



**Adoption and development of OERs and practices  
for self-directed learning: A South African  
perspective**

**Vol 4, 2023**





Official publication of the Unit for Distance Education  
Faculty of Education  
University of Pretoria  
Web address: <https://upjournals.up.ac.za/index.php/tetfle>  
Email address: [tetflemanager@up.ac.za](mailto:tetflemanager@up.ac.za)

## **Adoption and development of OERs and practices for self-directed learning: A South African perspective**

**Geesje van den Berg**

University of South Africa

**Email:** [Vdberg@unisa.ac.za](mailto:Vdberg@unisa.ac.za)

**ORCID Identifier:** <https://orcid.org/0000-0002-0306-4427>

**Charlene du Toit-Brits**

North-West University

**Email:** [charlene.dutoit@nwu.ac.za](mailto:charlene.dutoit@nwu.ac.za)

**ORCID Identifier:** <https://orcid.org/0000-0001-7899-930X>

**DOI: 10.35293/tetfle.v4i1.4247**

## Abstract

The use of open educational resources (OERs) within the broader context of open educational practices (OEPs) has many advantages, including the potential to result in self-directed learning as students take responsibility for their learning. However, despite their vast potential, the promise of OERs has not yet translated into concrete and tangible OER adoption and development in the Global South, and specifically not in South Africa. It also seems that the flow of OERs is mostly in one direction—namely, from developed to developing country contexts. This article aims to determine what the literature reveals regarding OER adoption and development in South Africa. Within an interpretivist paradigm and a qualitative approach, we used an integrative literature review to collect data. Two large databases were consulted, and after applying the inclusion and exclusion criteria six relevant texts were found and discussed. The findings reveal that limited research is available. Furthermore, it became clear that OER planning, adoption, and development is a process and that collaboration, institutional support, and leadership play important roles in OER adoption, development, and projects. The literature also revealed that despite the benefits of using OERs there are stumbling blocks to adopting and using OERs in South Africa. Based on the findings, it is suggested that OERs for self-directed learning should advance and develop teaching and learning by supporting flexibility and openness of learning resources. In the last instance, ongoing research on the state of OER adoption and development is needed to grow the use of OERs with specific reference to South Africa.

**Keywords:** open educational resources, open educational practices, South Africa, developing country contexts, self-directed learners



## Introduction

Since the 2000s, there has been growing interest in open educational resources (OERs).<sup>1</sup> This ever-increasing interest addresses complex encounters in education. Research shows that adopting OERs inspires educators who want to transform education and students' learning experiences (Ingavélez-Guerra, Robles-Bykbaev, Teixeira, Otón-Tortosa & Hilera, 2022; UNESCO, 2016). To transform teaching-learning, educators need to change to more active teaching and learning methods in their learning environments through openness and flexibility. OERs have the potential to encourage, motivate, and support autonomous (independent) thinking through active learner-centred learning where students can decide where, when, what, and how they study. Therefore, implementing OERs in the learning environment is linked to the broader idea of open educational practices (OEPs).

OEPs are an all-encompassing signifier of practices comprising the construction and implementation of OERs, open pedagogies, and sharing teaching-learning practices (Koseoglu & Bozkurt, 2018). They embody teaching-learning methods that focus on open education (Cronin & MacLaren, 2018), participatory technologies, and OERs to direct collaborative and self-directed learning (SDL),<sup>2</sup> thus, active learner-centred learning. The aim of OEPs is to embrace (a) construction, management, and implementation of OERs; (b) cultivation and employment of active open pedagogies; (c) gaining of access to open learning opportunities; (d) open access to publication, where teaching ideas and OERs can be shared; and (e) implementation of open and available technologies in a teaching-learning environment (Bellinger & Mayrberger, 2019; Cronin, 2017; UNESCO, 2016). In OEPs, educators, students, and the community are co-creators of teaching-learning using shared OERs. As a result, learning activities in OEPs are more likely to be student-centred. Thus, in learning activities in OEPs, there is a shift away from teaching-orientated models towards

---

<sup>1</sup> OERs 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, 2019:5).

<sup>2</sup> For the purposes of this article, the concept of SDL is regarded as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes" (Knowles, 1975:18).

learning opportunities where students are engaged in more meaningful ways. OEPs have an impact on various stakeholders. Students can benefit from OEPs by using knowledge and skills in a broader setting than just their learning programme. Freedom of access and greater opportunity for meaningful self-directed and social learning exist.

OERs are imperative, as having learning materials openly accessible allows educators and students at higher education institutions (HEIs) to use learning materials that they otherwise would not be able to afford (Bali, Cronin & Jhangiani, 2020). In open pedagogies, OERs can include complete learning programmes, open learning materials, modules, learning objects, textbooks, openly licensed videos, assessments, learning software packages, and procedures and methods that can be implemented to support access to knowledge. We believe teaching-learning is strengthened and supported when knowledge, skills, and values are openly shared. This is confirmed by Cronin (2017), DeRosa and Jhangiani (2017) and Jhangiani and DeRosa (2018). As a consequence of OER, in this era of information richness, SDL has more significant prominence. Students need more autonomy over their learning, specifically in online learning environments. As a result, students need more opportunities to learn and, in the process, gain a sense that they are free to learn when and where they feel the need.

We believe that OEPs seek to reject teacher-centred teaching-learning methods and approaches in learning environments where the focus is on students being unknowledgeable and educators being knowledgeable and that, instead, OEPs value learning environments where students and educators are co-creators of knowledge, through collaboration and reflection (Brown & Croft, 2020; DeRosa & Jhangiani, 2017; Jhangiani & DeRosa, 2018). For students and educators to be co-creators of knowledge, educators need to provide a safe learning space for students to give their voice and to be able to play a role in the creation of knowledge. Students must be invited to self-direct and shape their learning and thoughts in such an open learning space. Open learning spaces need to acknowledge and comprehend the importance of SDL and, by implication, students' agency, where students need to concentrate more on decision-making as a directing drive in this safe learning space. For students to be invited to self-direct their learning, they need to have the opportunity in these learning environments to be empowered with SDL skills to support them in adjusting to different learning environments—thus, being able to take more control of their learning and think about what successful learning is about, think critically, and implement self-reflection and SDL skills. Consequently, OEPs must be a safe



learning space where students and educators can co-construct and co-author learning materials, skills, and resources (Nienaber-Rousseau & Du Toit-Brits, 2022).

Last, OEPs provide the opportunity to learn how students and educators can be more vigorously and enthusiastically engaged in the OER cycle. Therefore, HEIs need to foster OEPs, increase the quality of educational practices, and establish an environment for the development and use of OERs. Informed by various sources, we postulate that a prerequisite for OEPs is a collaboration between stakeholders, the HEI, and OERs.

## **The Need for OER Adoption in South Africa**

Most of the research conducted on OERs has been done in the Global North. A recent systematic mapping of OER literature by Otto, Schroeder, Diekmann, and Sande (2021) showed that while most OER research conducted between 2015 and 2019 came from North America (37,3%) and Europe (18,8%), only 7% from Africa. They raise the point that it is striking that only a few empirical studies are available for areas such as the African continent which is often considered to be the significant profiteers of OER. Most of the studies in their research focussed on adopting and using OERs; these studies appeared stable and slightly increased over time. The studies mainly concentrated on lecturers' and teachers' creation and evaluation of OER and rarely by students (e.g. Schuwer & Janssen, 2018; Hassan, Rahaman, Sumon, & Dewan, 2019). Other topics were attitudes and perceptions towards OER, learning outcomes achieved with OER, OER's effectiveness, infrastructure studies, quality of OER materials, strategy, barriers, and incentives and motivation for using OER. Most of these studies were conducted in higher education (71%) followed by only a few in schools (14%) and the rest in various other education environments (Otto et al., 2021).

By contrast, referring to OER adoption in Africa, the systematic literature review of Tlili et al. (2022) indicated limited studies on OER adoption in Africa. These studies focussed on the creation process and challenges within the African context, including culture, language, and personality. African countries differ widely in terms of their cultural and socioeconomic approach to education and the accessibility of educational technologies. These differences are visible in adopting OER in different countries on the continent. In 2014, Seychelles was the first African country to acknowledge OER nationally to improve access to quality materials. This adoption

followed two years after the Paris OER Declaration during the World Congress in 2012 (UNESCO, 2012). In 2017, Nigeria adopted a national OER policy for higher education.

Furthermore, institutions have their own OER policies and repositories, creation, adoption, and use of OER, such as Botswana Open University, Africa Nazarene University, Kwame Nkrumah University of Science and Technology, the National Open University of Nigeria, the University of South Africa, and the University of Cape Town (Tlili et al., 2022). Their research lets Tlili et al. (2022) to suggest the need for further investigation beyond the mere creation of OER. Specifically, they recommend focussing on adoption, dissemination, and addressing cultural and policy issues and strategies to overcome challenges.

OERs are considered supportive in under-resourced countries, often considered in the literature to be the primary beneficiaries of OER (King, Pegrum, & Forsey, 2018). They provide the opportunity to decolonise curricula by offering adaptable (learning) resources. The need for OER adoption and implementation is increasing worldwide due to international organisations' encouragement. It has become evident that implementing OERs in the African context, specifically in South Africa, is much needed (Olivier, 2021; Tlili, Altinay, Huang, Altinay, Olivier & Mishra, 2022). Indeed, UNESCO (2016) encourages and promotes the broader use of OERs in this context.

Developing OERs aims to ensure all-encompassing and quality education to encourage lifelong learning. It has been seen as an unstoppable development since the Massachusetts Institute of Technology (MIT) published its first educational resources online in 2001 (Mulder, 2011). However, despite their vast potential the promise of OERs has not yet translated into concrete and tangible results in the Global South, specifically in South Africa. It also seems that the flow of OERs is mostly in one direction, namely, from developed to developing country contexts (Kanwar, Kodhandaraman & Umar, 2010). Leeds (2013) confirms this when he states that because of the initial costs of OER production, developing countries tend to be consumers of OERs created in developed country contexts. This is problematic, as local creation, adaptation, and contextualisation of content are vital for OER development (Babini, 2012; Kanwar et al., 2010).

Despite the slow adoption of OERs in the Global South, growth is evident in portals such as OER@AVU, OER Africa, AfriVIP, and TESSA (Cox & Trotter, 2017). Furthermore, governments have a critical role in setting the scene for OER

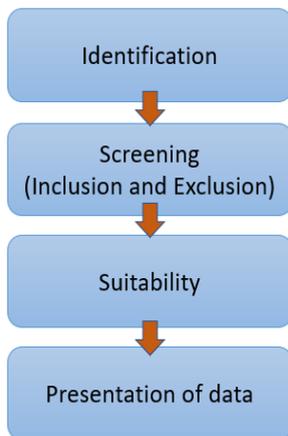


development and uptake in implementing policy and practice that supports such initiatives (Kanwar, 2011). For example, in South Africa national policy developments have supported OER initiatives such as the Department of Higher Education and Training's recommendation for the widespread use of OERs (DHET, 2013).

Despite these developments, several studies indicate that OER development, uptake, and impact vary, and generally engagement with OERs remains low in Africa, specifically in South Africa (Cox & Trotter, 2017; Samzugi & Mwinyimbegu, 2013; Tlili et al., 2022). Additionally, given that OER development is a relatively new practice in that OERs constitute just a fraction of the total number of educational materials created and used by academics, Cox and Trotter (2017) argue that there are still considerable gaps in the range of subjects covered by OERs. For these reasons, we deemed it necessary to learn more about research on the development and uptake of OERs in South Africa. The following research question guided our research: "What does the literature reveal regarding OER adoption and development in South Africa?"

## Methodology

We used an interpretivist paradigm and a qualitative approach to address the research question. The latter is seen as a suitable approach in the social sciences to accumulate and interpret non-numerical data (Mohajan, 2018). In addition, we conducted an integrative literature review to investigate the phenomenon of OERs in terms of its uptake in South Africa. Whittemore and Knafl (2005) define an integrative literature review as a review that uses different data sources to enhance a better understanding of the topic of interest. Snyder (2019:335) explains that the purpose of an integrative literature review is to "assess, critique, and synthesise the literature on a research topic in a way that enables new theoretical frameworks and perspectives to emerge". In the process of selecting literature, Whittemore and Knafl's (2005) proposed stages for conducting an integrative literature review were used. These stages are depicted in Figure 1.



**Figure 1:** Flow chart of the stages for conducting a literature review (adapted from Whittemore & Knaf, 2005)

To identify relevant literature on the adoption and use of OERs in South Africa, we consulted EBSCOhost and Google Scholar, two large databases of scholarly literature (Tlili et al., 2022). We used the keywords “OER”, “open educational resources”, and “South Africa”. EBSCOhost (an education source) returned 32 citations, and Google Scholar returned 57 citations. To narrow the search, we screened the texts by reading the titles and abstracts to determine if the texts were suitable for inclusion. Our inclusion criteria were a literature that reported on OER projects or OER adoption in education at all levels. We excluded duplications and texts that were not fully available online. Last, we excluded texts that reported on policy and funding matters and research on collaborative projects between South Africa and other countries. We were interested in the state of OER adoption, specifically in South Africa.

## Findings

After considering the inclusion and exclusion criteria, six texts from peer-reviewed scientific journals and books were identified. All these texts reported on the state of OER adoption or OER projects in South Africa, initiated and managed by South



Africans. Five texts had a higher education context, while one reported on an OER project in a school context. Five of the six texts were articles and one was a book.

The texts that were selected for analysis and discussion of OER initiatives are indicated in Table 1 in alphabetical order according to the authors, and these will be discussed next.

<b>Table 1: Selected studies on OER initiatives in South Africa</b>			
<b>Author(s)</b>	<b>Year of publication</b>	<b>Title of the article and journal or book</b>	<b>Institution(s)/ organisation(s) involved</b>
De Hart, KL, Chetty, YB & Archer, E	2015	“Uptake of OER by staff in distance education in South Africa” <i>International Review of Research in Open and Distributed Learning</i>	University of South Africa (Unisa)
Hodgkinson-Williams, C & Paskevicius, M	2012	“The role of postgraduate students in co-authoring open educational resources to promote social inclusion: A case study at the University of Cape Town” <i>Distance Education</i>	University of Cape Town (UCT)
Jimes, C, Weiss, S & Keep, R	2013	“Addressing the local in localisation: A case study of open textbook adoption by three South African teachers” <i>Journal of Asynchronous Learning Networks</i>	High schools in KwaZulu-Natal
Keats, D	2009	“The road to Free and Open Educational Resources at the University of the Western Cape: A personal and institutional journey” <i>Open Learning: The Journal of Open, Distance and e-Learning</i> ,	University of the Western Cape (UWC)
Olivier, J, Du Toit-Brits, C, Bunt, B & Dhakulkar, A	2022	Contextualised open educational practices: Towards student agency and self-directed learning <i>Peer-reviewed scholarly book</i>	North-West University (NWU)
Sapire, I & Reed, Y	2011	“Collaborative design and use of open educational resources: A case study of a mathematics teacher education project in South Africa” <i>Distance Education</i>	South African Institute for Distance Education (SAIDE), different tertiary institutions

As indicated in Table 1, the study by De Hart, Chetty, and Archer (2015) at the University of South Africa (Unisa) determined the uptake of OERs by its academic and professional staff members to gather information for future planning at the university. This was a follow-up study on earlier research to establish the feasibility of initiating OERs at Unisa. The authors indicate that Unisa has matured since the earlier research. At the time of their study in 2015 it had an approved OER strategy, and its OER initiative was led by an OER coordinator (De Hart et al., 2015). In addition, the university management has given strategic direction by recognizing that openly licensed content can contribute to the quality of its students' teaching and learning experience. It should therefore be integrated into mainstream institutional processes. However, OER integration in learning environments must occur at the university to achieve this goal.

For this reason, a survey was used to determine staff members' knowledge of OERs, intellectual property and licensing, participation in OERs, and barriers to OERs in the institutional context. There were 483 respondents in the survey. The results showed that, as an institution, there had been a progression through the stages of adoption (based on Rogers' five stages of innovation adoption) but that progress has been slow (De Hart et al., 2015). The results further revealed that staff had good knowledge and understanding of OERs, which indicates some success for the OER initiative at the institution. In addition, it shows a level of maturity regarding OER adoption.

However, knowledge of intellectual property and licensing was limited, which could in turn prevent the effective implementation of OERs. Staff members participated in OERs mostly by revising and remixing OERs and developing their own. Barriers related to the lack of adequate ICT infrastructure and difficulty finding quality or suitable OERs. Regarding OERs at Unisa, the highest value of OERs was placed on their potential to increase collaboration within Unisa and internationally. Respondents also agreed that OERs aligned well with the academic tradition of sharing knowledge and helping to enhance the quality of teaching and learning. The study recommends that institutions determine the impact of OER initiatives and how both institutions and staff mature through various phases in the uptake of OERs to guide further planning, decision-making, and implementation (De Hart et al., 2015).

Hodgkinson-Williams and Paskevicius's (2012) study reports on the role of postgraduate students in co-authoring OERs and how this includes social inclusion.



Social inclusion in this context refers to optimising OER use for non-University of Cape Town (UCT) students in general and for black African students and/or lecturers. In joining the OER movement, UCT has created an OER directory (OpenUCT) where academics can share their teaching and learning materials. In the planning process of this specific OER project, the Centre for Educational Technology (CET) and the UCT Faculty of Health Sciences drew heavily on the University of Michigan's described process. The OER process involved postgraduate students working collaboratively with lecturers to review existing materials for broader applicability and to identify content that needed to be removed, replaced, or referenced. The students were involved in permission, licensing, and uploading of material. During the interviews with the students, they indicated how they have made the material more inclusive—for example, by removing context-specific content or making content available in more languages besides English. Postgraduate students further assisted lecturers in adding activities that the lecturers did not have time for or did not have the needed expertise or interest. The students used a far more comprehensive range of mediating artefacts than the academics such as YouTube videos, slides hosted on SlideShare, and PowerPoint slides to adapt or create teaching materials. They argued that lecturers were often hesitant to post material on open platforms. The students assisted in using appropriate tools, adding metadata, and sharing the OERs on platforms that make public access to the materials possible (Hodgkinson-Williams & Paskevicius, 2012). A significant finding from the study was a growing sense of agency, as students initially only removed dates from existing assignments, but were later adapting and creating text, removing irrelevant content, and providing academics with new ways of developing OERs. The study concludes by stating that because of the contribution postgraduate students can make to OER creation, it would be a pity not to include them in this process.

Jimes, Weiss, and Keep's (2013) study reports on three high school teachers' adoption and use of open textbooks in KwaZulu-Natal. The study builds on previous research on the Siyavula (a Nguni word meaning "we are opening") project leading high school teachers' adoption and use of open textbooks in the province of KwaZulu-Natal. Local field experts and scholars collaboratively authored the mathematics and science textbooks in the field (Jimes et al., 2013). The teachers found the content of the textbooks to be of a higher quality than that of textbooks published by large publishing houses. They also found that the textbooks had localised content, with the

potential to be modified to specific classroom needs. Specifically, the study revealed the importance of content rooted in teachers' cultural and geographical contexts. Participants mentioned that the language, style, and tone of the content could be made more accessible to meet the needs of the students, since textbooks were mainly in English which is not the home language of most of the students. The findings indicate that collaborative authorship facilitated communication in improving the quality of the textbooks. This article proposes broadening the definition of localisation by moving beyond the limits of content adaptation (such as translation, editing, and remixing) to a description that considers socioeconomic diversity within a specific context.

Keats's (2009) study reports on the road to OERs at the University of the Western Cape (UWC). Inspired by the MIT OpenCourseWare, UWC developed its Free Content and Free and Open Courseware implementation strategy in 2005 (Keats, 2009). The vision of the UWC strategy is one where UWC is engaged in creating and using OERs in its everyday operations. At the time of the study, UWC had agreed to set up a server to host OERs and integrate them into its learning management system. Ideally, Keats (2009) argues that a project leader should lead the free courseware project. It is envisaged in the article that academics at UWC would be users, producers, and modifiers of existing OERs with the needed support from the institution as active participants in the global OER network (Keats, 2009). The author acknowledged that free courses would be available starting from the 2009 academic year. An important finding from this research is that the OER strategy approval and implementation process ran smoothly because the strategy was in line with the notion of freedom and the institution's history (Keats, 2009). The author acknowledged that at the time of publication the university had only published a small number of OERs and that although internal communication was still necessary the principles of OERs enjoyed widespread acceptance.

The North-West University (NWU) Open Educational Resources Fellowship (Olivier, Du Toit-Brits, Bunt & Dhakulkar, 2022) was an opportunity for university staff interested in creating and including new OERs in their classes or adapting their resources to their students' specific context to receive support and funding for creating or adapting open learning content as well as researching the process. The workshops and seminars that formed part of the fellowship included presentations by international and South African experts on open pedagogy, open practices and



social justice, open licensing, research OERs and OEPs, ubuntu, student advocacy and professional development, open textbooks, open-source authoring tools, OERs and quality frameworks, as well as exploring OERs using the COUPE (cost, outcomes, use, perceptions and engagement) framework.

A few of the NWU OER Fellowship research initiatives are captured in the text of Olivier et al. (2022). This includes the contribution of OERs to quality education, localising self-directed OEPs, and developing multilingual philosophy glossaries that focus on socially just pedagogical praxis. Another initiative focuses on designing an OER as part of a technology-enhanced practice environment that develops beginner language learners' oral interactional competence. Also included in the research initiatives are decolonising the journalism curriculum by co-creating an OER textbook with students, creating OERs in a music education module, and developing an OER as part of an interprofessional collaborative learning opportunity. Other initiatives include the development of an OER game as a tool to create awareness of infectious diseases and the development of a framework for an inclusive educational learning environment using a decolonial approach.

In the final article, Sapire and Reed (2011) report on the collaborative design and use of OERs by mathematics teacher educators. Because of the poor performance of learners in mathematics across the South African school system, the South African Institute for Distance Education (SAIDE) took the initiative to design an OER. It was intended for face-to-face and distance teacher education courses in mathematics and used in other applicable contexts (Sapire & Reed, 2011). In this project, 15 mathematics teacher educators from nine tertiary institutions worked collaboratively and valued the creation of a community of practice. They spent two years adapting existing materials and piloting and revising them. According to Sapire and Reed (2011), the collaborative process resulted in a more constructivist orientation to learning, more careful attention to the scaffolding of activities, and more applicable mathematics content to include all learners—also those with special needs. The OERs consisted of six units and were made freely available as print-ready materials for teacher educators to download and use at their respective institutions. A community of practice was established during this ACEMaths project, where participants could identify common problems, share ideas and experiences, explore new possibilities, and create new products. The authors found that the uptake was higher when there was institutional support for using OERs, specifically at the management level. Also,

at institutions where lecturers could work more autonomously, they were more likely to use and adapt OERs. Finally, Sapire and Reed (2011) argue that expert-led, collaborative, localised course design has the potential to achieve quality, cost-effective, and multiple-use resources. Although the module led to better and more open ways of teaching mathematics, this community of practice became inactive and the project was conceived of as a project of limited duration.

## Discussion of the findings

The study reviewed available articles on adopting and developing OERs in South Africa, from which several significant findings emanated.

First, when looking at the number of South African studies, it is clear that more research is needed on the state of development and adoption of OERs in South Africa. This finding is confirmed in several studies on OERs in South Africa (e.g., De Hart et al., 2015; Tlili et al., 2022). Although the findings confirm that OER initiatives are taking place, that they develop and mature, and have advantages and challenges, ongoing research is needed. Documenting such processes and sharing the research with the local and international community could assist institutions when planning, sharing, or designing OERs.

The reviewed literature further highlighted that OER planning and implementation is a process, with the staff and institution moving through various growth and maturity phases (De Hart et al., 2015; Keats, 2009). Therefore, collaboration is critical when developing OERs. While it is undoubtedly possible for individual lecturers to create and develop their own OERs without support, collaboration which took place at different levels was indicated as highly valued when developing OERs (De Hart et al., 2015), and it enhanced both the quality and the quantity of OER output (King, 2017). In some cases lecturers across higher education institutions collaborated to develop OERs (Sapire & Reed, 2011). For example, in OER development at UCT postgraduate students collaborated with lecturers to develop OERs. As a result, these students were seen as often having more time and technical skills than academics, bringing a different perspective to the content and improving the overall OERs. The process of involving students in OER development is supported by Olivier (2020), who argues that OER adoption implies acknowledging contextualisation and



localisation which can be done in a student-driven manner. Another collaboration model was developing open textbooks for teachers where local field experts and scholars collaborated. This collaboration aimed to create localised mathematics and science textbooks which led to higher-quality materials that could easily be adapted to different school contexts.

The critical role of institutional support and leadership was also essential for the successful uptake of OERs. King (2017) confirms that the most sustainable OER projects appear to be those supported by an institutional mandate. The articles established the need for institutional support such as policies and strategies (De Hart et al., 2015; Keats, 2009) or leadership to support and lead OER projects (Keats, 2009; King, 2017). Other examples of leadership when adopting OERs were an OER coordinator or leader (De Hart et al., 2015; Keats, 2009) or an organisation outside the institution(s) supporting and leading the project (James et al., 2013; Sapire & Reed, 2011). Worth noting is the fact that while short-term or soft-funded OER projects (see, for example, Sapire & Reed, 2011) are valuable in developing the skills and competencies required for OER production, they might only be sustainable if they have support and leadership.

The above discussion on the adoption and use of OERs in South Africa reveals several stumbling blocks which need to be considered.

## **Stumbling blocks to the adoption and use of OERs**

The literature reviewed for this research and the initiatives described above show that despite the benefits of using OERs, there are constraints, or stumbling blocks, to adopting and using OERs in South Africa. With the implementation of OERs teaching-learning has become within reach for all. However, finding appropriate and suitable OERs is still a significant stumbling block in their adoption (Lane, 2009). Establishing best practices and providing relevant training for educators can address numerous stumbling blocks. Tlili et al. (2022) offer a comprehensive list of the stumbling blocks constraining the implementation of OERs. However, this article will focus on only some stumbling blocks to implementing OERs.

Linked to the paucity of relevant research supporting the use of OERs is the general lack of awareness of the importance of OERs, a lack of motivation to implement

OERs, and insufficient training on how to develop and implement OERs. Another stumbling block is that the process of selecting OERs is not fast enough, and there are challenges in understanding OER licence authorisations. Other stumbling blocks relate to intellectual property and preparedness to distribute knowledge that can be implemented commercially. It is also time-consuming to locate and select suitable and appropriate OERs. Additionally, most OER content is stored in institutions' repositories and is decentralised. Finally, a significant stumbling block concerns technological problems such as inadequate and restricted access to computing devices. Related to this, internet access can be expensive and poor connectivity in certain areas can be a significant stumbling block (Atenas & Havemann, 2013; Ingavélez-Guerra et al., 2022; UNESCO, 2015; Wang & Towey, 2017).

There are also stumbling blocks in developing and designing OERs, as OERs can be created with the same content by various educational institutions (Ingavélez-Guerra et al., 2022; Wang & Towey, 2017). In addition, with the creation and development of OERs, the context needs to be understandable to global students or users. Another stumbling block with OERs is quality, since many OER repositories permit users to create post-learning resources. Besides the above constraints, there is an inadequate critical assessment of these learning resources (Tlili et al., 2022). Educators must have active ways to integrate the learning material into their programmes, and they must understand how OERs can transform their teaching approach. There is also widespread confusion regarding what is meant by “open”, “free”, and “no cost”, and the types of licences related to learning content. In addition, there is uncertainty about investors' approval for implementing OERs in programmes and the appropriateness of OERs in programmes (Wang & Towey, 2017).

Furthermore, although OERs are offered in numerous languages, several are only accessible and presented in English which constrains their utility for non-English speakers.

## Concluding remarks

Using OERs within OEPs, knowledge and skills are needed in choosing, adopting, and developing learning resources that can support students to become more self-directed. Given all that has been mentioned so far, one may assume that it is essential to consider



that students should gain learning responsibilities and learn diverse skills, especially skills related to SDL, when using OERs. Supporting the need to take responsibility and ownership in the use of OERs, it is essential to encourage mindfulness of SDL within OEPs, both for educators and among students, as this approach can be seen as an integrated, effective way to learn with OERs (Horn, Anderson & Pierick, 2018; Olivier, 2020, 2021). This supports creating a more meaningful learning experience with OERs for students—thus, not merely regurgitating learning content that has been memorised. Therefore, SDL can have countless applications throughout life, encouraging independence and life skills.

In this article, we believe that in OEPs active learner-centred learning,—thus, SDL—is necessary, as students must be able to know what, how, and when they will participate in and contribute to active learning activities and the use of OERs. Given the flexibility of OEPs, SDL is essential (Horn et al., 2018). It is imperative that students must be aware that they bear the primary responsibility and accountability for their learning. Consequently, educators need to consider active learning to use teaching approaches that create meaningful learning experiences in OEPs which can encourage SDL skills (Horn et al., 2018).

In addition, educators should regard their teaching approach as complementary to implementing OERs in OEPs. Integrating OERs into SDL necessitates that teaching and learning support developing students' SDL skills, thereby preparing students for autonomous learning in OEPs (Horn et al., 2018). Learning is more meaningful, constructive, and valuable when students integrate OERs into their SDL. To this end, it is proposed that implementing OER in SDL in OEPs has empowered educators and students to become more innovative in their teaching and learning via the openness and flexibility SDL offers for educators and students. With the use of OER in self-directed OEPs, independent, autonomous, and critical thinking are cultivated through the SDL process. Further, OER in SDL encourages lifelong learning opportunities to encompass deep and meaningful learning. The opportunity to implement SDL in OEPs will enable students to set and achieve learning and personal goals. With the implementation of SDL in OEPs, educators and students are supported in collaboratively creating knowledge by taking up OERs. Through SDL an open pedagogy can be cultivated for success in OEP. We further contend that with the implementation of SDL in open learning, various learning opportunities, different learning resources, confidence, and willingness to change are cultivated. Therefore, in

this article, the authors proposed that OEPs encompass SDL's fundamental principle.

Flowing from the discussions above, the authors suggest that OEPs must provide learning that engages students in constructive engagement with OERs in their learning and empowers them with effective use of OERs.

In conclusion, in this paper we propose that OERs can mediate more self-directed students with OER use. To this end, it is suggested that OERs for SDL should advance and develop teaching and learning by supporting flexibility and openness of learning resources. Therefore, we believe that OERs can be seen as an SDL instrument that can effectively build an active learning environment. In these active OEPs educators need to construct and implement OER-focused curricula for self-directed students. Then, with OER, educators can be equipped to become more innovative in their learning through openness and flexibility. But more importantly, we believe that SDL creates a better platform to transform an open learning and teaching culture, thus cultivating a culture of OER-based self-directed learning.

In addition, OEPs and OERs can fundamentally promote the capacity of educators and students for greater engagement in teaching and learning. Finally, OERs need to play a significant part in the lives of self-directed students. They can value the opportunities to learn independently and have the freedom and autonomy to discover whatever they want. This is an important reason why OERs for SDL are so powerful.

We acknowledge that, like all research, this study has its limitations. First, we have only discussed OER initiatives in South Africa and excluded collaborations between South African institutions and institutions in the Southern African region and beyond. Including these OER initiatives would have resulted in different and richer findings. Second, we only consulted two databases in our research and could have excluded South African research on OER adoption. However, despite these limitations, we trust this research will lead to more studies on OER uptake in South Africa and beyond.

## Recommendations

Based on the findings of this literature review and the advantages of OERs for students, we recommend the following: (a) that institutions and lecturers consider the collaborative development of contextualised OERs; (b) to ensure their sustainability, OERs need to be an integral part of the curriculum and should not be regarded as an



add-on or an additional resource; (c) institutions should take the lead in supporting the development and uptake of OERs by implementing relevant policy, leadership, and support.

We suggest conducting further research in the following areas based on our recommendations. First, there is a need for more research on how collaborations can be beneficial and enhance the development of OER in South Africa. Second, it is crucial to investigate how adopting OER can transform educational practices. In the last place, the role of leadership at institutional and other levels in the development of OER needs to be thoroughly researched. This research can provide valuable insights into the effective implementation of OER and help advance the field of open education in South Africa.

## Why is the theme essential?

We regarded the theme of *Rethinking flexibility, openness and lifelong self-directed learning in teacher education in emerging economies* as essential as it provides significant opportunities for educators and students to critically evaluate their pedagogical approaches, surpassing the conventional distinction between in-person and virtual instruction. Given the extraordinary disruptions brought about by the Covid-19 pandemic, the field of teacher education is faced with novel challenges that require the creation and execution of inventive pedagogical methods. To tackle these challenges, it is imperative to establish enhanced learning environments that transcend the limitations of traditional classroom settings. Self-directed learning (SDL) spaces should be designed to foster flexibility, inclusivity, and the development of lifelong self-directed learning skills, allowing students to engage in independent or collaborative work with their peers. The prioritisation of interactive pedagogical approaches is crucial, as it promotes active teaching presence and provides sufficient student support.

In the African context, it is crucial to reconsider the field of teacher education due to the fundamental importance of individuals' capacity to actively pursue lifelong self-directed learning for their success. Providing flexible and open learning opportunities is necessary to empower students to take initiative and exhibit independence in their educational endeavours. Through the adoption of self-directed learning, teacher education programmes have the potential to provide educators with the

essential abilities and proficiencies required to excel in an ever-changing educational environment.

Nevertheless, it is crucial to recognise that, notwithstanding the growing adoption of flexible and blended learning methodologies, the issue of limited access to technology and digital resources persists as a substantial obstacle, particularly in developing nations. The presence of a digital divide underscores the stark challenges experienced by individuals who do not have equal access to educational opportunities online. Therefore, emerging economies must acknowledge and tackle this disparity while formulating strategies that guarantee enhanced accessibility and opportunities for self-directed online learning.

In order to facilitate the transition of future adopters of online and distance teaching and learning, it is imperative for emerging economies to place emphasis on prioritising initiatives that seek to address the digital divide. This entails allocating resources towards the development of infrastructure, ensuring the provision of affordable and dependable internet connectivity, and fostering the enhancement of digital literacy among educators and students. In addition, it is imperative to establish and execute policies and programmes to cultivate inclusivity and guarantee equitable access to flexible and self-directed educational opportunities for individuals, irrespective of their socioeconomic status.

## Why were we interested in a special edition on this theme?

We believe that current online learning approaches direct flexibility, openness, and self-directed teaching and learning. Still, these concepts come with challenges—student access and success issues, quality, and student support. These issues need ongoing research, and we believe that the theme of this issue contributes to reflection on current practices and suggestions for necessary improvements to benefit all students. The emergence of new pedagogical approaches, technologies, learning needs, and changes in students' personal situations will constantly challenge the requirements for open, flexible, and SDL environments that provide suitable facilities and support for active student learning.

Therefore, this special issue explores the transformative potential of innovative pedagogical approaches. By embracing adaptability and autonomy, teacher education



programmes can equip educators with the skills and abilities necessary to navigate the challenges of the digital age. This volume seeks to contribute to the ongoing educational reform dialogue and encourage educators, policymakers, and researchers to reimagine teacher education to benefit emergent economies and future generations.

## **Why is this the right time to investigate the theme?**

The rapid development of information and communication technologies for diverse student bodies and growing expectations related to the need for the twenty-first century and self-directed learning called for a theme focussing on these current issues in teacher education. This is a tremendous time of opportunity and innovation, sparking endless reimagination on all teacher education levels. The unprecedented disruptions caused by the Covid-19 pandemic have highlighted the fragility of traditional educational systems and the need for innovative approaches. With the current distinct socioeconomic and infrastructural challenges, emerging economies require tailored strategies to meet the changing demands of education.

Against this background and related opportunities for research, we believe that this special edition is sharing knowledge on educational issues that affect Africa in particular, as well as similar developing contexts.

In the lead article on this issue, we investigate the adoption and development of OER and practices for self-directed learning. From the findings, it became clear that OER planning, adoption, and development are processes and that collaboration, institutional support, and leadership play important roles in OER adoption, development, and projects. We argue that OERs for self-directed learning advance and develop flexibility and openness of learning resources. In conclusion, we argue that ongoing research on the state of OER adoption and development is needed to grow the use of OERs with specific reference to South Africa.

In the second article, Ali and Koza collaborated in using a self-study to look into their practice to learn about fostering student engagement during the COVID-19 pandemic in online teaching and learning. They found that their collaborative endeavours assisted in dealing with their fears and vulnerabilities, and they noticed pertinent aspects of student engagement in online teaching. Based on their findings, they recommend that lecturers embrace collaboration in negotiating new and

challenging educational situations.

Le Hanie, Van Putten, and Botha investigate the effect of COVID-19 on inclusive mathematics education in the third article. Using a case study design, data were collected from two high school mathematics teachers before and during emergency remote teaching. Focussing on hearing-impaired learners, they found that teachers need adequate training and support when teaching hearing-impaired learners. They conclude by sharing the need for future research to determine how a pandemic and the lack of inclusive practices affect these learners' progression in mathematics.

The fourth article focuses on ICT-based pedagogy to teach English First Additional Language during the COVID-19 pandemic. Using a rural case study, Maja found that only two of the nine teachers employed ICT in remote teaching and learning. Acknowledging challenges such as support, lack of ICT knowledge and skill, lack of data bundles for internet connection, and learners' lack of digital devices, she concludes that remote teaching and learning attempts were unsuccessful. This study recommends in-service training on ICT integration in teaching and learning.

In the fifth article, Tafirenyika and Van den Berg investigate students' views on strategies for sustained learning in open-distance learning. Using an Ubuntu perspective, the findings indicate that institutions should provide sufficient learning support, conduct surveys, improve communication with students, develop a hotline, provide financial aid and psychological assistance, ensure timely delivery of study material, and explore different methods for content delivery. They argue that Ubuntu's values should be considered when drafting policy and implementing strategies to support students.

Mawonedzo, Manatsa, and Masina investigate the efficacy of teaching practicum during COVID-19 in the sixth article. Focusing on pre-service student teachers in Chitungwiza schools, they found that pre-service student teachers and the entire education sector were caught unprepared by the sudden demand for online education. The study found infrastructure and human capacity deficits to effectively ensure quality education. They propose that the government develop policies that promote and enhance support information communication infrastructure availability.

Using a mixed-methods approach, Masina and Mukaro developed and tested a self-directed assessment framework in distance learning for clothing and textile technology undergraduate teacher trainees during COVID-19. Findings from this seventh article showed that the effective and adaptable framework can help students



traverse the convolutions of distance learning to attain success in their studies.

In the last article, Majaule and Kasozi focused on Botswana Open University, where they assessed student support services in open and distance learning. The researchers adopted Simpson's Model of Student Support Services for Success in ODL. The model states that for students to succeed in an ODL environment, they should receive cognitive, emotional, and organisational support. The findings identified administrative, academic, technical, and psychosocial support challenges. Based on these findings, they made adaptable recommendations to improve student support at Botswana Open University and in similar contexts.

## Acknowledgments

We, the editors, would like to especially appreciate the following colleagues for their review of the manuscripts and their valuable contribution to improve their quality:

- Dr Y Ali, University of Pretoria, South Africa
- Dr Samuel Babalola, University of Ibadan, Nigeria
- Dr Henry Bignaut, North-West University, South Africa
- Dr Erasmos Charamba, Wits University, South Africa
- Isabella Du Preez, University of the Free State, South Africa
- Lizelle Eksteen, University of the Free State, South Africa
- Professor Karen Ferreira-Meyers, University of Eswatini, Eswatini
- Professor L. Jacobs, University of the Free State, South Africa
- Dr Joseph Amooti Kasozi, Botswana Open University, Botswana
- Hendri Kruger, SANTS Private Higher Education Institution, South Africa
- Dr Linda Le Hanie, SANTS Private Higher Education Institution, South Africa
- Dr Fidzani Agnes Majaule, Botswana Open University, Botswana
- Professor Cosmas Maphosa, University of Eswatini, Eswatini
- Dr Ephraim Mhlanga, Saide, South Africa
- Professor Lebo Patience Mudau, University of South Africa, South Africa
- Dr Asteria Nsamba, University of South Africa, South Africa
- Dr Mmabaledi Seeletso, Botswana Open University, Botswana
- Dr Waaiza Udhin, Mauritius Institute of Education, Mauritius

## References

- Atenas, J & Havemann, L. 2013. Quality assurance in the open: An evaluation of OER repositories. *INNOQUAL – International Journal for Innovation and Quality in Learning*, 1(2):22-34. Available at <https://eprints.soas.ac.uk/17347/1/30-288-1%20-PB.pdf> Accessed 25 November 2021.
- Babini, D. 2012. Scientific output from Latin America and the Caribbean – Identification of the main institutions for regional open access integration strategies. *SSRN Electronic Journal*. Available at <http://eprints.rclis.org/19085/1/Babini%202012.pdf> Accessed 25 November 2021.
- Bali, M, Cronin, C & Jhangiani, RS. 2020. Framing open educational practices from a social justice perspective. *Journal of Interactive Media in Education*, (1):Article 10. <http://doi.org/10.5334/jime.565>
- Bellinger, F & Mayrberger, K. 2019. Systematic Literature Review zu Open Educational Practices (OEP) in der Hochschule im europäischen Forschungskontext. *MedienPädagogik*, 34:19-46. <https://doi.org/10.21240/mpaed/34/2019.02.18.x>
- Brown, M & Croft, B. 2020. Social annotation and an inclusive praxis for open pedagogy in the college classroom. *Journal of Interactive Media in Education*, (1):Article 8. <https://doi.org/10.5334/jime.561>
- Cox, G & Trotter, H. 2017. An OER framework, heuristic and lens: Tools for understanding lecturers' adoption of OER. *Open Praxis*, 9(2):151-71.
- Cronin, C. 2017. Openness and praxis: Exploring the use of open educational practices in higher education. *The International Review of Research in Open and Distributed Learning*, 18(5). Available at <https://aran.library.nuigalway.ie/handle/10379/6394> Accessed 3 December 2019.
- Cronin, C & MacLaren, I. 2018. Conceptualising OEP: A review of theoretical and empirical literature in Open Educational Practices. *Open Praxis*, 10(2):127-43. <https://doi.org/10.5944/openpraxis.10.2.825>
- De Hart, KL, Chetty, YB & Archer, E. 2015. Uptake of OER by staff in distance education in South Africa. *The International Review of Research in Open and Distributed Learning*, 16(2).
- Department of Higher Education and Training. 2013. *White Paper for Post-School Education and Training: Building an expanded, effective and integrated post-school system*.



- DeRosa, R. & Jhangiani, R. 2017. Open pedagogy. In: Mays, E (ed.). *A guide to making open textbooks with students*. Montreal: The Rebus Community for Open Textbook Creation. Available at <https://press.rebus.community/makingopentextbookswithstudents/> Accessed 3 December 2019.
- DHET *see* Department of Higher Education and Training.
- Hodgkinson-Williams, C & Paskevicius, M. 2012. The role of postgraduate students in co-authoring open educational resources to promote social inclusion: A case study at the University of Cape Town. *Distance Education*, 33(2):253-69.
- Hassan, Q. K., Rahaman, K. R., Sumon, K. Z., & Dewan, A. 2019. Lessons learned from the development of open educational resources at post-secondary level in the field of environmental modelling: An exploratory study. *Education Sciences*, 9(2), 103. <https://doi.org/10.3390/educsci9020103>
- Horn, EA, Anderson, R & Pierick, K. 2018. Open educational resources (OERs) in self-directed competency-based education. *Information Discovery and Delivery*, 46(4):197-203. <https://doi.org/10.1108/IDD-02-2018-0005>
- Ingavélez-Guerra, P, Robles-Bykbaev, V, Teixeira, A, Otón-Tortosa, S & Hilera, JR. 2022. Accessibility challenges in OER and MOOC: MLR analysis considering the pandemic years. *Sustainability*, 14(6):Article 3340. <https://doi.org/10.3390/su14063340>
- Jhangiani, RS & DeRosa, R. 2018. *Welcome to the Open Pedagogy Notebook*. Available at <https://openpedagogy.org/> Accessed 3 December 2019.
- Jimes, C, Weiss, S & Keep, R. 2013. Addressing the local in localisation: A case study of open textbook adoption by three South African teachers. *Journal of Asynchronous Learning Networks*, 17(2):73-86.
- Kanwar, A. 2011. *Can OER transform education? A developing world perspective*. Available at <https://oasis.col.org/items/1f899873-2af9-46b5-93c4-88422d92044f> Accessed 3 December 2019.
- Kanwar, A, Kodhandaraman, B & Umar, A. 2010. Toward sustainable open education resources: A perspective from the Global South. *The American Journal of Distance Education*, 24(2):65-80. <https://doi.org/10.1080/08923641003696588>
- Keats, D. 2009. The road to Free and Open Educational Resources at the University of the Western Cape: A personal and institutional journey. *Open Learning: The Journal of Open, Distance and e-Learning*, 24(1):47-55.

- King, M., Pegrum, M., & Forsey, M. 2018. *MOOCs and OER in the Global South: Problems and potential. The International Review of Research in Open and Distributed Learning*, 19(5). <https://doi.org/10.19173/irrodl.v19i5.3742>
- King, TW. 2017. Postgraduate students as OER capacitors. *Open Praxis*, 9(2):223–34.
- Koseoglu, S & Bozkurt, A. 2018. An exploratory literature review on open educational practices. *Distance Education*, 39(4):441–61. <https://doi.org/10.1080/01587919.2018.1520042>
- Lane, A. 2009. The impact of openness on bridging educational digital divides. *International Review of Research in Open and Distance Learning*, 10(5). Available at <https://files.eric.ed.gov/fulltext/EJ869420.pdf> Accessed 20 February 2022.
- Leeds, B. 2013. Assessing the potential of OERs for ODL. *South African Journal of Higher Education*, 27(6):1490–1507.
- Mohajan, HK. 2018. Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1):23–48.
- Mulder, A. 2011. Open educational resources and the role of the university. *EDUCAUSE Review*, 12 September. Available at <https://er.educause.edu/articles/2011/9/open-educational-resources-and-the-role-of-the-university> Accessed 3 December 2019.
- Nienaber-Rousseau, C & Du Toit-Brits, C. 2022. What open educational resources' incorporation in education might contribute including implications for self-directed learning. In: Olivier, J, Du Toit-Brits, C, Bunt, B & Dhakulkar, A. 2022. Contextualised open educational practices: Towards student agency and self-directed learning. NWU Self-Directed Learning Series Volume 10. AOSIS.
- Olivier, J. 2020. Self-directed open educational practices for a decolonised South African curriculum: A process of localisation for learning. *Journal of e-Learning and Knowledge Society*, 16(4):20–8. <https://doi.org/10.20368/1971-8829/1135330>
- Olivier, J. 2021. Online access and resources for open self-directed learning in Africa. In: Burgos, D & Olivier, J (eds.). *Radical solutions for education in Africa: Open education and self-directed learning in the continent*. Singapore: Springer. pp. 1–16. [https://doi.org/10.1007/978-981-16-4099-5\\_1](https://doi.org/10.1007/978-981-16-4099-5_1)
- Olivier, J, Du Toit-Brits, C, Bunt, B & Dhakulkar, A. 2022. *Contextualised open educational practices: Towards student agency and self-directed learning*. NWU Self-Directed Learning Series Volume 10. AOSIS.
- Otto, D., Schroeder, N., Diekmann, D. and Sander, P., 2021. Trends and gaps in



- empirical research on open educational resources (OER): A systematic mapping of the literature from 2015 to 2019. *Contemporary Educational Technology*, 13(4), ep325. <https://doi.org/10.30935/cedtech/11145>
- Samzug, AS & Mwinyibegu, CM. 2013. Accessibility of Open Educational Resources for distance education learners: The case of The Open University of Tanzania. *HURIA: Journal of the Open University of Tanzania*, 14(1):76-88.
- Sapire, I & Reed, Y. 2011. Collaborative design and use of open educational resources: A case study of a mathematics teacher education project in South Africa. *Distance Education*, 32(2):195-211.
- Schuer, R., & Janssen, B. 2018. Adoption of sharing and reuse of open resources by educators in higher education institutions in the Netherlands: A qualitative research of practices, motives, and conditions. *International Review of Research in Open and Distance Learning*, 19(3): 1151-1171. <https://doi.org/10.19173/irrodl.v19i3.3390>
- Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104:333-39.
- Tlili, A, Altinay, F, Huang, R, Altinay, Z, Olivier, J & Mishra, S. 2022. Are we there yet? A systematic literature review of Open Educational Resources in Africa: A combined content and bibliometric analysis. *PLoS ONE*, 17(1): Article e0262615.
- UNESCO. 2012. *The Paris OER Declaration*. The Paris OER Declaration 2012 ([unesco.org](http://unesco.org))
- UNESCO. 2015. *Guidelines for open educational resources (OER) in higher education*. Available at <https://unesdoc.unesco.org/ark:/48223/pf0000213605> Accessed 25 November 2021.
- UNESCO. 2016. *What are open educational resources (OERs)?* Available at <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/what-are-open-educational-resources-oers/> Accessed 12 May 2021.
- Wang, T & Towey, F. 2017. Open educational resource (OER) adoption in higher education: Challenges and strategies. *IEEE 6th International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*. pp. 317-319. <https://doi.org/10.1109/TALE.2017.8252355>
- Whittemore, R & Knafl, K. 2005. The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5):546-553.