

Background paper prepared for
the Global Education Monitoring Report

Technology in education

KEY POLICY ISSUES IN OPEN EDUCATIONAL RESOURCES

This paper was commissioned by the Global Education Monitoring Report as background information to assist in drafting the 2023 GEM Report, Technology in education. It has not been edited by the team. The views and opinions expressed in this paper are those of the author(s) and should not be attributed to the Global Education Monitoring Report or to UNESCO. The papers can be cited with the following reference: “Paper commissioned for the 2023 Global Education Monitoring Report, Technology in education”. For further information, please contact gemreport@unesco.org.

BEN JANSSEN, ROBERT SCHUWER & DOMINIC ORR

2023



ABSTRACT

Open Educational Resources (OER) have the potential to help countries achieve the UNESCO SDG 4 goal: "Ensure inclusive and quality education for all and promote lifelong learning". This potential value of OER is based on the central features of free (no-cost) access and rights to use, adapt, and distribute the educational materials.

This report provides an overview of the state of affairs regarding the adoption of OER worldwide. It looks at current trends and the main challenges and opportunities associated with OER. In Chapter 3, we first consider the potential values of OER for resolving major challenges in education, making a distinction between the generic value of OER, independent of a context, and the derived value of OER. Chapter 4 summarizes the state of affairs and trends in the adoption of OER worldwide. This overview is mainly based on available empirical OER research found in journals, and publications by institutions such as UNESCO and the Commonwealth of Learning. Chapter 5 deals with the players in the development of OER content, including individuals, communities of instructors, educational institutions, and public authorities. Whereas in the beginning it was primarily individuals and institutions, nowadays it is increasingly national governments that have become important players in the adoption of OER. Section 6 presents examples of six types of public policy that governments can introduce to contribute to the acceptance and mainstreaming of OER in teaching and learning. Section 7 looks at the challenges that COVID-19 has brought to education, and what the role of OER is and could be within that context. Finally, Chapter 8 gives an overview of the challenges that need to be addressed at the micro-, meso-, and macro-level (nationally and globally) if OER are to reach full maturity.

The report in its totality outlines the current situation in which acceptance of OER is at a tipping point. Worldwide awareness of OER and their potential for improving the quality of education and access to high-quality education is growing, the COVID pandemic has increased the need for OER, and the UNESCO Recommendation on OER has mapped out

a path towards a situation in which, by 2030, OER will have been adopted on a large scale worldwide to provide optimum support for the SDGs.

TABLE OF CONTENT

Abstract	1
Table of Content	3
1. Introduction	5
2. Potential of OER	6
2.1. Generic value	7
2.2. Derived value	8
3. State of affairs and major trends in the adoption of OER	9
3.1. Introduction	9
3.2. State of affairs	9
3.3. Case - Germany	12
3.4. Case - Africa	12
3.5. Case - USA	13
3.6. Case - Small countries in the Global South	14
3.7. Trends – A tipping point	14
4. Overview of main players in OER content development	15
4.1. Introduction	15
4.2. Main players	15
4.3. Funding	17
4.4. Examples	18
5. Open Educational Resources Policies	20
5.1. Introduction	20
5.2. Policy and strategy	20
5.3. Six types of policies to facilitate the development and widespread of OER	20
5.4. 1. Policies that focus on the creation and use of OER	21
5.5. Comprehensive strategic education policies with an OER component	23
5.6. Policies related to general ICT for learning with some OER component	24
5.7. Policies aimed at open government that include an OER component	26
5.8. Open Access, Open Science and Open GLAM Policies	27
5.9. Labor market policies	28
6. The COVID-19 pandemic and OER	29
6.1. Introduction	29
6.2. Examples	29
6.3. Insights from worldwide developments	30

7.	Main challenges in mainstreaming OER	31
7.1.	Introduction	31
7.2.	Overview of the inhibitors of mainstreaming	32
8.	Conclusion	34
9.	Appendix: What is Open?	36
	References	40
1.	Introduction	40
2.	Potential of OER	40
3.	State of affairs and major trends of OER	41
5.	Open Educational Resources Policies	42
6.	The COVID-19 pandemic and OER	44
7.	Main challenges in mainstreaming OER	45
8.	Appendix	46

1. Introduction

In 2022, access to high quality learning remains a challenge across the world. Open educational resources, which emerged as a reform movement in the 2000s, offer an ecosystem-focused response to this challenge. They address both efforts to make existing learning materials accessible to more people, and efforts to adapt existing learning materials to the context in which they are used, putting the learner and her or his learning environment first.

This focus might be well encapsulated in popular slogan “if content is king, context is the kingdom” – i.e. access to high quality learning will only be achieved through better distribution channels for materials (open access) and the opportunity to adapt and localize these materials to the needs and context of the learners (re-purposing).

In 2019, UNESCO’s General Conference unanimously adopted the OER Recommendation. This Recommendation defined OER as follows: “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.”

In the 21st century, digitalisation of learning has both helped and hindered getting learners the high quality learning experiences they need. Digitalisation has helped, as platforms have become the new distribution centers for learning materials and learning management systems and learning experience platforms have provided scalable learning environments, which support individual learning pathways, augmenting or substituting for missing formal education settings. But digitalisation has hindered access where platforms have created so-called walled gardens, where only those logged in have access to this content. In this, they have replicated some of the limitations of access to learning found in formal education and/or used the mechanics of the private sector to create scarcity of opportunities, which require learners to pay for access (including, where access to learning is free, but certification for recognition by employers requires fee payments). Digitalisation has also hindered the potential for better access where these platforms only promote self-paced learning of preconfigured learning materials that have not been adapted to the needs of different learner groups. This is a product-centered approach to learning and does not provide sufficient space for adaptation and co-creation of the learning experience through interactive elements like face-to-face sessions and peer exchange.

Perhaps one of the key characteristics of OER is their enabling impact as open resources. The opportunity to reuse and adapt existing materials can promote and encourage teachers to work together – thereby not simply creating better learning materials, but also contributing to the professional development of the teaching body which remains a cornerstone of high-quality teaching and learning.

Through utilizing reviews of empirical studies and worldwide policies, this report will provide an overview of OER policies, communities and practices at a pivotal point in the history of education. Policies and practices in education systems must address the ever-present challenges for achieving the SDG goals by 2030, for harnessing a fair and impactful digitalisation in education, for developing vibrant and resilient education systems in face of the current

COVID19 pandemic and for enabling a just and inclusive transition for climate change. OER is now seen as a key contributor to this task.

Finally, a few words about the approach taken to synthesize existing studies and thought pieces should be made. Otto et al. (2021) published the results of a systematic review of empirical OER research found in journals between 2015 and 2019. We have taken this review, and in particular the publications it covers, as our starting point. We supplemented the list of publications with journal publications for the period 2020 to 2022, using ERIC and the same search criteria as Otto et al.

Other sources we have used for this publication are:

- OER Knowledge Cloud (<https://www.oerknowledgecloud.org/>), a repository of open access journal articles, reports, books, or other items in any medium about OER and Open Education. The repository is curated by the Athabasca University Library.
- Oasis (<https://oasis.col.org/home>), the Commonwealth of Learning's online institutional open access repository for learning resources and publications.
- OERWorldMap, a database containing meaningful statistics and information about the various types of actors, the many types of repositories, and the types of policies regarding OER. This database has been discontinued since May 2022. We made a copy of the data in good time before writing this report.

Additionally, we consulted fellow researchers worldwide. We would like to thank members of the open education community, in particular Werner Westermann, Alan Levine, Glenda Cox, Wayne MacIntosh and Jan-Bart de Vreede, for their help and information.

2. Potential of OER

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. All worthwhile interventions in education should contribute to the UNESCO SDG 4 goal: “Ensure inclusive and quality education for all and promote lifelong learning”.

The potential value of OER is based on the central characteristics of free (no-cost) access and rights to use, adapt and distribute the high-quality learning materials. To review the potential values of OER, it is useful to differentiate

between the generic value of OER, independent of a context, and the derived value for OER for solving major challenges facing education.

2.1.Generic value

The generic value of OER can be described from various perspectives. In the literature (Clinton, 2019; UNESCO, 2019; Menzli et al, 2022), we encounter the following perspectives.

- **Quality.** A frequently used argument in advocacy for large-scale adoption of OER is that adoption of OER increases the quality of education. Instructors and students will have more and, in terms of type, more varied learning materials at their disposal with OER. This makes it possible to better meet the needs of instructors and students. OER also make rich didactic forms possible that would be difficult or impossible to achieve without OER. Such didactic formats are also referred to as open pedagogy (Hegarty, 2015; Clinton-Lisell, 2021). Studies that support this quality perspective can be found on the website of the Open Education Group. Open sharing of educational resources also leads in many cases to a broader peer review and improvement process than in models of local implementation, with fewer persons involved. This ultimately leads to a higher quality of learning resources (cf. Parker, 2012).
- **Efficiency.** Sharing and reusing of educational resources will ultimately lead to cost savings in the development of these resources, both institutionally and socially. Open publication of educational resources provides a better internal picture (for example, between departments) of what learning resources are already available. The idea is that reusing educational resources will prevent the same resources being created in different places. That saves hours of development. Studies of reuse show that especially "expensive" resources (such as videos) are reused. Additionally, reviewing existing resources may also inspire creators, cutting the length of the development process for new adaptations (Baas & Schuwer, 2020).
- **Inclusion, diversity and equity.** The value of OER also lies in helping to transform and expand open access to resources to truly address diversity, equality and inclusion (Lambert,2018). Socially, sharing and reuse of OER contribute to reducing the public and private costs of education, a more even distribution of high-quality learning resources, and thereby to more equitable access to learning opportunities for learners (Orr, Rimini & Van Damme, 2015; UNESCO, 2019). The right to adapt resources provide opportunities to make these resources accessible for disadvantaged communities and learners with disabilities, and to add alternative voices from minorities to the resources, thereby contributing to more equity (Adam, 2020; Hodgkinson-Williams & Trotter, 2018; Lambert, 2018; Bali et al, 2020).
- **Study benefits.** Prospective students can benefit greatly from OER because they can use them to gain a detailed and realistic picture of the content and quality of education at a university or college and thus be better able to make the right study choice. This could reduce dropout rates in the first year. Studies (for example by the Open Education Group mentioned earlier) indicate that study benefits using OER are at least the same if not better than those using commercial materials. One meta-analysis (Clinton & Khan, 2019) also

revealed that using open textbooks instead of commercial textbooks led to a significant lower dropout rate among postsecondary students.

- **Research and innovation.** Publishing OER provides the opportunity to experiment with digital learning materials outside the (accredited) curriculum. Publishing a MOOC also has the potential to collect data for research, often via surveys of MOOC participants (Valkenburg, 2016) and thereby to learn more about the user needs. In addition, reusing OER from elsewhere can stimulate innovation within the institution, for instance in the case of reusing Virtual Reality and Augmented Reality content. Sharing and reusing educational resources in professional communities lowers the threshold for looking into each other's institutions and encourages learning from each other (Baas & Schuwer, 2020).

2.2.Derived value

OER can contribute to some of the grand challenges in education today, which is why they are so often included in overall strategies for education and digital learning as a key intervention.

- **Contributing to flexibilization.** More flexibility and customization in education meets an increasingly diverse student population (Clifton & Hoffman, 2020). Publishing open online courses is a way of realizing low-threshold time- and place-independent offers for working people.
- **Cooperating regionally and internationally.** Working within cross-institutional professional communities to develop and share OER is a way of achieving more cooperation (Nascimbeni et al, 2020). In addition, open pedagogy, which we have listed under the generic value of the quality of OER, provides relatively simple opportunities for linking up the classroom with external parties (e.g. the professional field and educational institutions) (Nascimbeni et al, 2020; Tang et al, 2021). Finally, publishing research results or learning materials about trends in society via open online courses provides opportunities for making this knowledge more accessible to a wider audience than just peers. This contributes to a better connection to the labor market and society.
- **Financial issues.** The feature that OER are freely accessible to a learner can contribute to a reduced spending on learning materials by students. Research in the US has shown that savings for students can be significant. A 2018 study in North Dakota shows that over a 3-year period, an initial investment of \$110K led to savings for students of over \$1M (Gallion, 2018). Several studies on the website of the Open Education Group also provide similar results.
- **Outreach and profiling.** OER can function as an instrument with which an institution can reach new, often overlooked, target groups and also propagate its social function. The latter is derived from the generic value of inclusion and equity. Massive Open Online Courses (MOOCs) in particular are used for this purpose. For Delft University of Technology, for example, this has led to a greater international reputation (TU Delft, 2020). For instructors, open sharing of their educational resources can also be a means of distinguishing

themselves, comparable to when a researcher writes a journal paper. In addition to reaching new target groups, OER can also contribute to binding alumni to the institution in lifelong learning programs.

3. State of affairs and major trends in the adoption of OER

3.1. Introduction

This chapter provides an overview of the current situation and the major trends in the adoption of OER. Empirical research on the actual adoption of OER worldwide, however, is still in its infancy (Otto et al., 2021). In four out of five studies on OER adoption, the evaluation of individual projects, particular measures taken, or interventions made, is the main focus.

The scarcity of overview and trend studies also has to do with the fact that there is no clear theoretical foundation for OER research designs (yet), and research is carried out from the perspective of many different disciplines and utilizing different methods based on the purpose of the individual study. There is still "insufficient evidence of profound and systematic approaches to compare, replicate and validate research findings. In this manner, the key explanatory variables could be identified instead of being only vaguely stated and based on anecdotal evidence" (Otto et al., 2021,18). Moreover, as already presented in Chapter 3, OER have generic and derived values and research must deal with the challenge that in many cases OER are enablers rather than causes.

Having named these limiting conditions, based on several surveys that have been conducted with regularity, however, we can present a reasonable, albeit not completely comprehensive, picture of the state of affairs and trends. In particular, we reference surveys conducted by or on behalf of the Commonwealth of Learning (Hoosen & Butcher, 2012; COL, 2016; COL 2017, and COL 2022) and the annual surveys conducted by Bayview Analytics for the U.S. (most recent is Seaman & Seaman, 2022). In addition, OER Africa provides a reasonable picture of the situation on the African continent (Baijnath et al. 2022). Finally, we would like to point to a collection of articles, country reports and working papers on the state of affairs of OER uptake and policies in various countries, produced by the Center for Open Education Research (COER) (Marín et al., 2020; Marín et al., 2022a en 2022b; Marín, Peters & Zawacki-Richter, 2022; Zawacki-Richter et al., 2020; Zwacki-Richter & Bozkurt, 2022).

3.2.State of affairs

According to Seaman and Seaman (2022), the COVID-19 pandemic in higher education in the USA has caused a boost in the use of digital materials in general and OER in particular in educational settings. In two years, a major change has taken place in the attitudes and practices of instructors. For the first time, more than half of instructors said they were familiar with OER. For this study, being familiar with..." includes not only knowing about the existence of OER, but also being familiar with the licensing terms of OER. The percentage of instructors who believe "students learn better from printed materials than from digital" has fallen sharply, from 43 percent in 2020 to 33 percent in 2022.

The actual use of OER in higher education in the USA has also increased. The percentage of instructors prescribing OER in courses increased to 22 percent in spring 2022 from 15 percent in fall 2020. The percentage of instructors prescribing inclusive access¹ to students in their courses more than doubled, from 8 percent in 2020 to 19 percent in 2022.

The study also showed that the growth in actual use is not as strong as the growth in positive attitudes of staff to OER. Thus, the adoption picture in the USA does not differ from the global picture. In 2021, COL conducted a survey on OER to understand the state of affairs in the global community and in the 38 countries of the Commonwealth, respectively. Similar surveys had been conducted in 2012, 2016 and 2017.

In the 2012 survey conducted prior to the 1st World OER Congress, the picture that emerged was that the adoption of OER took place primarily in the form of initiatives by institutions and individuals involved and through specific projects or programs with public funding. There was hardly any targeted policy by governments. While in the survey 45% of the countries indicated that they had a policy or strategy on OER. Still, in one-third of the member countries surveyed, no activity around OER was known to exist (Hoosen, 2012). OER activities were distributed almost equally among the primary, secondary, and tertiary education sectors.

For the 2nd World OER Congress, COL and UNESCO repeated the global survey in 2017. It found that much had happened in the intervening five years. Support for OER policies had increased between 2012 and 2017 (55% compared to 45% in 2012). Most of these policies (41%) were reportedly national, followed by institutional (22%) and project (9%). And more than half (59%) of respondents further indicated that their country was considering developing policies for OER. Most OER activities reportedly continued to be implemented through institutional initiatives and involved individuals, and through specific programs or projects with government funding. The activities were found to be generally at the secondary, post-secondary (non-tertiary) and tertiary education levels, i.e., with limited OER activities concerning TVET and non-formal education.

In line with the study covering the USA, it appeared that global awareness of OER was high in 2021, with 85% of respondents saying they were aware of OER. Again, the actual use of OER was lower: While 45% said they were involved in OER activities or projects, 22% had remixed or adapted OER themselves and 16% had developed open content themselves and released it as OER (COL, 2022). The use of available OER repositories worldwide was low.

The most used repositories and platforms were: OER Commons (38%), COL Commons (36%), OpenLearn (30%), the Directory of Open Access Journals (28%), and MIT OpenCourseWare (26%). Almost half (44%) of the respondents reported difficulty in finding relevant OER.

¹ Traditionally, students are responsible for acquiring their own course materials and textbooks – by purchasing them online, from the university bookstore, or other independent college bookstores. With inclusive access, schools and universities sign up, and an entire student class will automatically get digital course materials. “Inclusive” refers to the fact that every student will have access to the same materials on the first day of class; in other words, she/he is “included”. The cost of the materials is included in the tuition.

In terms of barriers to mainstreaming OER at the national level, 87% of the respondents pointed to a lack of user capacity to access, reuse and share OER, followed by insufficiently inclusive and equitable access to quality content (82%). Individually, lack of skills (47%), followed by lack of connectivity (47%) are the key barriers for mainstreaming OER (COL, 2022).

In the 2017 Global Report (COL, 2017), lack of appropriate OER policies was at the top of the list, chosen by 70% of respondents. While policies went down in the ranking of challenges in the 2021 Report to 47%, more respondents indicated a need for policy. Four out of five respondents saw the lack of appropriate policy solutions as one of the main challenges to the mainstreaming of OER.

In the publication *Spotlight on OER policy in the Global South* (ROER4D, 2017) which was prepared for the 2nd World OER Congress in 2017, a tentative overview was presented of OER activity in the Global South. It was based on data provided by a cross-regional study by de Oliveira Neto, Pete, Daryono and Cartmill (2017). The data were from a survey of 295 randomly selected educators at 28 higher education institutions in nine countries across the three ROER4D regions South America, Sub-Saharan Africa, and South and Southeast Asia². Just over half (51%) of the educators surveyed stated that they had used OER at least once; one-quarter (25%) had never used OER; and almost another quarter (24%) were not sure whether they had used OER. The level of OER use appeared to be slightly differentiated by region: 50% in South America, 46% in Sub-Saharan Africa, and 56% in South and Southeast Asia. The percentage of OER users (51%) was more than twice as high as the percentage of OER creators (23%).

Overall, the finding is that expressed demand for OER is contradicted by its low adoption in practices worldwide (Otto, 2019; Otto et al., 2021). Summarizing available studies, it can be stated that this is due to, among other things:

- The lack of an enabling policy environment for OER.
- OER funding is often in the form of project funding (Seaman & Seaman, 2022)
- Moreover, that funding is often dependent on third parties (UNESCO-IITE, 2020).
- Still almost half of teachers do not know what OER are and what they can do.
- The perception that it is very time consuming to create OERs.
- Due to discoverability issues, the Insufficient availability of inclusive and equitable quality content.
- There is a lack of OER skills among teachers and too little support is still taking place (COL, 2022).

² ROER4D (Research on Open Educational Resources for Development) focused on understanding the use, creation and impact of OER across three regions in the Global South – South America, Sub-Saharan Africa, and South and Southeast Asia – over the period 2014– 2017. The project consisted of 18 sub-projects with more than 100 participating researchers and research associates in Afghanistan, Brazil, Chile, Colombia, Ghana, India, Indonesia, Kenya, Malaysia, Mauritius, Mongolia, Pakistan, the Philippines, Somalia, South Africa, Sri Lanka, Tanzania, Uganda, Uruguay, Zambia and Zimbabwe.

- There is still much doubt about the quality of OER materials (COL, 2022, Seaman & Seaman, 2022).
- As there is increasing competition from commercial publishers who are investing heavily in supplemental learning materials, OER producers are struggling to remain visible (Seaman & Seaman, 2022).

3.3. Case - Germany

There are many initiatives for OER, whether part of larger programs targeting digitization in teaching and learning in Germany or not. In 2017, Orr, Neumann & Muuss-Merholz (2017) noted that although Germany was a relatively latecomer to the OER scene, there was a strong OER community in the country: many bottom-up grassroots initiatives, and a national funding program OERinfo, which had started in November 2016. Orr et al. explicitly mention the creation of the Hamburg Open Online University, which they saw as the most ambitious OER project in Germany at that time. At the regional level, there was a growing recognition that OER had significant potential to promote innovation, and there was an expectation that OER would experience considerable growth. By 2022, it appears that this growth has indeed occurred. There are many initiatives in the various educational domains. The Wissenschaftsrat (2022) (German Science Council) has presented an overview of some 35 initiatives in public higher education (Appendix I, based on Krause & Krempkow, 2021). The scope of the OER provided has been limited so far; most of them are materials on individual topics and not yet many entire courses. A culture of providing open educational materials has not yet been established across the board at universities (Wissenschaftsrat, 2022).

There have also been initiatives in the domains of TVET education in Germany. Grimm and Bodo (2020) have documented the situation of OER in vocational schools until the end of the year 2019. The term OER is known to nearly one third of professionals at vocational schools (31%), albeit better to managers (42%) and media advisors than to teachers (27%). Only a small proportion of teaching staff (10%) is willing to share their own materials on public platforms beyond their own college. Rather sporadically (3%), open licenses are used. Platforms OER are known to just under half (49%), although these turned out not all to offer OER, but instead simply made digital media available free at the point of use, suggesting the term OER is not always clearly understood. On 29 July 2022 the Federal Ministry for Education and Research in Germany released the long-awaited national strategy for OER (BMBF, 2022) which aims to further develop the practice of utilizing OER in education and has a special focus on improving the permeability and inclusiveness of the German education system through use of OER and accompanying practices of open education.

3.4. Case - Africa

In many African countries, providing access to learning content and lifelong learning opportunities remains a challenge. Large parts of the population cannot benefit from existing educational offers due to geographical remoteness and a lack of financial resources. Marginalized groups such as girls and women as well as populations living in rural areas are particularly affected by restrained access to education. As a result, they often lack the required competences for finding employment in local labour markets (ROER4D, 2017).

Baijnath, Hoosen, Butcher & Lelliott (2022) have presented the findings of a retrospective analysis of 11 selected initiatives in higher education in Africa (South Africa, Ghana, Nigeria, Tanzania and several in East, West and Southern African countries) to understand the effectiveness of these initiatives for the development and support of OER practices. Several of these projects have made an invaluable contribution by creating or repurposing OER in many disciplines for students, or by developing materials that facilitate OER-related skills development:

- The National Open University of Nigeria (NOUN) made materials available for sharing and reuse by internal and external students and academics.
- The TESSA (Teacher Education in Sub-Saharan Africa) initiative has created many OER in English to support teacher education, three-quarters of which are also available in Kiswahili, French, and Arabic. The OER cover primary school curricula, as well as handbooks and toolkits for teachers and teacher educators. TESSA OER have been used across a wide range of programs in all partner institutions, with an estimated enrolment of one million teacher learners and in-service teachers. The biggest contributors to this enrollment were the University of South Africa (UNISA), Open University Sudan (OUT), and the National Teachers' Institute in Nigeria.
- The Kwame Nkrumah University of Science and Technology in Ghana (KNUST) made extensive progress in producing health related OER, including interactive cases, instructional animations, images, and videos. KNUST also developed its own online repository to house all materials developed under the initiative, as well as other OER. KNUST's OER repository was designated as the national open access repository for Ghana.
- The University of Cape Town OER Adaptation Project contributed numerous OER to the institutional repository. Lecturers were provided small grants that allowed them to employ students. The adaptation project was particularly innovative because it took an agile alternative approach in supporting lecturers in developing their own enabling systems for OER production, specifically through employing students to reduce the time costs of OER engagement.

In all initiatives the focus was not solely on resource development, but also on ensuring that the resources were of a high quality, responsive, and contextually appropriate. Initiatives have also developed repositories to store the resources that they create, thus widening access to pertinent knowledge. Furthermore, the initiatives have created useful frameworks and guidelines to optimize and facilitate OER development use, repurposing, and adoption.

3.5. Case - USA

As part of Trade Adjustment Assistance Community College and Career Training (TAACCCT) program of the American Federal Government, in 2016 the Department of Labor (DOL) initiated a program to create, adopt, and implement an open licensing requirement (CC BY) for learning materials created by community colleges using DOL public funding. (<https://doleta.gov/taaccct/>). The TAACCCT program was meant to increase the ability of community colleges in the USA to address the challenges of today's workforce. Every state received funding during 2011 - 2014 through grants totaling \$1.9 billion. The TAACCCT grants were impacting 60% of the nation's publicly funded community colleges

and building industry-aligned programs in manufacturing, healthcare, information technology, energy, transportation, and other industries. An OER repository was set up ([SkillsCommons](#)) to freely host the OER produced and the program support materials for job-driven workforce development. The repository is still widely used today. Another important OER repository in the USA is MERLOT (Multimedia Educational Resource for Learning and Online Teaching). It was started in 1997, when the California State University Center for Distributed Learning (CSU-CDL) developed and provided free access to MERLOT (www.merlot.org). Merlot is a community of staff, volunteers, and members who work together in various ways to provide users of OER teaching and learning materials with a wealth of services and functions that can enhance their instructional experience. Today nearly thirty institutions are partners of MERLOT and contribute to the repository.

3.6. Case - Small countries in the Global South

A good example of a cross-nation organization and infrastructure for development, adoption and re-use of OER is the COL Virtual University for Small States of the Commonwealth (VUSSC) (<https://vussc.col.org>). It is a network of small states committed to bridging the digital divide including the collaborative development and sharing of free content resources to promote learning for sustainable development. The 32 participating countries are mainly from three regions: Asia and the Pacific, Caribbean, Africa and Mediterranean.

OER cover fields such as agriculture, life skills, disaster management, fisheries, port management, online content development and professional development for educators. In the development of high quality OER VUSSC works closely with professionals and specialists in industry to ensure that the materials are relevant. The materials are learner and teacher oriented and developed bearing in mind the language skills of the target audience. Capacity development is also an important task of VUSSC, as it assumes that increasing the number of persons involved in developing OER will secure the sustainability of the work.

3.7. Trends – A tipping point

There are several positive developments that suggest OER may be crossing the tipping point from interest of the few to practice of the mainstream (COL 2022). The actual involvement of respondents in OER-related activities is above 20% in the US and Commonwealth countries.

We may notice an increased awareness of OER among stakeholders and there are more OER activities at all levels of education, especially in the tertiary education sector. During the Covid-19 lockdown period, OER have played a positive role in improving access to teaching and learning, particularly in supporting students. Academic staff and teachers leveraged online and blended learning during the pandemic, and respondents in both the Bayview Analytics and COL surveys indicated that their acceptance of digital materials and their opinion of OER-based online learning had increased positively.

The COL and Bayview Analytics surveys also point to a number of other important aspects related to OER mainstreaming. Much OER in repositories are not adequately used. In addition to unfamiliarity among potential users, this finding points to a greater need for communication about the content of repositories and for making repositories more discoverable through general search engines. It also points to the need for curated resources and the use of open textbooks that are curriculum-aligned. Another important aspect of OER is quality assurance. It is important to focus on developing quality OER using a framework such as OER TIPS (Kawachi, 2014) or professional communities. These are all topics, which well-designed policy frameworks can address.

4. Overview of main players in OER content development

4.1. Introduction

Different types of stakeholders are involved in initiatives to develop OER:

- Individuals
- Schools/institutions
- Governments and Non-Governmental Organization (NGO's)
- Private sector
- Communities of tutors
- Public institutions partnerships and public/private partnerships

Initially, individual institutions (mainly from higher education) started by sharing their available content, where developing new OER was a logical follow-up activity. The Open Courseware Project from MIT, starting in 2001 and still alive, was the first of many of those initiatives. In 2005, several dozens of these institutions started collaborating in the Open Courseware Consortium (currently named Open Education Global, shortened to OEGlobal).

4.2. Main players

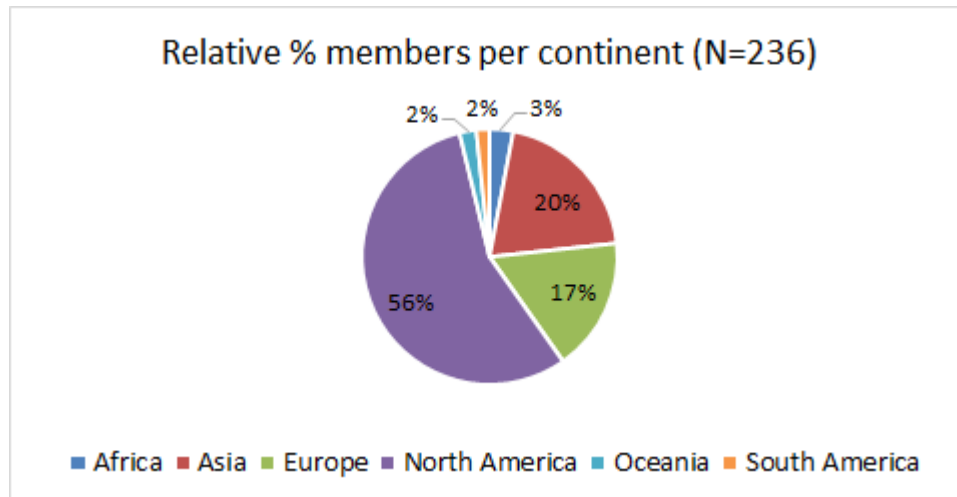
OEGlobal can be considered as representative for the OER movement worldwide. Arguments for this are the age (started in 2005), the steady growth in memberships (currently 236 members), the status of the annual OEGlobal conferences (attracting several 100's of visitors, also non-members) and the participation in the yearly Open Education Week they organize since 2012 (~1000 participants in 2012 to ~9900 in 2021)³.

Currently, OEGlobal has 236 members. Here are some statistics of these members.

Figure 1 displays the relative spread of members across the continents.

³ These and the next figures are according to a dataset from OEGlobal, on request delivered on 9 August 2022

Figure 1 Spread members across continents



From the 236 members, 36% are universities, 17% are community colleges, 1% are from K-12, 6% are government, NGO or non-profits and less than 1% are for-profits. The remaining 38% are from miscellaneous types (e.g., individual member). 149 Members, mostly community colleges or universities, are organized in a total of 6 consortia. Although members merely stem from the Global North, participants of the annual OEGlobal conference and the Open Education Week show a more evenly spread across the globe, the latter merely because activities are mainly locally organized.

In 2012, *Massive Open Online Courses* (MOOC) appeared. Although these are mainly only offering access to open courses, partnerships, and initiatives within or between institutions to develop open content are geared towards these platforms. According to a recent analysis in (Perifanou & Economides, 2022), many universities, companies, and organizations have cooperated with the platforms and provided MOOCs through them. Major platforms are located in the US (Coursera, edX, Udacity, Udemy), China (XuetangX), India (Swayam), UK (FutureLearn), and Spain (MiriadaX).

These global platforms have offered thousands of MOOCs while regional platforms were more likely to have offered dozens. The major global platforms in the US offer MOOCs mainly in English, though they offered MOOCs in other languages as well. The regional platforms offered MOOCs mainly in local languages, and to some extent in English and other languages. Although many of these platforms only make their learning materials open access available, but do not permit exercising the 5R-rights from OER, they still are an important player and are therefore also considered in this overview.

On a global scale, two organizations have a long tradition in initiating and supporting initiatives on OER: UNESCO and the Commonwealth of Learning.

UNESCO coined the term OER already in 2002 and have since then led efforts to get the topic of OER on the agenda of governments. These efforts have been manifested in, consecutively, the Paris OER Declaration in 2012⁴, the Ljubljana OER Action Plan⁵ in 2017 and ultimately the Recommendation on OER in 2019⁶. To support the implementation of areas of action defined in this Recommendation, in 2020 the OER Dynamic Coalition was established by UNESCO's Communication and Information Sector.

Commonwealth of Learning (COL)⁷ is a global organization, committed to support OER initiatives in all educational sectors, with a focus on the Global South. These initiatives help them in their aim to “create and widen access to opportunities for learning, making use of the potential offered by distance education and by the application of communication technologies to education”. The 2012 World OER congress in Paris, leading to the Paris OER Declaration, was a result of collaboration between UNESCO and COL.

More and more, libraries are important stakeholders in OER initiatives in schools and universities (Salem, 2017). Allen et al (2014) coined the term *OER Librarian* for librarians that support teaching staff in curating, finding, and publishing OER. Globally, academic and research libraries collaborate in the Scholarly Publishing and Academic Resources Coalition (SPARC⁸) to promote open access to scholarship.

4.3. Funding

Most initiatives on OER start as a project requiring initial funding. Sources for these can vary. Sometimes, institutions aiming at introducing OER in their organization initiate internal grant programs. Another important source are national grant programs where the funding comes from governments. Examples of these programs are described in more detail hereunder.

For many years already, the European Commission has had grant programs for both OER initiatives and initiatives in which developing and sharing OER is a means to reach another goal (e.g. more inclusive education). A recent example of the former is the Encore+-project⁹.

⁴ <https://en.unesco.org/oer/paris-declaration>, accessed 9 September 2022

⁵ <https://unesdoc.unesco.org/ark:/48223/pf0000266206>, accessed 9 September 2022

⁶ <https://www.unesco.org/en/communication-information/oer-recommendation>, accessed 9 September 2022

⁷ <https://www.col.org/>, accessed 8 August 2022

⁸ <https://sparcopen.org/>, accessed 11 September 2022

⁹ <https://encoreproject.eu/>, accessed 11 September 2022

In 2002, the private organization William and Flora Hewlett Foundation¹⁰ started grant programs to foster OER initiatives worldwide. In these years, they also were at the forefront of OER idea development. Among others, they have co-funded both the 2012 World Congress on OER and the 2017 World Congress on OER. Their current aim in supporting OER initiatives is to democratize knowledge and empower learners around the world.

4.4.Examples

It is nearly impossible to provide a comprehensive overview of the main players. Instead, several examples of initiatives are described to illustrate the involvement of types of players.

4.4.1.Public-private partnership: SUNY and Lumen Learning

Janssen & Van Casteren (2020) have described the partnership between The State University of New York (SUNY) and Lumen Learning. SUNY is the largest public university in the United States and consists of 64 institutions, approximately half of which are universities and the other half community colleges. SUNY provides open online education for outreach and continuing education. In 2019, it enrolled over 600,000 full-time and part-time students. There were also 700,000 participants in continuing education and community outreach programs.

The ever-increasing cost of textbooks was a major reason for New York State to provide a fund in 2017, which SUNY and others used to promote the use of OER.

Among other things, SUNY works closely with Lumen Learning, an American organization that has been helping educational institutions adopt and effectively deploy OER since 2012. Lumen Learning enables SUNY to deploy four tools for evidence-informed learning. This leads to data-driven improvements in content and design, with the goal of enhancing student learning and engagement. It also helps with faculty professionalization around digital learning materials.

SUNY has estimated the savings from implementing OER - replacing commercial textbooks - since 2017. The estimated total savings from OER since 2017, is then around \$50 million (status October 2020).

4.4.2.Involvement of governments (national and regional)

In 2008, the government of the Netherlands launched their initiative Wikiwijs, being the first government initiating an effort to create and share OER nation-wide, for all educational sectors (Schuwer et al, 2014). In the chapter about policies, this initiative is described in more detail.

¹⁰ <https://hewlett.org/strategy/open-education/>, accessed 11 September 2022

Examples of similar initiatives were undertaken by Vietnam (Do, 2014), Norway (Müller, 2019; Müller, 2021), Germany¹¹ and Brazil¹². Regionally, both institutions and NGO's partner to start and extend initiatives. Examples are OER Africa¹³, BC Campus¹⁴, OERu¹⁵ and Hamburg Open Online Universität (HOOU, 2018).

One of the largest initiatives initiated by the government is the Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program from the U.S. Department of Labor, running from 2012-2016. In total 256 grants, totaling to \$1.9 Billion were awarded over 4 years. This initiative is described in more detail in the chapter about policies.

4.4.3. Communities of tutors

In 2007, the initiative Siyavula, based in South Africa, emerged from a project where OER were published¹⁶. Siyavula started as a fellowship project within the Shuttleworth Foundation. Their approach is to organize and support communities of tutors to develop open textbooks for Grades 4-12 from K-12 on different topics, in most cases from Science and Math. In 2014, this project was reformed as a company, Siyavula Education. Currently, their offer contains both paid services as free accessible open textbooks.

Starting in 2017, 15 universities in The Netherlands offering a Bachelor Nursing program started collaborating in creating a professional community of teachers for creating, sharing and reusing OER (Versantvoort & Schuwer, 2022). Until 2020, two grants were available from the Dutch Government. After this period, the majority of the participating universities decided to continue the efforts to realize a situation where OER is mainstream in their programs. Currently, 1450 OERs are shared¹⁷ and around one quarter of teachers are involved in the professional community¹⁸.

¹¹ https://www.bmbf.de/SharedDocs/Publikationen/de/bmbf/3/691288_OER-Strategie, accessed 11 September 2022

¹² <https://www.gov.br/capes/pt-br/acao-a-informacao/acoes-e-programas/educacao-a-distancia/uab/rea> (accessed 8 August 2022)

¹³ <https://oerafrica.org/> (accessed 8 August 2022)

¹⁴ <https://open.bccampus.ca/> (accessed 8 August 2022)

¹⁵ <https://oeru.org/> (accessed 8 August 2022)

¹⁶ Information about this initiative is based on their website, <https://www.siyavula.com/>, accessed 8 August 2022

¹⁷ <https://hbo-vpk.wikiwijs.nl/>

¹⁸ <https://hbovpk.nl/welcome/homepage>

5. Open Educational Resources Policies

5.1. Introduction

Around the world, national governments are involved in initiating and supporting OER practices. 192 states have signed the UNESCO Recommendation, thereby indicating that they will formulate and implement OER and Open Education policies in the coming years. Some states have made more progress here than others. This is on the positive side. However, many states still need to formulate and implement policies to raise awareness about OER and further support the development of OER practices. The COL survey in 2021 found that the lack of a policy environment for OER consistently emerged as a major barrier to the uptake of OER. At the same time, it was observed that there is an overall greater acceptance of OER as an integral part of institutional and individual educational practices (COL, 2022).

Besides a standalone OER policy, OER might be a component of an ICT education policy and/or within a lifelong learning policy. It could also be part of the development of open licensing frameworks for many areas (publications, data, software etc.) in connection with general challenges in education or as part of the overall response of a nation/state to the challenges of living in a digital world (i.e., as part of a digitalization strategy) or to the challenges of an international pandemic such as Covid-19.

In this chapter we present examples of six types of policy that can contribute to the uptake and mainstreaming of OER in education and learning. In each case, the focus is on a different domain or application of learning and knowledge acquisition and the contribution which OER can make to achieve the overall objectives. But before doing so, we indicate what is meant by policy and present an indicative picture of the global situation regarding the uptake of OER policies.

5.2. Policy and strategy

The term ‘policy’ is used differently in different contexts and geographical regions (Neumann et al., 2022). Here we define a policy as the expression of concerted and planned effort by a governmental body to achieve specific goals through prioritizing specific means. For educational organizations and institutions, the term ‘strategy’ can be used, understood as the plan of action taken up at the institutional level as a reaction to a new policy and/or to other changes in the institutional environment. Or very succinctly: the definitions used here focus on the fact that policy comes from ‘politics’ while ‘strategy’ comes from individual institutions (Miao, Mishra, Orr & Janssen, 2019 following Mintzberg et al., 2009).

5.3. Six types of policies to facilitate the development and widespread of OER

In Chapter 4 we have sketched an indicative picture of the uptake of OER worldwide. In a period of ten years we have seen that more and more governments and institutions are considering the development of policies for OER. In

the 2021 report about the situation in the Commonwealth member states, four out of five respondents underlined the need for OER policies.

At the same time, we also noted that the growth in OER activities worldwide has remained on the level of initiatives of individual institutions and temporary projects, often with limited funding. Thus, although awareness of OER and the number of OER activities have increased considerably, the mainstreaming of OER will only take place when there are more targeted policies from governments and institutions aimed at addressing capacity problems in obtaining, reusing, and sharing OER, organizing sufficiently inclusive and equitable access to quality content, and sustainable and/or reliable access to the Internet (COL, 2022).

International organizations such as COL and UNESCO have played an important role in advancing policies on OER around the globe. The UNESCO 2019 Recommendation on OER was an important policy manifesto to support mainstreaming of OER. Since then, many member states have been engaged in OER policy driven activities. These activities can be found embedded within a wider range of policies supporting the advancement of OER. For Miao, Mishra, Orr & Janssen (2019), policies that support OER must particularly focus on achieving SDG 4 through being inclusive, culturally and gender diverse, promoting formal and informal learning, and supporting Open Educational Practices of both teachers and students.

Following the European Commission's Joint Research Centre and Atenas et al. (2020), six types of policy that can support the development and widespread of OER are distinguished below. For each type, examples are given regarding supporting the uptake of OER¹⁹.

5.4.1. Policies that focus on the creation and use of OER

Globally, policies that focus on the creation and use of OER are the most common form of policy. The overall objective is to encourage knowledge producers to openly license the content that they produce. We include in this collection the production and use of open textbooks.

5.4.1. Examples:

- One of the oldest examples is the policy of the Dutch government to create and maintain the platform Wikiwijs. Wikiwijs is a platform where teachers can create, find, and download learning and teaching materials. Wikiwijs is based on open content, open source, and open standards. Wikiwijs's target group is teachers from the entire Dutch education system, from primary education to universities, but the majority come from primary, secondary and vocational schools.
- The objective of Wikiwijs is to provide the largest possible number of high-quality OER, for and by teachers, on a common, open national platform (producing and using OER). It also aims to be a place where instructors can search for and find high-quality OER, across as many themes as possible (finding and accessing OER). The platform also supports and facilitates instructors and other producers in producing and

¹⁹ To a substantial extent, the examples are taken from Javenas et al. (2020)

distributing OER (capacity building). Finally, Wikiwijs stimulates and facilitates communities of professionals (community building) (Schuwer et al., 2014).

- Situation 2022: 6 million direct visits per year, 1,100 searches per day, more than 400,000 lessons of which 150,000 are interactive online lessons, direct links to more than 80 collections of open and semi-open learning resources (for explanation of the term semi-open, see Appendix), and open standard connections to all LMS platforms. (<https://www.wikiwijs.nl>) (Schuwer et al., 2014)
- The second example is the OER policy of the provincial ministries of education in Sri Lanka. The purpose of this policy is to provide direction in the use of OER to increase access to and support quality teaching and learning in the school education system in Sri Lanka. In doing so, the policy seeks to strengthen commitment to OER by all concerned stakeholders.
- The predominant form of education in Sri Lanka is teacher-driven supplemented by prescribed printed textbooks which are largely subsidized by the government. During recent years, several initiatives have made progress in Sri Lanka addressing the needs of the education system to meet the new challenges in moving towards a knowledge society such as greater access, cutting costs of education for students, more inclusiveness, more use of ICT and more flexibilization. OER are seen as an enabler which will allow schools to fully harness the potential provided by the new ICT initiatives. Furthermore, promoting educators to engage in the production of supplementary educational materials as OER, in the two national languages (Sinhala and Tamil), would allow adaptation and adoption of existing quality materials to match with the national school curriculum requirements. As a result, duplication of efforts can be reduced while promoting creative and innovative use of resources. (COL, 2016).
- Third example is the policy of eighteen Norwegian districts for secondary education to provide OER to the schools. To this aim, they established the Norwegian Digital Learning Arena (Nasjonal Digital Læringsarena). Twenty percent of the budgets provided by the districts for acquiring learning materials are channeled through NDLA to develop and provide OER. The remaining budget for learning materials goes through the schools themselves, allowing them to make their own choices in purchasing materials. All districts - except for Oslo - own and fund the NDLA. An important facilitating factor in the establishment of the NDLA was the Norwegian government's initiative to equip all schools with computers and internet access. Each student also received a laptop from the government. All schools were connected to a central login system, and every teacher and student has since been able to log in through the school institution. This created a national IT infrastructure on which other platforms with single sign-on identification could develop (NDLA, 2011, Müller, 2019, interview with S. Trageton (Acting CEO and Head of NDLA Explore) and K.J. Skifjeld (Leder NDLA Utforske), notated in Janssen & Van Casteren, 2020)
- Fourth example concerns the policy of a government organization - the Office of the Superintendent of Public Instruction (OSPI) in Washington State - which directs knowledge producers in K-12 to openly license all products created by OSPI employees, contractors and beneficiaries. Its purpose is to realize the

educational impact of the significant investments made by the state, federal government and private foundations in educational materials created by or for OSPI. ([Open Licensing Policy | OSPI](#)).

- Fifthly, OER-related policy development has been an important tool in attempts to mainstream open practices in HE institutions in Africa. In their analysis of 11 selected initiatives, Baijnath et al. (2022) found that there was a crossover between the initiatives and an institutional OER strategy. Success of an initiative led to awareness of the importance of a strategy, and the presence of the latter in turn affected the effectiveness of the OER initiatives. Initiatives like the OpenUCT Initiative and the Nelson Mandela University's Open Education Influencers (OEIs) initiative were successful in mainstreaming OER into institutional practices and achieving a certain level of continuity – even after the initiative had ended in some cases.
- The OpenUCT initiative at the University of Cape Town (UCT) in South Africa was a particularly successful example of this. Once the initiative ended, stakeholders at the institution agreed that the OpenUCT repository had to be maintained and become an integral part of the institution's operations. The instrument of small grants of up to ZAR10,000 (approximately US \$650) used in the initiative for staff and students to develop or adapt teaching and learning content into OER, was incorporated into the university's general teaching and learning grants. Furthermore an [UCT's Open Textbook Award](#), was established which recognizes the efforts of open textbook authors and promotes the creation and reuse of OER, thus formally rewarding open practices.

5.5.Comprehensive strategic education policies with an OER component

This type of policy refers to strategies for (parts) of the education system that include OER as a building block.

Examples include the education cooperation policy of 32 so-called smaller Commonwealth states under the name of Virtual University for Small States of the Commonwealth (VUSSC), and the Open Learning Policy Framework for South African Post-School Education and Training of the South African Government.

5.5.1.Examples:

- The Virtual University for Small States of the Commonwealth (VUSSC) is a network of 32 small countries that work collaboratively to expand access to and improve the quality of post-secondary education in their countries. It acts as a forum for educational institutions to build capacity and expertise in online collaboration, eLearning, and information and communication technologies (ICT). Educational institutions collaborate within the VUSSC in designing, developing, and delivering post-secondary, skills-related courses and university-level programs in areas that enhance their economic, social, and community growth. To this end, VUSSC promotes the sharing and transfer of course content, learning materials, and resources using Creative Commons (CC) licenses (OER). Over the years, VUSSC has been involved in several OER-related initiatives in countries around the world (Baijnath, Hoosen, Butcher & Lelliott, 2022).
- In 2017, the South African Department of Higher Education and Training (DHET) established the 'Open Learning Policy Framework for South African Post-School Education and Training', under the Higher

Education Act, the Continuing Education and Training Act and the Skills Development Act. The Open Learning Framework is aimed at exploring ways in which open learning can respond to the social, economic and transformation needs of the country. In the framework, OER are strongly recommended as a mechanism to support the sustainable development and sharing of quality learning materials (Goodier, 2017). There are, however, currently no overarching national policy about digital infrastructures and their implementation in the specific context of (O)ER (Prinsloo & Roberts, 2022).

- Part of the framework was the project Cases on Open Learning (COOL), executed by the Centre for Innovation in Learning and Teaching ([CILT](#)) at the University of Cape Town (UCT). Its objective was to investigate the uptake of ‘open learning’ (of which OER are an important part) in Technical Vocational Education and Training (TVET) colleges and higher education (HE) institutions. Primary objective of the COOL project was to contribute to improving inclusion and social justice in the South African tertiary education sector by seeking to understand factors relating to equitable access, inclusive institutional culture, responsive teaching practice, sensitive student support, free and open access to materials, appropriate assessment, widely accepted accreditation and ongoing professional development.

5.6. Policies related to general ICT for learning with some OER component

This type of policy is typically national or regional ICT, e-learning, or distance learning policies or strategies in which OER are embedded, but in which OER are not the central element of the policy.

Examples of this type of policy include the Digital Strategy for Cyprus, the Plan Ceibal of Uruguay to provide ICT-tools to promote equal access and educational retention in all levels of education. Also, the Acceleration Plan in Higher Education in the Netherlands and the policies of German regions and federal government to support OER-portals can be mentioned as examples here. In these programs, OER are part (building blocks) of broader ICT programs in order to achieve certain objectives; to contribute to greater access to education, to reduce the costs of educational resources, or to enable new modes of education such as Open Educational Practices.

5.6.1.Examples:

- In 2012 the Cypriot government recognized that the use of Information and Communication Technologies (ICT) plays a key enabling role for achieving a smart, sustainable and inclusive economy and society. Therefore, it developed a comprehensive plan for the development of information society in Cyprus and the uptake of ICT entitled “Digital Strategy for Cyprus. One of the objectives was to connect the whole Cyprus with high-speed networks, so that all citizens, businesses, and public bodies have access to information society services and benefit from the use of ICT. Another was to promote digital education by using ICT as a dynamic tool aiming at the upgrade, the enrichment, and the reform of the educational process. Amongst other activities the latter included the development of free digital educational content for most primary and secondary schools. OER. In this case, OER are intended to improve the quality of educational resources and thereby increase the quality of primary and second-level education. They are also intended to give teachers

(and pupils) free access to high-quality educational resources, enabling them to develop and apply innovative teaching practices. (Republic of Cyprus, 2012).

- In Uruguay, public education prevails at all levels of education, initial, primary, and middle levels, as well as technical education and teacher training. Public education is free of charge and autonomous. Public education comprises 85% of total enrolment at initial, primary, and secondary education levels.
- The Uruguayan government offers several programs aimed to promote equal access and educational retention, amongst the Plan Ceibal aimed at providing laptops for teachers and students, connectivity in schools and public spaces, educational platforms and the production and delivery of a wide variety of educational digital materials, both for public and private educational institutions, especially at the primary and secondary level. The latter entails a hybrid strategy that involves, on the one hand, the negotiation of copyrights with publishers and developers to offer digital content platforms in line with Uruguayan copyright laws and, on the other, the creation of repositories of Open Educational Resources (OER) as well as incentives for the creation and use of OER.
- In the Netherlands, higher education institutions have joined forces under the umbrellas of SURF to jointly advance the use of information and communication technologies at universities and to jointly organize the necessary IT infrastructure development and the use of digital services. In 2018, the so-called Acceleration Plan for educational innovation at member institutions was launched. OER is a vital part of this program. Participating universities have committed to participate actively and to make yearly investments of €250K. Dutch government has provided additional funding of 15 million euros (<https://www.versnellingsplan.nl/en/>). An important outcome of the program is that all public Dutch higher education institutions have agreed to jointly advance the creation, sharing, reuse of OERs and to develop a joint strategy regarding procurement of digital commercial learning materials (de Jong & van den Berg, 2022).
- In 2022, the Dutch government has pledged €560M for further investment in digitization at universities (<https://www.digitaliseringsimpuls.nl>). In parallel, the Dutch government has approved an impulse investment program for primary, secondary, and vocational education, entirely focused on the further development of OER and the repository infrastructure needed for it. The scope of that program is €65M (<https://www.openleermateriaal.nl>).
- The education system in Germany is federally structured: legislation and implementation of education are regulated at state level (Länder). This also applies to the topic of digitisation of education. However, a national Digital Agenda for 2025 ("Digital Strategy 2025") was created in 2016, as well as concrete measures ("Digitalisierung gestalten"- Umsetzungsstrategie der Bundesregierung) in 2018 (Bedenlier & Marín, 2022). In mid-2022, the memorandum "OER-Strategie. Freie Bildungsmaterialien für die Entwicklung digitaler Bildung" (BMBF, 2022) was published. In it, the national government states that, as part of its digital agenda, it wishes to support the innovative potential of digital educational media and materials and to promote

modernisation and innovation in education. OER offer potential for collaboration, competence development and the development of new pedagogical practices to support the development of learners and teachers in all areas of education.

- Several regions (Länder) support university portals for Open Educational Resources (OER). An exemplary example of this approach is ORCA.nrw - that is the Open Resources Campus of the state of North Rhine-Westphalia: a big online portal for digitally supported teaching and learning in which all 37 public universities in NRW participate (<https://www.orca.nrw>). On it, teachers and students can find OER, and teachers can publish their own materials and thus contribute to unrestricted access to education. ORCA.nrw is part of the so called "[Digitalisierungssoffensiv](#)".
- In doing so, this and other portals provide a tool for networking and exchange. At national level there is the "Kooperationsnetzwerk OER-förderliche Infrastrukturen und -Dienste" (KNOER) (www.kn-oer.de). KNOER actively organizes the development of open educational offerings at the federal level. Its aim is to establish national sustainable cross-state cooperation in OER (communities and OER repositories and OER referatoria) and making high-quality, freely accessible teaching and learning materials in different subjects available across Germany (Wissenschaftsrat, 2022).

5.7.Policies aimed at open government that include an OER component

Open government policies (OGPs) focus on national priorities for open government in which values are formulated for transparency, accountability, and public participation.

In the past ten years several nations have discovered the powerful intersection between Open Government Policy and Open Education and Open Educational Resources and have therefore included OE and OER as leverages in their open government policies (Wetzler, 2020). According to the 2019 OGP Global Report, at the end of 2018, 52 of the 84 members of the Open Government Partnership²⁰ reported they had concrete plans for education within their OGPs (Open Government Partnership, 2019a). Arguments in favor of OER mentioned in the various plans included reduction of exorbitant costs of conventional educational materials, the viability of updating open-source resources, improving student performance and inclusiveness in the educational systems (Open Government Partnership (2019c). The examples given are derived from SPARC and Open Government Partnership Global Report (Open Government Partnership, 2019b, 2019c)

5.7.1.Examples:

- In the [Third National Action Plan](#), the Brazilian government has established a model for assessing, procuring, promoting and distributing digital learning materials in order to achieve an open digital culture in education. The objective is to create the conditions for continuous use and adaptation of digital learning resources, and

²⁰ The Open Government Partnership (OGP) is an international organization of government leaders and civil society advocates united to promote more transparent, accountable, and responsive governance and services for citizens. The OGP includes 78 National governments (representing 2 billion people) and additional local governments working closely with thousands of civil society organizations.

to recognize and value the plurality and diversity of Brazilian education. Although this commitment does not explicitly mention open education or open licensing, it refers to the principles of openness, including giving priority to the "continuous use and adaptation" of learning resources.

- The [Third National Action Plan of Chile](#) includes a statement entitled "Open Educational Resources for Civic Education," through which the Library of the National Congress is committed to openly licensing a set of resources to support digital civic education under a Creative Commons Attribution (CC-BY) license. These include a curriculum framework, lesson plans, an evaluation system and a training module for teachers.
- Greece's OER commitment in their [Third National Action Plan](#) to create a publicly accessible digital library populated with OER. In accordance with the open education efforts already being led by the Ministry of Education, Third National Action Plan Research and Religious Affairs, their commitment also aims to create a new procurement process allowing for school manuscripts and other educational resources at all levels of education to be Creative Commons licensed, and educate students and teachers on open education more generally.

5.8. Open Access, Open Science and Open GLAM Policies

Worldwide, we are witnessing the fact that OER are increasingly becoming part of Open Science policies, Open Access policies, and Open GLAM (galleries, libraries, archives, and museums) policies. An increasing number of national states subscribe to the principle that science and its findings and artifacts of cultural heritage should be visible and accessible to all, without financial or other barriers (open access).

Probably the most common component of Science and Open Glam is Open Access: 'openness to everyone' (see [Budapest Open Access Initiative](#)). Findings of publicly financed science and cultural heritage collections are to be re-used by users without permission. There is close alignment between Open Science, Open Access and Open GLAM and OER. Resources from the aforementioned can in fact be freely used as open content, as OER.

5.8.1.Examples

- In February 2022, the Academy of Science of South Africa published a draft open access and open science policy stating that all "publicly funded research processes and outputs", meaning all research backed by government funds in South Africa will have to be published in open access journals. It would also cover all data acquired or generated by public funds (Van der Merve, 2022)
- Open GLAM has been practiced by an increasing number of institutions for several years, and best practices and standards have emerged. A pioneer in making their cultural heritage collection open is the Rijksmuseum in Amsterdam (<https://www.rijksmuseum.nl/>), a national museum of the Netherlands containing a wealth of internationally important artworks and historical objects. In 2011 the Rijksmuseum began to consider releasing some of their images online. An overview of open access policies and practices can be found in the [Open Glam survey](#). This survey lists 1,424 institutions that have published open glam data, from Aruba to Venezuela.

5.9. Labor market policies

This last type of policy has a strong focus on skills development for the labor market and incorporates OER.

5.9.1.Examples

- The most comprehensive and exemplary examples of this type of policy with the inclusion of OER are the Trade Adjustment Assistance Community College and Career Training (TAACCT) grant program and the Career Pathways Innovation Fund Grants Program of the USA Department of Labor.
- The TAACCT grant program was meant to increase the ability of US community colleges to address the challenges of the US workforce. Grants were provided to assist workers adversely affected by trade agreements in industry sectors facing problems as well as a broad range of other adults. Every U.S. state received funding during 2011 – 2014 totaling \$1.9 billion. TAACCT grants were impacting 60% of the nation's publicly funded community colleges and building industry-aligned programs in manufacturing, healthcare, information technology, energy, transportation and other industries.
- Under the TAACCT program the free and open online library SkillsCommons.org was developed. This repository contains free and open learning materials and program support materials for job-driven workforce development, developed by the colleges and other educational institutions. SkillsCommons.org is designed and managed by the California State University and its Merlot program. On September 12, 2022 the total number of hits was 7,997,926 of which 4,457,808 were file downloads.
- Under the Career Pathways Innovation Fund Grants Program the US Department of Labor provided \$122 million in grant funds to be awarded to Local Workforce Investment Boards (LWIBs), individual community and technical colleges, community college districts, and state community college systems. In order to further the goal of career training and education and encourage innovation in the development of new learning materials, all grantees are required to publish all work created with the support of the grant as OER.
- The third example is from South Africa. In 2017, South African Department of Higher Education and Training (DHET) established the 'Open Learning Policy Framework for South African Post-School Education and Training', under the Higher Education Act, the Continuing Education and Training Act and the Skills Development Act. The Open Learning Framework is aimed at exploring ways in which open learning can respond to the social, economic and transformation needs of the country. In the framework, OER is strongly recommended as a mechanism to support the sustainable development and sharing of quality learning materials. Part of the Open Learning Framework.

6. The COVID-19 pandemic and OER

6.1. Introduction

The rapid and unexpected outbreak of the COVID-19 pandemic has had a major impact on education worldwide. It disrupted 'the normal'. Education all over the globe was unprepared for the challenges of the COVID-19 pandemic and millions of students were denied education. In a very short period of time teachers and students in all educational sectors had to adopt new instructional and learning strategies and methods and make courses suitable for Emergency Remote Education. We use this term rather than the term online distance education because it better describes the practices deployed by educators and educational institutions during the first waves of the pandemic (Bozkurt and Sharma, 2020a; Hodges et al. (2020).

Many governments and sectoral educational institutions issued emergency relief bills, financial packages and special assistance and support programs (Bozkurt et al., 2020; Johnson, Veletsianos & Seaman, 2020; Stracke et al. 2022). Almost all international organizations, institutions and many recognized scholars established special initiatives, hubs and webpages to share resources. Publishers temporarily opened their repositories. International organizations such as UNESCO, COL and the World Bank established partnerships to support educational institutions around the world to smooth the transition to Emergency Remote Education, supported by the big tech companies.

Early in the pandemic, UNESCO issued the "Guidance on Open Educational Practices during School Closures: Utilizing OER under COVID-19 Pandemic in line with UNESCO OER Recommendation" (Huang et al., 2020) which pointed out the aforementioned benefits of OER as well as how these could be implemented. Its focus was not so much on learning resources (creating, sharing, etc.), but rather on practice-based approaches that promote collaboration between learners and instructors for the creation and sharing of knowledge.

6.2. Examples

In a review article by Bozkurt et al. (2020) of the pandemic approach in 31 countries, OER are mentioned as one of the ways in which institutions and governments provided students with access to digital learning resources. OER represented an agile solution to the problems posed by the sudden total shutdown of education. With OER, educators could use digital learning materials instantly and, if necessary, adapt them to the needs of the growing population of online learners, without being confronted with copyleft issues, whether in terms of translation into the first language, accessibility, or reduced costs. Wetzler (2020) and [Open Government Partnership](#) give examples of how governments have used OERs in the COVID-19 response.

- Slovakia, within the framework of the Open Government Partnership (OGP), was mapping all available open educational resources in the Slovak language. When schools had to close due to COVID-19 quarantine, the Slovak OGP team promptly decided to release a 'work-in-progress' version of the resource map via social media. It became the most popular Facebook post ever. Teachers and parents found it very useful to use, adapt and reuse the resources immediately and the effect might last well beyond the current crisis.

- When Poland, with its 24,000 schools, 600,000 teachers and 4.8 million pupils, switched to ERE, NGOs were able to immediately reinforce educational efforts with open educational resources. The educational platform for e-textbooks (an open educational resource) of the Polish Ministry of National Education, previously little used by teachers, became an important and well-used tool because it was immediately available without restrictions. Lessons on the Web (Lekcje w sieci), a web service, created more than 200 OER lesson scenarios for all education levels in three weeks.
- During the pandemic, the Shanghai government, local educational authorities, educational institutions, and organizations made tremendous efforts to ensure that every student had access to basic technologies and that online learning materials were freely available to all students as well to the public. Because of the availability of accessible technologies and high-quality (open) educational resources, schools and colleges were able to offer emergency remote education and help students studying at home while avoiding disruption of their learning schedules.

6.3. Insights from worldwide developments

From an analysis of 1150 publications covering COVID-19 and education, two thematic clusters emerged: (1) educational response, emergency remote education, and continuity of education, and (2) the psychological impact of COVID-19 (Bozkurt et al., 2022). These findings are consistent with an earlier bibliometric study by Mishra et al. (2021) which learns that the impact of psychosocial issues on teaching and learning was one of the most important and researched topics. Other trending topics were Emergency Remote Education, distance learning, virtual learning environments and technologies for teaching and learning. From a literature search of K-12 research on education and COVID-19, the findings revealed that the focus was predominantly on the challenges to shifting to ERE, teacher digital competencies and digital infrastructure, teacher ICT skills, parent engagement in learning, and students' health and well-being (Bond, 2020 referred to in Bozkurt et al., 2022).

The global pandemic accelerated the need for digital resources and more in particular the open accessibility of the digital resources, and thence for OER. The evaluation study by Stracke et al. (2022) confirms that the pandemic encouraged a situation in which the combination of online learning and OER in combination with many other types of digital resources played a key role in ensuring the continuity of education (see also Bozkurt et al, 2020; Wetzler, 2020). COL 2021 survey data show that OER use increased by more than 50% during the pandemic (COL 2022).

Despite the growing number of studies, the impact of the COVID-19 pandemic on education is still insufficiently known (Bozkurt et al., 2022). Studies to date provide only patchy evidence of the impact of the pandemic on learning and teaching. This picture is confirmed by research conducted by Abu Talib et al. (2021), Bozkurt et al. (2022) and Stracke et al. (2022). In each of these studies, it is also pointed out that the pandemic could be an impetus for a broader acceptance of openness in science and education, and acceptance of OER. But at the same time, it is warned that there are potentially serious problems that need to be addressed, such as inequality and inaccessibility, technical difficulties, the need for technological literacy, privacy issues in online environments,

difficulties in assessing student performance, lack of student engagement, participation, and motivation, and the stress and workload for teachers.

A more thorough understanding of the serious implications the pandemic has for education, however, requires more systematic empirical research according to Mishra et al (2021), Bozkurt et al (2022) and Bozkurt (2022). This is certainly true of studies on the role of OER.

A critical look will also have to be taken at the position that private companies have built up (Williamson et al. 2022). Tech companies helped to switch to some form of online learning, to provide education to as many students as possible. But in the rush to do so, few governments checked whether the EdTech solutions they were quick to approve, or purchase were safe for students. In a study of online platforms approved by 49 governments, Human Rights Watch concludes that in 9 of 10 cases privacy is not guaranteed and user data is collected for purposes that have little to do with education (Human Rights Watch, 2022). With the need to respond quickly to lockdowns and school and campus closures in 2020, it is clear that there was insufficient time and attention to work out fair terms for commitments. For now and certainly for the future, it is important to realize that rushed short-term decisions and agreements are likely to have undesirable longer-term effects (Czerniewicz, 2022).

A key lesson learned is that there is a 'new normal' and it is significantly different from the "normal in 2019, to which we cannot return". The new normal is about change, recalibration, resilience, agility, sustainability, and scaling digital transformation to ensure personalized, inclusive, and accessible learning for all where no one is left behind (Stracke et al., 2022). OER and Open Educational Practices (OEP) can play a crucial role in this respect (Zhang et al. 2020; Gerard, et al, 2020). Therefore, OER and OEP must be encouraged, and initiatives to raise awareness and incentives should be developed to encourage educators to produce and use OER as a way to sustain OEP (Bozkurt & Sharma, 2022b).

7. Main challenges in mainstreaming OER

7.1. Introduction

In order for OER to reach its full transformative potential for supporting the realization of SDG4, mainstreaming of OER is necessary. 'Mainstreaming' here means that OER needs to be more tightly embedded into educational policies and practices from early childhood education to post-secondary and higher education and lifelong learning (UNESCO, 2017).

The previous chapters sketched a current situation where uptake of OER is currently at a tipping point. On a global scale, awareness of OER and its potential for improving the quality of education and access to high quality education is growing, the COVID pandemic has increased the need for OER and the UNESCO Recommendation on OER has mapped out a path to come to a situation where in 2030 OER is globally adopted at large scale to optimally support the SDG's.

The main challenges that inhibit the transformation of OER to a key element in mainstream education exist on micro- (of the individual teacher, learner or support staff), meso- (the institution or department) and macro-level (national and global). It takes concerted actions, e.g. as described in the Recommendation, to address these challenges and truly enable OER to reach its full potential.

The following overview of challenges is based on studies conducted in recent years on sharing and reusing OERs in international education. Most of the studies have been conducted in higher education, but also K-12 and TVET have been studied.

An overview of the sources:

- Various UNESCO initiated documents that eventually led to the OER Recommendation in 2019 (COL, 2017; UNESCO, 2019; Miao et al. 2019)
- Studies undertaken in the ROER4D-project²¹. This project has been an important stimulus for the development of OER in the Global South (Hodgkinson-Williams, 2018)
- Various (meta)studies, targeting challenges on (inter)national level, in institutions as those at individual level (Schuwer & Janssen, 2018; Baas, Admiraal & Van den Berg, 2019; Kinyua, 2021; Tlili et al, 2020; Tlili et al, 2021; Wimpenny et al, 2019; Luo et al, 2019; Tang, 2020; Marín et al, 2022; Menzli et al, 2022; Tlili et al, 2022)

These studies made clear that challenges are similar in all educational sectors and all regions of the world. The weight of these challenges can vary. For instance, in the Global South, localization was a greater challenge (because of the “de-westernization” of the content) than elsewhere (Wimpenny et al, 2019).

7.2. Overview of the inhibitors of mainstreaming

Especially studies leading to the Ljubljana OER Action Plan in 2017 (UNESCO, 2017) revealed that on a global scale the following issues needed an action plan to tackle them:

1. **Capacity of users to find, re-use, create and share OER.** To effectively use OER, educators, learners and librarians need the capacity to find, re-use, modify and share materials created under an open license. Furthermore, user-friendly tools to locate and retrieve OER need to be mainstreamed. Support and action in particular from Governments, educational institutions, especially teacher and librarian training institutions as well as professional associations; are necessary for the realization of the suggested actions in this area.
2. **Language and cultural issues.** OER should be available in diverse languages, particularly those that are less used, under-resourced or endangered, including indigenous languages. It should also be adapted to the related cultural context where it is used for uptake in local contexts within a Human Rights framework. Furthermore, for

²¹ <https://www.roer4d.org/>

OER to be used widely, sharing and use of knowledge from different sources needs to be accepted by educational stakeholders. Support and action in particular from governments, educational institutions – especially teacher and librarian training institutions as well as professional associations, including those responsible for language harmonization – are particularly important for the realization of these actions.

3. **Ensuring inclusive and equitable access to quality OER.** OER should be accessible to all learners who are both in formal and non-formal education contexts, irrespective of age, physical ability, socio-economic status, as well as those who live in remote areas (including nomadic populations), internally displaced and refugees, in all instances under a framework that ensures gender equality.
4. **Developing sustainability models.** OER are affecting traditional and stimulating new sustainability models associated with the creation and use of educational resources. OER also create opportunities for new providers to enter the education space with innovative models designed from the start to be open. There is a need to identify the full spectrum of possibilities for innovative sustainability models and the benefits they provide government, institutions, educators, librarians and learners. There is also a need to also develop innovative solutions and new sustainable value- added models to ensure that learners have access to high quality educational experiences and the resources and tools needed to support these experiences.

What follows is a more detailed overview of inhibitors, ordered into three levels.

7.2.1. Micro-level: Instructors/teachers/faculty

- Insufficient (allocation of) time
- Lack of clarity about the added value of creating and reusing OERs for instructors (what's in it for me)
- No recognition of and appreciation for sharing OER. This is especially felt by teachers in universities with research favored over teaching.
- Insufficient skills in metadata, searching OER, licensing, copyright and usage rights
- Lack of clarity about quality of OER found
- Inadequate support for instructional design, educational issues, copyright issues and ICT
- OER do not offer a "total solution". Commercial learning materials are often accompanied by test banks, slides, and other supplementary materials. Such a total solution is often lacking with OER.
- Lack of a supportive (work) environment
- Insufficient insights into (existence of) institutional policies on OER

7.2.2. Meso-level: institutions

- Little awareness about OER and its potential value for the institutions
- Insufficient grip on quality assurance of OER published under the institution's banner
- Lack of clarity about the added value of OER for the institution
- Lack of clarity on how to stimulate teachers to adopt OER in their teaching.

- Struggle with addressing views such as *not invented here*, *my content is king*, or *I created it in my own time so the institution is not an owner*
- Lack of clarity on how adoption of OER can be made sustainable (not dependent on one-time project grants)
- Lack of clarity about what issues are at play within topic communities about sharing and reusing OER.
- Institutional policies are scarce and often still generic and poorly operationalized
- Initiatives are still too much the work of enthusiastic teams or individuals and embedded in (not yet sustainable) projects.
- Insufficient interoperability between OER repositories and institutional systems
- Struggle to sustain OER initiatives after an initial (internal or external) funded phase

7.2.3. Macro-level: sectors and (inter)national

- Insufficient insights into significance on effect on learning outcomes with or without OER
- Sustainability of cross-institutional OER initiatives
- No national policy on OER, embedded in a policy for (higher) education and/or connected to policies on Open Science, Open Data and Open Education
- Intercultural practices to foster open education in a variety of learning environments (e.g. language and cultural issues in OER)

8. Conclusion

Reviewing developments in education today, it is clear that digital or perhaps better technology-enhanced learning is becoming a dominant part of the global learning landscape. This report has provided an overview and a critical reflection of open educational resources (OER) as a key component of this landscape.

OER have both generic and derived values for educational provision and delivery. The generic benefits are all about OER, i.e., the learning materials themselves. Through offering a 're-use-first' approach to creating learning materials, OER can promote efficiency in the education system and improve quality. This is because learning materials do not have to be repeatedly created afresh but can be adapted from existing materials. The time and resources saved in this process allows course creators to spend more time on ensuring quality for the learner. Course creators can concentrate on ensuring that the materials are appropriate to their target audience in terms of empirical content (i.e., keeping it up to date), but also in terms of the use of examples, frameworks for understanding, and language. Ultimately, this will contribute to making the learning environment more inclusive for diverse learning groups.

The experience of education systems dealing with COVID-19 has also emphasized a critical point in the context of technology-enhanced learning. It has shown that changing the medium of learning (to different forms of remote

learning via online learning, TV, radio etc.) requires changes to the processes surrounding the creation and delivery of learning opportunities.

The derived benefits of OER are all about the new open processes, which can be unleashed when working with OER as learning materials. Particularly, the co-creation of learning materials, and therefore of learning environments, with other instructors and, where possible, with the learners themselves, creates a more supportive, peer exchange-centered process. The evidence from dealing with the COVID-19 pandemic has particularly confirmed the importance of a supportive environment that helps educators to adapt existing learning settings to new framework conditions (e.g., moving from face-to-face to online learning). OER clearly played a key role in ensuring the continuity of education during the pandemic, with one international survey showing that OER usage increased by more than 50% during this period.

The acceptance of OER as a key component of the learning landscape had already been growing long before the COVID-19 pandemic. However, coping with the 'new normal' during the pandemic certainly made the significance of OER clearer to more teachers, educational leaders, and policymakers. It is for this reason that the study argues that OER are at a tipping point - moving from innovation to become part of the mainstream. This tendency can be seen across the globe.

However, a review of the inhibiting factors blocking this mainstream transition only shows the importance of well-designed policies and action plans. But this doesn't make OER any different from any other educational intervention. Learning ecosystems have to be carefully crafted, to empower teachers and learners, while ensuring an overall stability of the system and a predictability of outcomes for beneficiaries (direct and indirect) of an education system. During the pandemic, changes and adaptations in the education system became possible as this was the only way to secure the provision of learning. Common rules related to how learning is delivered, by whom, when and using what medium were relaxed. Policies which build on what was learnt during this period about what is possible, and which are the inhibiting factors (i.e. which build on a clear gap analysis) can lead to better education systems, which are high quality and inclusive. This report concludes that there is work to be done here.

But how linked are the potentials of digital learning to the potentials of OER? We might conclude this report with the statement that if harnessing digital learning is key to achieving significant progress towards SDG4 beyond constraints of infrastructure and place, OER are the component of this new landscape, which ensures that the learning provided is focused on the real needs of the learners and significantly contributes to a community-based practice of teaching and learning.

An inclusive global learning landscape must be dynamic and as adaptable as possible to ensure that it is really fulfilling every learner's needs. It is one of the central principles to achieving the SDGs that we should leave no-one behind (LNOB) and OER, by their very characteristics of openness, encourage and support participative processes in education that can ensure transformation and progress through meaningful participation of all stakeholders in

education. OER can and should be leveraged to ensure that learners, instructors, employers and the whole of society can play their part in achieving effective learning environments for all.

9. Appendix: What is Open?

In the UNESCO Recommendation on OER (UNESCO, 2019), the following definition of Open Educational Resources is used:

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.

In practice however, more differentiated contexts can be distinguished. To name a few:

- A lecturer can prefer adaptable learning materials but will be indifferent on access.
- A learner will in many cases only be interested in free access and not in adaptability. But the same learner can, when pedagogy makes it necessary, also be interested in adaptability. Think e.g., about practices of *open pedagogy* (for examples, see the Open Pedagogy Notebook²²)

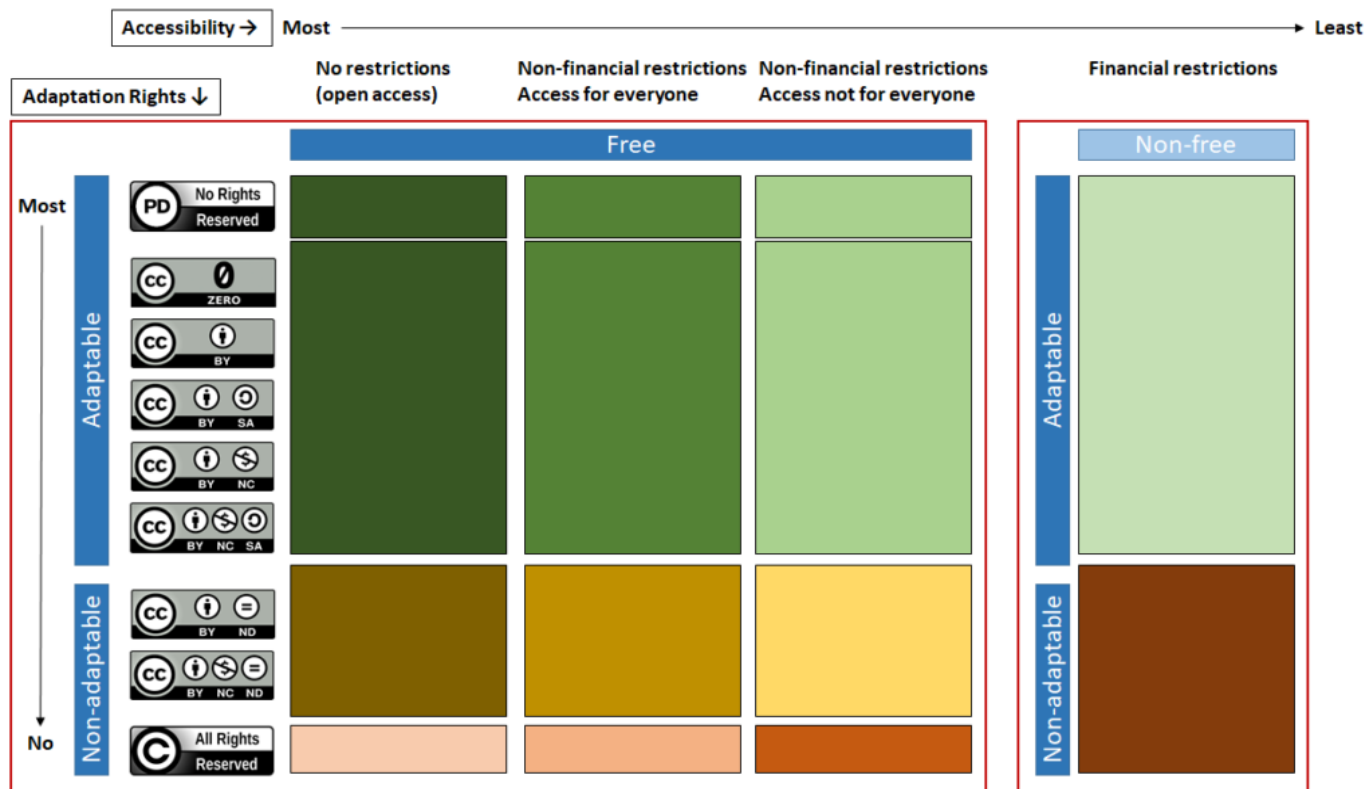
To cope with these situations, we propose a framework to categorize learning resources. This framework is an extension from (Wiley, 2020, p. 26) ([source](#), p. 26).

From the definition can be inferred that OER are a subclass from learning resources. Learning resources can be categorized using two dimensions:

- Access
 - no restrictions (open access), for everyone
 - non-financial restrictions, for everyone
 - non-financial restrictions, not for everyone (walled garden)
 - financial restrictions
- Adaptation rights
 - Adaptable (users have permission to adapt)
 - Non-adaptable (users have no permission to adapt)

Learning resources with access without financial restrictions are called **free** learning resources. The next figure is a graphical representation of our framework.

²² <http://openpedagogy.org/>



Some background information to this framework:

- For the free learning resources (without restrictions or with non-financial restrictions), adaptation rights are ordered from most (100%) to no rights to adapt. Licenses provide the conditions for adaptation. In the figure we have adopted the commonly used Creative Commons licenses²³. These licenses are about the rights creators give to others to retain, use, adapt and distribute their works and the conditions to be met when exercising those rights. The licenses do not cover restrictions on access to the works.
- The figure also shows that two Creative Commons licenses do not grant rights of adaptation due to the ND (*Non Derivative*) condition.
- The most common non-financial restriction when access for everyone is available is the obligation to create a free account to get access.
- A very common situation for non-financial restrictions, access not for everyone is membership of a group (institution, community of practice).
- The size of each area does not reflect a relative importance or a personal preference of that area, compared to the other areas

Ultimately, widening adoption of sharing and reusing educational resources is the primary aim. We therefore have chosen for a pragmatic view on openness. Characteristics like technical openness (only open-source tools and

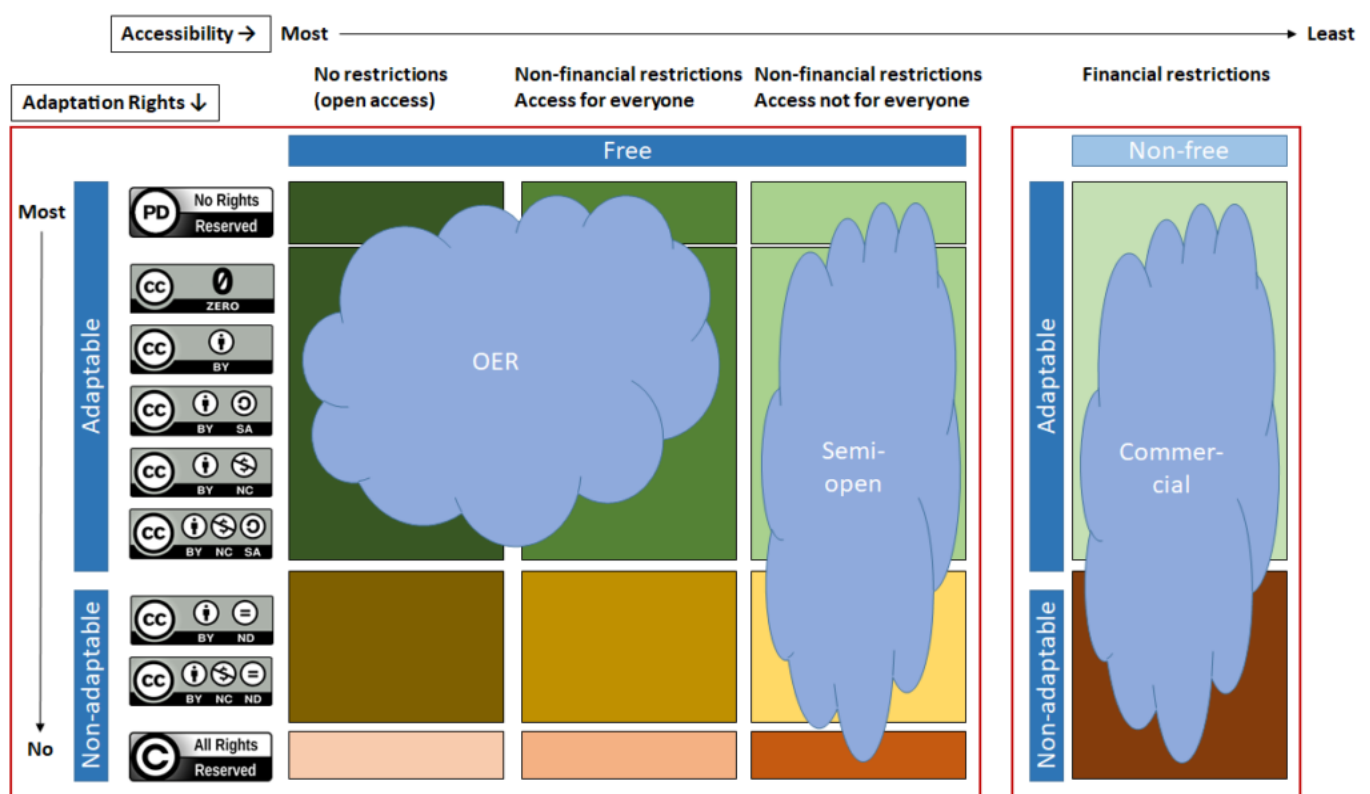
²³ <https://creativecommons.org/>

platforms are allowed to access the resource) or content requirements (e.g. inclusive, accessible to people with disabilities) have not been considered.

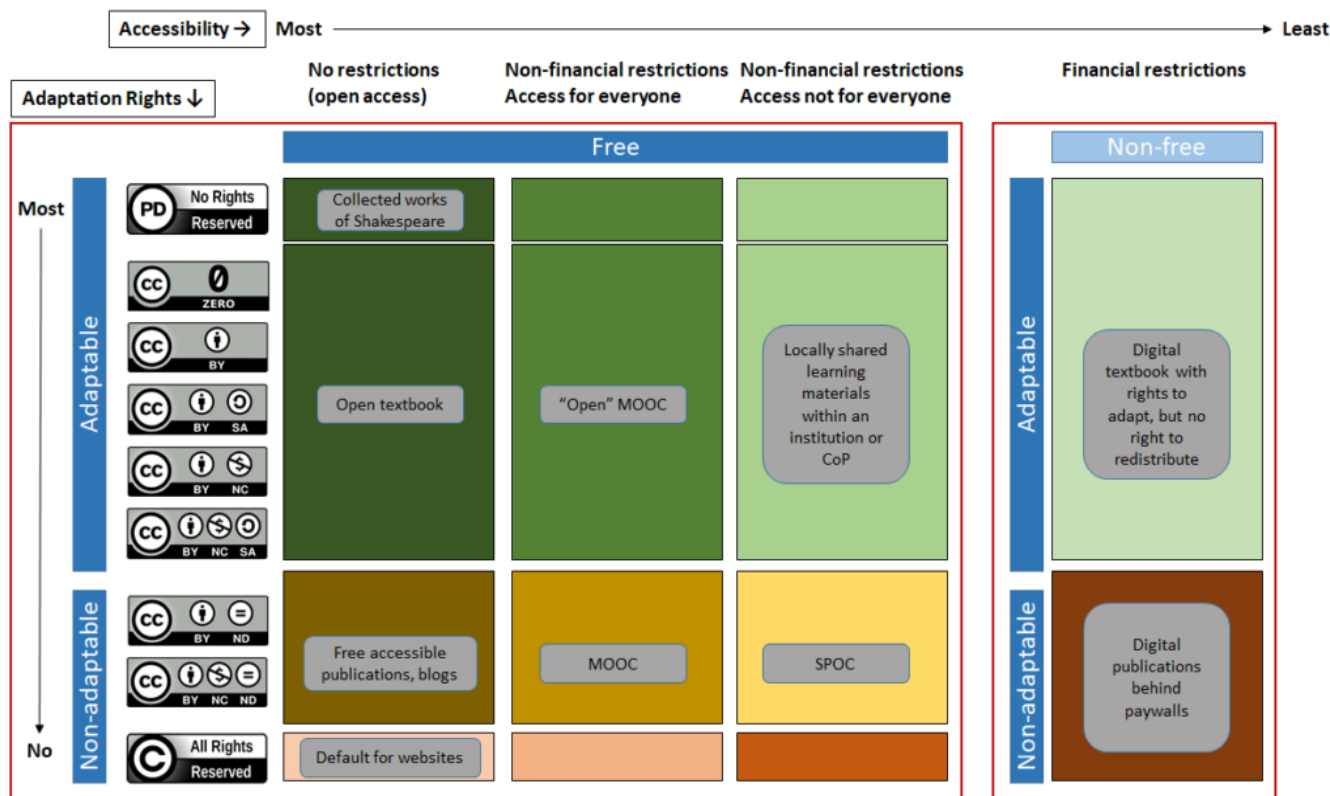
This framework allows us to distinguish between different types of openness for educational resources, next to OER:

- **Semi-open resources** are teaching, learning, and research resources that are available to a limited group of persons and eventually licensed in a manner that provides everyone in this group with free and perpetual permission to engage in the 5R activities, be it with the restriction that redistribution happens only within the limited group.
- **Commercial resources** are teaching, learning, and research resources that are only available under financial restrictions.
- **Closed resources** are teaching, learning, and research resources that are unavailable for a person or a group of persons. This definition is dependent on the perspective of the stakeholder. E.g. semi-open learning resources, available for a group, appear to be closed for persons outside of that group.

In the next figure we have positioned the sets of OER, semi-open learning resources and commercial learning resources in the framework.



To illustrate the framework, we have added some examples.



In this report, we have concentrated on OER. However, in our view, the discussion about more and better access to high quality educational resources should also embrace resources that are only freely accessible or OER within a limited group. These are also worthwhile and can contribute to realizing the UNESCO SDGs.

REFERENCES

1. Introduction

Otto, D., Schroeder, N., Diekmann, D., & 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>

2. Potential of OER

- Adam, T. (2020). Between Social Justice and Decolonisation: Exploring South African MOOC Designers' Conceptualisations and Approaches to Addressing Injustices. *Journal of Interactive Media in Education*, 2020(1), p.7. DOI: <http://doi.org/10.5334/jime.557>
- Baas, M., & Schuwer, R. (2020). What About Reuse? A Study on the Use of Open Educational Resources in Dutch Higher Education. *Open Praxis*, 12(4), 527-540. <https://dx.doi.org/10.5944/openpraxis.12.4.1139>
- Bali, M., Cronin, C., & Jhangiani, R. S. (2020). Framing open educational practices from a social justice perspective. *Journal of Interactive Media in Education*, 2020(1). <https://doi.org/10.5334/jime.565>
- Clifton, A., & Hoffman, K. D. (2020). *Open pedagogy approaches*. Milne Library. <https://milnepublishing.geneseo.edu/openpedagogyapproaches/>
- Clinton, V. (2019). Cost, Outcomes, Use, and Perceptions of Open Educational Resources in Psychology: A Narrative Review of the Literature. *Psychology Learning & Teaching*, 18(1), 4–20. <https://doi.org/10.1177/1475725718799511>
- Clinton, V., & Khan, S. (2019). Efficacy of open textbook adoption on learning performance and course withdrawal rates: A meta-analysis. *AERA Open*, 5(3), 233285841987221. <https://doi.org/10.1177/2332858419872212>
- Clinton-Lisell, V. (2021). Open pedagogy: A systematic review of empirical findings. *Journal of Learning for Development*, 8(2), 255-268. <https://il4d.org/index.php/eil4d/article/view/511>
- COL (2017). Open Educational Resources: Global Report 2017. Burnaby: COL. http://oasis.col.org/bitstream/handle/11599/2788/2017_COL_OER-Global-Report.pdf
- Gallion, J. (2018). Performance Audit Report North Dakota University System Open Educational Resources. Office of the State Auditor, North Dakota. [Source](#)
- Hegarty, B. (2015). Attributes of open pedagogy: A model for using open educational resources. *Educational Technology*, (July-August), 3-13.
- Hodgkinson-Williams, C. A., & Trotter, H. (2018). A Social Justice Framework for Understanding Open Educational Resources and Practices in the Global South. *Journal of Learning for Development*, 5(3), 204-224.
- Lambert, S. R. (2018). Changing our (Dis)Course: A Distinctive Social Justice Aligned Definition of Open Education. *Journal of Learning for Development*, 5(3), 225-244. <https://files.eric.ed.gov/fulltext/EJ1197463.pdf>
- Menzli, L.J., Smirani, L.K., Boulahia, J.A., Hadjouni, M. (2022). Investigation of Open Educational Resources Adoption in Higher Education Using Rogers' Diffusion of Innovation Theory, *HELIYON*, <https://doi.org/10.1016/j.heliyon.2022.e09885>
- Nascimbeni, F., Burgos, D., Spina, E., & Simonette, M. J. (2020). Patterns for higher education international cooperation fostered by open educational resources. *Innovations in Education and Teaching International*, 58(3), 361-371. <https://doi.org/10.1080/14703297.2020.1733045>
- Orr, D., M. Rimini and D. van Damme (2015), *Open Educational Resources: A Catalyst for Innovation*. OECD Publishing, Paris, [Source](#).
- Parker, P. (2012). Explaining the Paradox: Perceived Instructor Benefits and Costs of Contributing to Massachusetts Institute of Technology OpenCourseWare. Utah State University. [Source](#)
- Schuwer, 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. *The International Review of Research in Open and Distributed Learning*, 19(3). <https://doi.org/10.19173/irrodl.v19i3.3390>
- Tang, H., Lin, YJ. & Qian, Y. (2021). Improving K-12 Teachers' Acceptance of Open Educational Resources by Open Educational Practices: A Mixed Methods Inquiry. *Education Tech Research Dev* 69, 3209–3232. <https://doi.org/10.1007/s11423-021-10046-z>
- TU Delft (2020). Extension School Impact Report 2020. TU Delft Extension School. [Source](#)
- UNESCO. (2019). *Recommendation on Open Educational Resources*. [Source](#)
- Valkenburg, W. van (2016). The Impact of DelftX MOOCs. In: Jansen, D. & Konings, L. (eds). *European Policy response on MOOC opportunities*. EADTU. ISBN 978-90-79730-20-9. [Source](#)

3. State of affairs and major trends of OER

- Bajinath, M., Hoosen, S., Butcher, N. & Lelliott, T. (2022). OER initiatives in African Higher Education: Successes, challenges, and lessons learnt. <https://www.oerafrica.org/resource/oer-initiatives-african-higher-education>
- Bundesministerium für Bildung und Forschung (BMBF), 2022. OER-Strategie. Freie Bildungsmaterialien für die Entwicklung digitaler Bildung. https://www.bmbf.de/SharedDocs/Publikationen/de/bmbf/3/691288_OER-Strategie.html
- COL (2016). *OER Policy – Provincial Ministries of Education Sri Lanka*. <http://hdl.handle.net/11599/2360>
- COL (2017). *Open Educational Resources: Global Report 2017*. Burnaby: COL <http://hdl.handle.net/11599/2788>
- COL (2022). *Open educational resources in the Commonwealth 2021*. Commonwealth of Learning. <http://hdl.handle.net/11599/4009>
- Grimm, S., & Rödel, B. (2020): Open Educational Resources (OER) an berufsbildenden Schulen. Ergebnisse einer bundesweiten Online umfrage. Bonn 2020. ISBN 978-3-96208-203-1. <https://www.bibb.de/dienst/veroeffentlichungen/de/publication/show/16676>
- Hoosen, S. & Butcher, N. (2012). *Survey of governments' policies on open educational resources (OER)*. Neil Butcher & Associates ISBN: 978-1-894975-54-1. https://en.unesco.org/sites/default/files/survey_on_government_oer_policies.pdf
- Kawachi, P. (2014). *The TIPS Framework Version-2.0 : Quality Assurance Guidelines for Teachers as Creators of Open Educational Resources*. The Commonwealth Educational Media Centre for Asia (CEMCA), New Delhi. <https://en.unesco.org/icted/content/quality-assurance-guidelines-open-educational-resources-tips-framework>
- Krause, N., & Krempkow, R. (2021). Infrastrukturen für OER in der Hochschullehre und die Kultur des Teilens. *Bunsen-Magazin* 23 (2), 72–76. https://www.researchgate.net/publication/350373803_Infrastrukturen_fur_OER_in_der_Hochschullehre_die_Kultur_des_Teilens
- de Oliveira Neto, J. D., Pete, J., Daryono & Cartmill, T. (2017). OER use in the Global South: A baseline survey of higher education instructors. In C. Hodgkinson-Williams & P. B. Arinto (Eds.). *Adoption and impact of OER in the Global South* (pp. 69–118). <https://doi.org/10.5281/zenodo.599535>
- Marín, V. I., Peters, L. N. , & Zawacki-Richter, O. (2022). *(Open) Educational Resources around the World: An International Comparison*. EdTech Books. https://edtechbooks.org/oer_around_the_world
- Marín, V. I., Bond, M., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Qayyum, A., Roberts, J., Sangrà, A., Slagter van Tryon, P. J., Veletsianos, G., & Xiao, J. (2020). A comparative study of national infrastructures for digital (open) educational resources in higher education. *Open Praxis*, 12(2), 241–256. <http://doi.org/10.5944/openpraxis.12.2.1071>
- Marín, V., Zawacki-Richter, O., Aydin, C., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J. & Zhang, J. (2022a). Institutional Measures for Supporting OER in Higher Education: An International Case-Based Study. *Open Education Studies*, 4(1), 310–321. <https://doi.org/10.1515/edu-2022-0019>
- Marín, V. I., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J., & Zhang, J. (2022b). Faculty Perceptions, Awareness and Use of Open Educational Resources for Teaching and Learning in Higher Education: A Cross-Comparative Analysis. *Research and Practice in Technology Enhanced Learning*, 17(11), 1–23. <https://doi.org/10.1186/s41039-022-00185-z>
- Orr, D., Neumann, J., & Muuß-Merholz, J. (2017). *German OER Practices and Policy — from Bottom-up to Top-down Initiatives*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000261446>
- Otto, D. (2019). Adoption and diffusion of open educational resources (OER) in education: A meta-analysis of 25 OER-projects. *International Review of Research in Open and Distributed Learning*, 20(5), 122-140. <https://doi.org/10.19173/irrodl.v20i5.4472>
- Otto, D., Schroeder, N., Diekmann, D., & 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>
- ROER4D (2017). Spotlight on OER policy in the Global South: Case studies from the Research on Open Educational Resources for Development (ROER4D) project. DOI: <http://dx.doi.org/10.5281/zenodo.844695>

- Seaman, J. & Seaman, J. (2022). *Turning Point for Digital Curricula: Educational Resources in U.S. Higher Education*. Bay View Analytics <https://www.bayviewanalytics.com/reports/turningpointdigitalcurricula.pdf>
- UNESCO Institute for Information Technologies in Education (UNESCO-IITE) (2020). *Online and Open Education in Shanghai: Emergency Response and Innovative Practice during COVID-19*. <https://unesdoc.unesco.org/ark:/48223/pf0000373891.locale=en>
- Wissenschaftsrat (2022). *Empfehlungen zur Digitalisierung in Lehre und Studium*. ISBN: 978-3-949641-00-8, DOI: <https://doi.org/10.57674/sg3e-wm53>
- Zawacki-Richter, O., & Bozkurt, A. (2022). Research Trends in Open, Distance, and Digital Education. In O. Zawacki-Richter & I. Jung (Eds.), *Handbook of Open, Distance and Digital Education* (pp. 1–23). Springer.
- Zawacki-Richter, O., Conrad, D., Bozkurt, A., Aydin, C. H., Bedenlier, S., Jung, I., Stöter, J., Veletsianos, G., Blaschke, L. M., Bond, M., Broens, A., Bruhn, E., Dolch, C., Kalz, M., Kondakci, Y., Marin, V., Mayrberger, K., Müskens, W., Naidu, S., ... Xiao, J. (2020). Elements of open education: An invitation to future research. *The International Review of Research in Open and Distributed Learning*, 21(3). <https://doi.org/10.19173/irrodl.v21i3.4659>

4. Overview of main players in OER content development

- Allen, N., Bell, S., & Billings, M. (2014). Spreading the word, building a community: Vision for a national librarian OER movement. *Against the Grain*, 26(5). <https://doi.org/10.7771/2380-176x.6842>
- Do, M. (2013). Open Educational Resources in Vietnam. In Dhanarajan, G. & Porter, D. (eds). *Open educational resources: An Asian perspective* (pp. 161-172). Commonwealth of Learning and OER Asia. http://oasis.col.org/bitstream/handle/11599/23/pub_PS_OER_Asia_web.pdf
- HOUU (2018). Angebot ≠ Auftrag. Aktivitäten im Universitätskolleg Digital 2017/2018. <https://uhh.de/w1ind>
- Janssen, B. & Van Casteren, W. (2020). *Digitale leermaterialen in het hoger onderwijs (Digital learning materials in higher education)*. Acceleration Plan Educational Innovation with ICT. <https://www.versnellingsplan.nl/wp-content/uploads/2021/09/Rapport-zone-digitale-leermaterialen-in-hoger-onderwijs.pdf>
- Marín, V. I., Zawacki Richter, O., Aydin, C.H., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J., & Zhang, J. (under review). Institutional Measures for Supporting OER in Higher Education: An International Case Based Study.
- Müller, F. J. (2019). Opportunities and challenges of state-financed open educational resources: The Norwegian model – a way to more inclusion? <https://doi.org/10.31235/osf.io/7325g>
- Müller, F. J. (2021). Say no to reinventing the wheel: How other countries can build on the Norwegian model of state-financed OER to create more inclusive upper secondary schools. *Open Praxis*, 13(2), 213. <https://doi.org/10.5944/openpraxis.13.2.125>
- Perifanou, M., & Economides, A. A. (2022). The Landscape of MOOC Platforms Worldwide. *The International Review of Research in Open and Distributed Learning*, 23(3), 104-133. <https://doi.org/10.19173/irrodl.v23i3.6294>
- Salem, J. A. (2017). Open pathways to student success: Academic library partnerships for open educational resource and affordable course content creation and adoption. *The Journal of Academic Librarianship*, 43(1), 34-38. <https://doi.org/10.1016/j.acalib.2016.10.003>
- Schuwert, R., Kreijns, K., & Vermeulen, M. (2014). Wikiwijs: An unexpected journey and the lessons learned towards OER. *Open Praxis*, 6(2), 91. <https://doi.org/10.5944/openpraxis.6.2.116>
- Versantvoort, M., & Schuwert, R. (2022, May). *The Truth is Out There: Dutch Nursing realized sustainable adoption of OER* [Conference session]. OE Global 2022, Nantes. <https://connect.oeglobal.org/t/the-truth-is-out-there-dutch-nursing-realized-sustainable-adoption-of-oer/3837>

5. Open Educational Resources Policies

- Atenas, J., Havemann, L., Neumann, J., & Stefanelli, C. (2020). *Open Education Policies: Guidelines for co-creation*. Open Education Policy Lab. <https://doi.org/10.5281/zenodo.4032993>
- Bajinath, M., Hoosen, S., Butcher, N. & Lelliott, T. (2022). OER initiatives in African Higher Education: Successes, challenges, and lessons learnt. <https://www.oerafrica.org/resource/oer-initiatives-african-higher-education>

- Bedenlier, S. & Marín, V.I. (2022). Open Educational Resources within the Digital Transformation of German Higher Education. In V.I. Marin, L.N. Peters, L.N. & O. Zawacki-Richter (Eds.), *(Open) Educational Resources around the World. An International Comparison*, EdTech Books. https://edtechbooks.org/oer_around_the_world
- Bundesministerium für Bildung und Forschung (BMBF) (2022). *OER-Strategie. Freie Bildungsmaterialien für die Entwicklung digitaler Bildung*. https://www.bmbf.de/SharedDocs/Publikationen/de/bmbf/3/691288_OER-Strategie.html
- COL (2016). *OER Policy – Provincial Ministries of Education Sri Lanka*. <http://hdl.handle.net/11599/2360>
- COL (2017). *Open Educational Resources: Global Report 2017*. Burnaby: COL <http://hdl.handle.net/11599/2788>
- COL (2022). *Open educational resources in the Commonwealth 2021*. Commonwealth of Learning. <http://hdl.handle.net/11599/4009>
- Goodier, S. (2017, August, 24). A look at the open learning policy framework for post-school education and training in South Africa. *ROER4BLOG*. <https://www.roer4d.org/3091>
- Grimm, S., & Rödel, B. (2020). *Open Educational Resources (OER) an berufsbildenden Schulen. Ergebnisse einer bundesweiten Online Umfrage*. <https://www.bibb.de/dienst/veroeffentlichungen/de/publication/show/16676>
- Hoosen, S. & Butcher, N. (2012). *Survey of governments' policies on open educational resources (OER)*. Neil Butcher & Associates, ISBN: 978-1-894975-54-1
https://en.unesco.org/sites/default/files/survey_on_government_oer_policies.pdf
- Janssen, B. & Van Casteren, W. (2020). *Digitale leermaterialen in het hoger onderwijs (Digital learning materials in Higher Education)*. Utrecht. <https://www.versnellingsplan.nl/wp-content/uploads/2021/09/Rapport-zone-digitale-leermaterialen-in-hoger-onderwijs.pdf>
- Jong, H. de & van den Berg, D. (2022). *Control of educational resources. Towards a national approach to digital and open educational resources, version 1.0*. Acceleration plan for educational innovation with ICT, Utrecht. <https://www.versnellingsplan.nl/wp-content/uploads/2022/06/Statement-on-the-national-approach-to-digital-and-open-educational-resources.pdf>
- Krause, N., & Krempkow, R. (2021). Infrastrukturen für OER in der Hochschullehre und die Kultur des Teilens. *Bunsen-Magazin* 23 (2), 72–76.
https://www.researchgate.net/publication/350373803_Infrastrukturen_fur_OER_in_der_Hochschullehre_die_Kultur_des_Teilens
- Marín, V. I., Bond, M., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Qayyum, A., Roberts, J., Sangrà, A., Slagter van Tryon, P. J., Veletsianos, G., & Xiao, J. (2020). A Comparative Study of National Infrastructures for Digital (Open) Educational Resources in Higher Education. *Open Praxis*, 12(2), 241–256. DOI: <http://doi.org/10.5944/openpraxis.12.2.1071>
- Marín, V., Zawacki-Richter, O., Aydin, C., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J. & Zhang, J. (2022a). Institutional Measures for Supporting OER in Higher Education: An International Case-Based Study. *Open Education Studies*, 4(1), 310–321. <https://doi.org/10.1515/edu-2022-0019>
- Marín, V. I., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J., & Zhang, J. (2022b). Faculty Perceptions, Awareness and Use of Open Educational Resources for Teaching and Learning in Higher Education: A Cross-Comparative Analysis. *Research and Practice in Technology Enhanced Learning*, 17(11), 1–23.
<https://doi.org/10.1186/s41039-022-00185-z>
- Miao, F., Mishra, S., Orr, D., & Janssen, B. (2019). *Guidelines on the development of open educational resources policies*. UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000371129>
- Mintzberg, H., Ahlstrand, B., & Lampel, J. (2009). *Strategy safari: The complete guide through the wilds of strategic management*. London, UK: FT Prentice Hall.
- Müller, F. J. (2019). Opportunities and challenges of state-financed open educational resources: The Norwegian model – a way to more inclusion? <https://doi.org/10.31235/osf.io/7325g>
- NDLA (2011). *NDLA: Innovation in acquisition, development and distribution of digital learning resources: EPSA2011253*. Submission for the European Public Sector Award by Norwegian Digital Learning Arena. EPSA/EIPA. <http://ndla.no>
- Neumann, J., Schön, S., Bedenlier, S., Ebner, M., Edelsbrunner, S., Krüger, N., Lüthi-Esposito, G., Marin, V. I., Orr, D., Peters, L. N., Reimer, R. T., & Zawacki-Richter, O. (2022). Approaches to Monitor and Evaluate OER Policies

- in Higher Education - Tracing Developments in Germany, Austria, and Switzerland. *Asian Journal of Distance Education*, 17(1). <http://www.asianide.com/ojs/index.php/AsianJDE/article/view/61>
- Open Government Partnership (2019a). *Global Report. Democracy Beyond the Ballot Box. Volume I*. Washington. https://www.opengovpartnership.org/wp-content/uploads/2019/09/Global-Report_Volume-1.pdf
- Open Government Partnership (2019b). *Global Report. Democracy Beyond the Ballot Box. Volume II*. Washington. https://www.opengovpartnership.org/wp-content/uploads/2019/06/Global-Report_Volume-2.pdf
- Open Government Partnership (2019c). *Global Report. Democracy Beyond the Ballot Box*. Washington. https://www.opengovpartnership.org/wp-content/uploads/2019/09/Global-Report_Education-.pdf
- Prinsloo, P. & Roberts, J. (2022). Analysis of Higher Education (HE) Systems' Approach in South Africa. National Infrastructures for Digital Educational Resources. V.I. Marin, L.N.
- Peters, L.N. & O. Zawacki-Richter (Eds.), *(Open) Educational Resources around the World. An International Comparison*, EdTech Books. https://edtechbooks.org/oer_around_the_world
- Schuer, R., Kreijns, K., & Vermeulen, M. (2014). Wikiwijs: An unexpected journey and the lessons learned towards OER. *Open Praxis*, 6(2), 91-102. <https://doi.org/10.5944/openpraxis.6.2.116>
- Van der Merve, C., (2022). *South Africa's draft open science policy promises shake-up*. <https://www.researchprofessionalnews.com/rr-news-africa-south-2022-2-south-africa-s-draft-open-science-policy-promises-shake-up/>
- Wetzler, J. (2020, June, 1). Leveraging OER for COVID-19 Response Efforts and International Partnerships. *Creative Commons*. <https://creativecommons.org/2020/06/01/leveraging-oer-for-covid-19-response-efforts-and-long-term-international-partnerships/>
- Wissenschaftsrat (2022). *Empfehlungen zur Digitalisierung in Lehre und Studium*. <https://doi.org/10.57674/sg3e-wm53>
- Zawacki-Richter, O., & Bozkurt, A. (2022). Research Trends in Open, Distance, and Digital Education. In O. Zawacki-Richter & I. Jung (Eds.), *Handbook of Open, Distance and Digital Education* (pp. 1–23). Springer.
- Zawacki-Richter, O., Conrad, D., Bozkurt, A., Aydin, C. H., Bedenlier, S., Jung, I., Stöter, J., Veletsianos, G., Blaschke, L. M., Bond, M., Broens, A., Bruhn, E., Dolch, C., Kalz, M., Kondakci, Y., Marin, V., Mayrberger, K., Müskens, W., Naidu, S., ... Xiao, J. (2020). Elements of open education: An invitation to future research. *The International Review of Research in Open and Distributed Learning*, 21(3). <https://doi.org/10.19173/irrodl.v21i3.4659>

6. The COVID-19 pandemic and OER

- Abu Talib, M., Bettayeb, A.M. & Omer, R.I. (2021) Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. *Education and Information*, 26 (6), 6719–6746. <https://doi.org/10.1007/s10639-021-10507-1>
- Bond, M. (2020). Schools and emergency remote education during the COVID-19 pandemic: A living rapid systematic review. *Asian Journal of Distance Education*, 15(2), 191–247. <https://doi.org/10.5281/zenodo.4425683>
- Bozkurt, A., Jung, I., Xiao, J., Vladimirsch, V., Schuer, R., Egorov, G., Lambert, S., Al-Freih, M., Pet, Olcott Jr. D., Rodes, V., Aranciaga, I., Bali, M., Alvarez Jr, A., Roberts, J., Pazurek, A., Raffaghelli, J. Panagiotou, N., de Coëtlogon, P., Shahadu, S., Brown, M., Asino, T., Tumwesige, J., Ramírez Reyes, T., Barrios Ipenza, E., Ossiannilsson, E., Bond, M., Belhamel, K., Irvine, V., Sharma, R., Adam, T., Janssen, B., Sklyarova, T., Olcott, N., Ambrosino, A., Lazou, C., Mocquet, B., Mano, M., & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 Pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126. <https://doi.org/10.5281/zenodo.3778083>
- Bozkurt, A., & Sharma, R. C. (2020a). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education*, 15(1), i–vi. <https://doi.org/10.5281/zenodo.3778083>
- Bozkurt, A., & Sharma, R. C. (2020b). Education in normal, new normal, and next normal: Observations from the past, insights from the present and projections for the future. *Asian Journal of Distance Education*, 15(2), i–x. <https://doi.org/10.5281/zenodo.4362664>
- Bozkurt, A. (2022). Resilience, adaptability, and sustainability of higher education: A systematic mapping study on the impact of the coronavirus (COVID-19) pandemic and the transition to the new normal. *Journal of Learning for Development (JL4D)*, 9(1), 1–16. <https://doi.org/10.5281/zenodo.6370948>

- Bozkurt, A., Karakaya, K., Turk, M., Karakaya, Ö., & Castellanos-Reyes, D. (2022). The Impact of COVID-19 on Education: A Meta-Narrative Review. *TechTrends*, 66, 883-896. <https://doi.org/10.1007/s11528-022-00759-0>
- COL (2022). *Open educational resources in the Commonwealth 2021*. Commonwealth of Learning. <http://hdl.handle.net/11599/4009>
- Czerniewicz, L. (2022). Multi-layered digital inequalities in HEIs: the paradox of the post-digital society. In: Global University Network for Innovation (GUNI), *New Visions for Higher Education towards 2030 – Report 8. Special Issue. Part 2: Transitions: Key Topics, Key Voices*. Barcelona. https://www.guninetwork.org/files/guni_heiw_8_complete_-_new_visions_for_higher_education_towards_2030_1.pdf#page=124
- Gerard, L., Wiley, K., Haydel DeBarger, A., Bichler, S., Bradford, A. & Linn, M.C. (2021). Self-directed Science Learning During COVID-19 and Beyond. *Journal of Science Education and Technology*, 31, 258–271 <https://doi.org/10.1007/s10956-021-09953-w>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The difference between emergency remote teaching and online learning*. EDUCAUSE Review. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Huang, R., Liu, D., Tlili, A., Knyazeva, S., Chang, T. W., Zhang, X., Burgos, D., Jemni, M., Zhang, M., Zhuang, R., & Holotescu, C. (2020). *Guidance on Open Educational Practices during School Closures: Utilizing OER under COVID-19 Pandemic in line with UNESCO OER Recommendation*. Beijing: Smart Learning Institute of Beijing Normal University. https://iite.unesco.org/wp-content/uploads/2020/05/Guidance-on-Open-Educational-Practices-during-School-Closures-English-Version-V1_0.pdf
- Human Rights Watch (2022). “How Dare They Peep into My Private Life?” Children’s Rights Violations by Governments that Endorsed Online Learning During the Covid-19 Pandemic. <https://www.hrw.org/report/2022/05/25/how-dare-they-peep-my-private-life/childrens-rights-violations-governments>
- Johnson, N., Veletsianos, G., & Seaman, J. (2020). U.S. faculty and administrators’ experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning*, 24(2), 6–21. <https://doi.org/10.24059/olj.v24i2.2285>
- Mishra, S., Sahoo, S., & Pandey, S. (2021). Research trends in online distance learning during the COVID-19 pandemic. *Distance Education*, 42(4), 494–519. <https://doi.org/10.1080/01587919.2021>
- Stracke, C.M.; Burgos, D.; Santos-Hermosa, G.; Bozkurt, A.; Sharma, R.C.; Swiatek Cassafieres, C.; dos Santos, A.I.; Mason, J.; Ossiannilsson, E.; Shon, J.G.; et al. (2022). Responding to the Initial Challenge of the COVID-19 Pandemic: Analysis of International Responses and Impact in School and Higher Education. *Sustainability* 2022, 14, 1876. <https://doi.org/10.3390/su14031876>
- Wetzler, J. (2020, June, 1). Leveraging OER for COVID-19 Response Efforts and International Partnerships. *Creative Commons*. <https://creativecommons.org/2020/06/01/leveraging-oer-for-covid-19-response-efforts-and-long-term-international-partnerships/>
- Williamson, B., Gulson, K.N., Perrotta, C., & Witzemberger, K. (2022) Amazon and the new global connective architectures of education governance. *Harvard Educational Review*, 92(2): 231–256, <https://doi.org/10.17763/1943-5045-92.2.231>
- Zhang, X., Tlili, A., Nascimbeni, F., Burgos, D., Huang, R., Chang, T., Jemni, M., & Koutheair Khribi, M. (2020). Accessibility within open educational resources and practices for disabled learners: a systematic literature review. *Smart Learning Environments*, 7(1). <https://doi.org/10.1186/s40561-019-0113-2>.

7. Main challenges in mainstreaming OER

- Baas, M., Admiraal, W., & Van den Berg, E. (2019). Teachers' Adoption of Open Educational Resources in Higher Education. *Journal of Interactive Media in Education*, 2019(1): 9, pp. 1-11. DOI: <http://doi.org/10.5334/jime.510>
- Commonwealth of Learning (COL) (2017). *Open Educational Resources: Global Report 2017*. Burnaby: COL. http://oasis.col.org/bitstream/handle/11599/2788/2017_COL_OER-Global-Report.pdf
- Hodgkinson-Williams, C. (ed.) (2018). *ROER4D - Adoption and Impact of OER in the Global South*. African Minds, <https://vavibook.com/read/adoption-and-impact-of-oer-in-the-global-south/>

- Kinyua, A. H. (2021). When the trainer is untrained: Stakeholder incapacitation in implementation and utilisation of open educational resources in Kenya. *Journal of Learning for Development*, 8(1), 171-181. <https://doi.org/10.56059/jl4d.v8i1.396>
- Luo, T., Hostetler, K., Freeman, C., & Stefaniak, J. (2019). The power of open: Benefits, barriers, and strategies for integration of open educational resources. *Open Learning: The Journal of Open, Distance and e-Learning*, 35(2), 140-158. <https://doi.org/10.1080/02680513.2019.1677222>
- Marín, V.I., Zawacki-Richter, O., Aydin, C.H. et al. Faculty perceptions, awareness and use of open educational resources for teaching and learning in higher education: a cross-comparative analysis. *RPTEL* 17, 11 (2022). <https://doi.org/10.1186/s41039-022-00185-z>
- Menzli, L.J., Smirani, L.K., Boulahia, J.A., Hadjouni, M. (2022). Investigation of Open Educational Resources Adoption in Higher Education Using Rogers' Diffusion of Innovation Theory, *HELIYON*, <https://doi.org/10.1016/j.heliyon.2022.e09885>
- Miao, F., Mishra, S., Orr, D., & Janssen, B. (2019). Guidelines on the development of open educational resources policies. UNESCO Publishing. http://oasis.col.org/bitstream/handle/11599/3455/2019_Guideliness_OER_Policy_final_COL_web.pdf
- Schuer, R., & Janssen, B. (2018). Adoption of sharing and reuse of open resources by educators in higher education institutions in The Netherlands: A qualitative study of practices, motives, and conditions. *The International Review of Research in Open and Distributed Learning*, 19(3). <https://doi.org/10.19173/irrodl.v19i3.3390>
- Tang, H. (2020). A qualitative inquiry of K-12 teachers' experience with open educational practices: Perceived benefits and barriers of implementing open educational resources. *The International Review of Research in Open and Distributed Learning*, 21(3). <https://doi.org/10.19173/irrodl.v21i3.4750>
- Tlili, A., Nascimbeni, F., Burgos, D., Zhang, X., Huang, R., & Chang, T. (2020). The evolution of sustainability models for Open Educational Resources: insights from the literature and experts. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2020.1839507>
- Tlili, A., Zhang, J., Papamitsiou, Z., Manske, S., Huang, R., Kinshuk, & Hoppe, H. U. (2021). Towards utilising emerging technologies to address the challenges of using open educational resources: A vision of the future. *Educational Technology Research and Development*, 69(2), 515-532. <https://doi.org/10.1007/s11423-021-09993-4>
- Tlili, A., Altinay, F., Huang, R., Altinay, Z., Olivier, J., Mishra, S., Jemni, M., & Burgos, D. (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), e0262615. <https://doi.org/10.1371/journal.pone.0262615>
- UNESCO (2017). Second World OER Congress Ljubljana OER Action Plan 2017. UNESCO, Paris. <https://unesdoc.unesco.org/ark:/48223/pf0000266206>
- UNESCO (2019). Recommendation on Open Educational Resources (OER). http://portal.unesco.org/en/ev.php-URL_ID=49556&URL_DO=DO_TOPIC&URL_SECTION=201.html
- Wimpenny, K., Nascimbeni, F., Affouneh, S., Almakari, A., Maya Jariego, I., & Eldeib, A. (2019). Using open education practices across the Mediterranean for intercultural curriculum development in higher education. *Teaching in Higher Education*, 27(1), 54-69. <https://doi.org/10.1080/13562517.2019.1696298>

8. Appendix

- UNESCO. (2019). *Recommendation on Open Educational Resources*. [Source](#)
- Wiley, D. (2020, May). *Everything You Always Wanted to Know About OER But Were Afraid to Ask*. <https://bit.ly/yavapai-wiley-2020>

ED/GEMR/MRT/2023/P1/09

<https://doi.org/10.54676/PLDD8708>