identify materials that they can use routinely (Wiley et al., 2014). Regularly checking links requires time and effort (Mtebe & Raisamo, 2014), which decreases the likelihood that instructors will adopt OERs. Issues with accessibility are universal and not specific to EAP. When systems are updated, older HTML or JavaScript codes used on certain OER pages cease functioning. For example, Flash-based materials were once favoured because they allowed interactivity and animation, but Adobe Flash Player is no longer supported (Adobe, 2021). Therefore, teachers who rely on Flash-based learning materials can no longer use them and must locate new resources.

Furthermore, challenges with accessibility can be a push factor for the development of OERs. EAP teachers in this study, like teachers in other disciplines who participated in previous studies, said that OERs must be adaptable (Wiley et al., 2014). However, many OERs are PDFs, which cannot be edited easily. For example, a teacher who wants to include examples of IEEE or Vancouver style references to a PDF about the APA referencing style may be forced to add a sticky note to the file, which is not reader-friendly. Therefore, making PDF files editable could be considered a potential avenue for OER development.

A similar theme emerged when the teachers described the need to develop OERs or modify them for online delivery during the COVID-19 pandemic. Traditional PDF documents were not interactive and could not be delivered effectively using the Share Screen function on Zoom. This challenge was not identified in studies conducted before the pandemic, but it points to another challenge related to PDF-based OERs. The teachers believed that PDF materials must be improved to facilitate online delivery. This suggests that, in addition to other push factors reported in previous studies (e.g., cost savings; Belikov & Bodily, 2016), the pandemic helped teachers develop OERs for online teaching and learning.

14.5.3 Limitations

Despite our efforts to ensure the reliability and validity of this interpretative research, several limitations deserve the reader's attention. First, the authors believe that the sample was representative. However, teachers at the research site are exposed to a range of OERs, including MOOCs and YouTube channels. Thus, they may better understand OERs than many other teachers. That could affect the generalizability of

this study or its applicability to other contexts. Second, this study adopted a proper quality assurance mechanism to ensure the validity of the coding process, but the process is inherently subjective. As the nature of an interpretative study is to examine the evidence—in this study, interview transcripts—from a subjective perspective, the researcher is part of the data analysis process. Moreover, coding can be understood as a subjective construct, which could affect the reliability of the current study.

14.6 Implications and Practical Suggestions

This section provides suggestions for EAP practitioners and researchers related to advancing the OER movement. They rest on the thematic map (Fig. 14.1) presented in the previous section. As shown in Fig. 14.2, we suggest (1) a course-based material repository, (2) professional research on necessary resources, (3) multidimensional training, and (4) continuous research.

14.6.1 Building a Course-Based Open Educational Resource Material Repository

This study suggests that there are sufficient OER resources in the EAP context, but teachers have accessibility concerns that reduce their willingness to use them. To

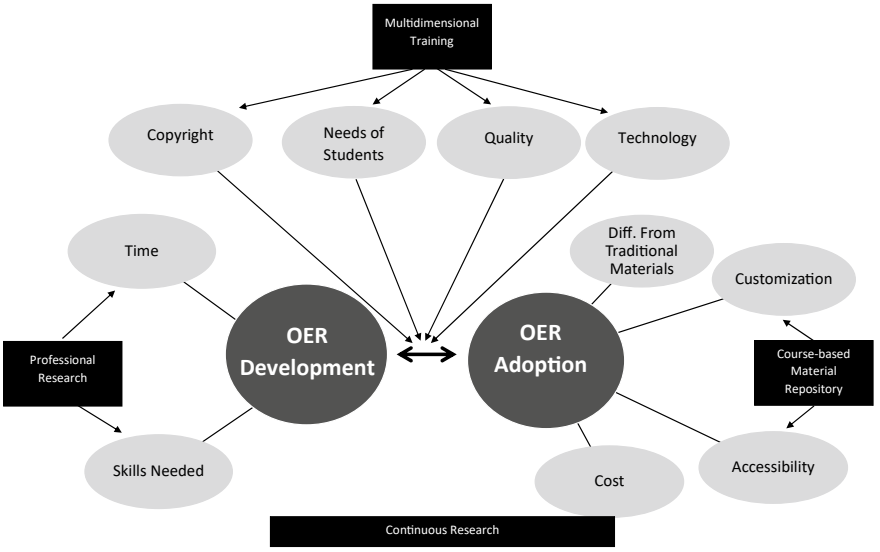

Fig. 14.2 Illustration of relationships

address this issue and allow for the efficient use of OERs, course designers could establish an OER repository. This could be as simple as a shared spreadsheet with a list of resources or a sophisticated webpage with a search function. For example, an OER repository of writing resources has been established by another project at the research site; it includes PDF-based worksheets and interactive online activities (Foung & Lughmani, 2019). These resources are stored in a searchable repository (see https://literacy.elc.polyu.edu.hk/) so language teachers and discipline teachers can search for what they need for their lessons.

Regardless of the form they take, such repositories should contain lists of materials that could be used in particular EAP courses. Each entry should include the title, topic, purpose, developing institution, required time, and a link to the relevant OER. Teachers could add, update and remove entries to keep the list up-to-date. In addition, there could be an auto-generated date of the last update (i.e., the last time the entry was edited) and a function that notifies users when an entry is deleted or updated.

Such repositories could reduce the time needed to locate appropriate resources. Any teacher on the team who identified or adopted an OER could add it to the repository based on their experience using it. Other teachers could consider adopting the OER based on the developing institution and the needs of their students, two of the keys to adoption discussed in this study. If this teacher could not locate the resources using the link, they could delete the entry and teachers who had signed up for notifications would be notified that the materials were no longer available, saving them from having to check the link themselves.

The authors would like to emphasise that the form of the repository is unimportant. The value is the time saved when team members can choose from resources recommended by their colleagues rather than searching through the vast pool of material on the Internet. However, a notification feature related to updates and changes in the availability of resources could lead to greater efficiency.

14.6.2 Professional Research on the Development of Materials

This study provides strong evidence that teachers do not have enough time and support to develop OER materials. Although an extensive training plan needs to be developed, as discussed in the following section, administrators must also be convinced to provide teachers with sufficient time and training. One possibility would be to develop a research programme to examine the time and resources needed to develop course materials. Previous academic research has focused on the process of curriculum development (Zhadko & Ko, 2019), but insufficient research has been conducted on material development. Unlike research intended to advance knowledge about OER (discussed in a later section), this line of professional research would provide empirical evidence that could be used to persuade administrators to provide more resources for material development. A practical example of relevant

professional research would be to recruit individuals who create OER materials and conduct interpretative and longitudinal interviews with them. These interviews could explore their needs, feelings, and challenges at various stages of development (e.g., being assigned the task, meeting with team members, developing drafts, receiving feedback, revising and finalising materials, and introducing them to team members). Such empirical studies could provide evidence to present to administrators regarding the time and resources required to develop OER materials.

14.6.3 Multidimensional Training Activities

In addition, we found that the participants in our study had not received enough training to develop OERs. As well as resources, teachers need targeted training. Training sessions could be provided in three areas: (1) the development of teaching materials for classroom use, (2) the development of OERs, and (3) the adoption of OERs.

Training teachers to develop general teaching resources falls outside the scope of this paper but does affect the development of OERs. Most teachers in the current study perceived the development of OERs to be accompanied by unique challenges. However, this is a contextual issue. The teachers in the current study were accustomed to developing materials for the use of an entire team (i.e., standardised notes for use across different sections of a course). This may not be common in all contexts because some institutions do not have standardised notes (or even assessments) for all sections of a course; teachers only develop materials for their classes. Therefore, these teachers may need training on developing materials for team use, as this skill is a prerequisite for the effective development of OERs. These sessions could address the stages of development, what to include to ensure effective communication with other teachers, and how to address issues raised by stakeholders. While these training topics would be relevant to teachers in the EAP context, they could also prepare teachers to develop OERs for delivery in various contexts.

Beyond this basic training, specific training on the development of OERs could address various issues identified in the current study. First, training sessions should provide information about copyright regulations and suggest websites that host copyright-free images. Second, they should inform teachers about simple forms of technology used in OERs. Third, they should give teachers hands-on experience developing simple activities using PDF-based worksheets. These sessions should not focus on conventional topics, such as developing a quiz on the learning management system or simple instructional programmes such as *Kahoot!* Instead, teachers should gain hands-on experience using basic HTML to develop quizzes and learn about websites that provide helpful HTML and JavaScript source codes. This would prepare them to develop standalone OERs independently.

Teachers should also be provided training on the adoption of OERs, even though most of them understand the general concept. First, they should be introduced to copyright issues that can arise when adopting materials. They need to know, for

example, whether they are free to use an OER if they simply cite the source. Furthermore, instructors must be empowered to understand technologies that enable them to customise materials. For example, they could be taught how to convert a PDF file into an editable file or use an HTML page in the face-to-face classroom. While these simple technological issues are covered in workshops on Adobe Acrobat and webpage design, teachers need these specific skills (rather than the whole suite of skills related to Adobe Acrobat) when adapting materials. These workshops could reduce the effort required to modify OERs and thus increase teachers' motivation to do so.

14.6.4 Continuous Research on Open Educational Resources in English for Academic Purposes

This section describes potential avenues of research that could contribute to the promotion of OERs. The continuous research described in this section would be aimed at developing OER in general and be relevant to all aspects of the themes described. It is vital to examine students' needs in the development and adoption of OERs and how teachers and material developers perceive them. Research conducted in the traditional classroom provides evidence on best practices related to developing effective and engaging materials, but developers of OERs must consider the diverse needs of students in different cultural contexts and disciplines. This line of research could help the academic community rethink the development of materials for OER purposes.

Further cross-disciplinary research is also needed to examine sociotechnical issues related to OERs. This line of research should be conducted with computer scientists specialising in system development and maintenance. Potential research problems could include finding a compromise between software updates and compatibility with OERs. For example, both Drupal and WordPress have undergone software updates, and more research can be done on how system administrators address the compatibility issues of these systems. Research could also focus on best practices in designing sustainable materials from a system compatibility perspective. These lines of research would allow practitioners to reduce sociotechnical issues, such as accessibility, in developing and adopting OERs.

14.7 Conclusion

This study examined the challenges and opportunities of developing and adopting OERs in EAP courses at a Hong Kong university. We adopted an interpretative approach and interviewed EAP teachers on their perspectives. Although teachers believe it is essential to address students' needs through the customisation of

OERs, they have concerns about accessibility, time, and skills. To better foster the advancement of the OER movement in the EAP context, these issues could be addressed by providing multidimensional OER training activities, establishing a course-based OER material repository, and implementing research on OER design. These methods would allow EAP practitioners to develop and adopt OERs more easily and effectively.

This study makes an important contribution to the body of knowledge related to the OER movement. First, the evidence presented in the current study provides a vivid picture of how teachers in the EAP context adopt and develop OER materials, issues which have been little examined in earlier studies. Second, as well as providing broad recommendations for the direction of future research, this study makes specific and practical suggestions that can be easily adopted by EAP practitioners or teachers in other disciplines. Third, while previous studies have presented solid evidence about the perspectives of teachers and other individual groups of stakeholders, the evidence and suggestions discussed in this study aim to connect the views of these different stakeholders (e.g., teachers, administrators, and course leaders) to better support the development of OERs.

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