Understanding the Impact of OER: Achievements and Challenges

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UNESCO Institute for Information Technologies in Education

Authors: Sarah Hoosen and Neil Butcher, OER Africa
Editor: Svetlana Knyazeva, UNESCO Institute for Information Technologies in Education

Foreword by UNESCO IITE

For more than 15 years UNESCO has been supporting the OER movement, which is growing rapidly and has reached some remarkable achievements to date. By providing opportunities to expand access to lifelong learning, achieve quality education and establish legal and political frameworks that promote coordinated partnerships, OER has the potential to make significant contribution to Sustainable Development Goal 4: Quality Education (SDG4).

UNESCO IITE, as an integral part of UNESCO, recognizes the vital role of such innovations as OER in achieving SDG4 and, therefore, contributes to the implementation of activities aimed at mainstreaming OER in order to foster inclusive and equitable quality education.

This publication is the result of a collective effort of UNESCO IITE and OER Africa, an initiative established by the South African Institute for Distance Education (Saide). We express our deepest gratitude to all colleagues from OER Africa who were involved in this research project for their enthusiastic cooperation and high professionalism.

With this publication, we aim to critically review the growth of OER and its potential impact on education systems around the world. The publication points at some significant achievements as well as key challenges hindering the growth and potential of OER that need to be addressed. It comprises a synthesis report and a series of case studies from several countries in each of the five UNESCO regions.

UNESCO IITE expresses sincere appreciation to all experts on OER who provided their valuable contribution to this publication: Robin Wright (Australia), Viviane Vladimirschi (Brazil), Rory McGreal (Canada), Werner Westermann Juárez (Chile), Ronghuai Huang (China), Jan Pawlowski (Germany), Maria-Soledad Ramirez-Montoya (Mexico), Batbold Zagdragchaa (Mongolia), Wayne Mackintosh (New Zealand), Jane-Frances Obiageli Agbu (Nigeria), Mitja Jermol (Slovenia), Cheryl Hodgkinson-Williams (South Africa), Tolly S.A. Mbwette (Tanzania), Sana El Harbi (Tunisia), and Martin Weller (United Kingdom).

We hope this publication will encourage decision-makers, educators and innovators to engage with OER in ways that drive defined pedagogical improvements, while encouraging equity and diversity in global knowledge networks.

Tao Zhan
UNESCO IITE Director

Foreword by Saide

Saide's OER Africa initiative is delighted to partner UNESCO IITE in putting together this important publication. This builds on a long relationship between the organizations, based on our mutual commitment to enabling successful open learning for all, and on our belief in the potential of open educational resources (OER) in pursuing those ends. Unfortunately, the claims of OER in relation to equity, diversity and inclusion, as well as in improving pedagogy cost effectively, remain largely untested.

Based on 15 case studies from across the world, this publication seeks to shed light on these important issues: the economic and pedagogical value of investing in OER; the role of OER in fostering diversity, inclusion, and in purposively pursuing quality improvement and innovation; and, finally, the extent to which these important issues are being researched.

I am particularly grateful to my OER Africa colleagues, Neil Butcher and Sarah Hoosen, for their unstinting efforts in ensuring that our continent was firmly represented in this publication, and in helping to shape this publication.

Jennifer Glennie
Saide Director

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ACRONYMS

AB	Alberta
AfriVIP	African Veterinary Information Portal
ALT	Association for Learning Technology
ATEN	African Teacher Education Network
AU	Athabasca University
AVU	African Virtual University
BC	British Columbia
BCN	*Bibliloteca del Congreso Nacional* (Library of National Congress of Chile)
BOLT	Blended and Online Learning and Teaching
CAPES	*Portaria Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Coordination for Improvement of Higher Education Personnel Ordinance)
CC	Creative Commons
CC0	Creative Commons Zero
CC-BY	Creative Commons Attribution
CC-BY-NC	Creative Commons Attribution Non-Commercial
CC-BY-NC-ND	Creative Commons Attribution Non-Commercial No Derivatives
CC-BY-NC-SA	Creative Commons Attribution Non-Commercial Share Alike
CILT	Centre for Innovation in Learning and Teaching
CMEC	Council of Ministers of Education, Canada
CoET	College of Engineering & Technology
COL	Commonwealth of Learning
CONACYT	*Consejo Nacional de Ciencia y Tecnología* (National Council for Science and Technology)
CONICYT	*Comisión Nacional de Investigación Científica y Tecnológica* (National Commission of Scientific and Technological Research)
COP	Community of Practice
CPD	Centre for Professional Development
CPUT	Cape Peninsula University of Technology
CRA	*Centro de Recursos para el Aprendizaje* (Resource Centre for Learning)
CUDI	*Corporación Universitaria para el Desarrollo de Internet* (University Corporation for Internet Development)
CVC	Committee of Vice Chancellors (of Nigerian Universities)
CVSP	*Campus Virtual da Saúde Pública* (Virtual Campus of Public Health)
DfE	Department for the Economy
DHET	Department of Higher Education and Training
DIVESUP	*División de Educación Superior* (Division of Higher Education)
DLC	Distance Learning Centre
DOAB	Directory of Open Access Books
DOT4D	Digital Online Textbooks for Development
DREAM IT	Development Research to Empower All Mongolians through Information and Communications Technologies
DRM	Digital Rights Management
DUCE	Dar es Salaam University College of Education
ECOWAS	Economic Communities of West African States
EU	European Union
f2f	face-to-face
FOER	Free and Open Educational Resources
HEFCE	Higher Education Funding Council for England

HEFCW	Higher Education Funding Council for Wales
ICDE	International Council for Distance Education
ICT	Information and Communications Technology
IDNEUF	*Initiative pour le développement numérique de l'espace universitaire francophone* (Initiative for the digital development of the French-speaking university space)
IDRC	International Development Research Centre
IGNOU	Indira Gandhi National Open University
INACAP	*Instituto Nacional de Capacitación* (National Training Institute)
IP	Intellectual Property
IPP	*Instituto Profesional Providencia* (Providence Professional Institute)
IRRODL	International Review of Research in Open and Distributed Learning
ITSON	*Instituto Tecnológico de Sonora* (Sonora Institute of Technology)
JANET	Joint Academic Network
JISC	Joint Information Systems Committee
LSHTM	London School of Hygiene and Tropical Medicine
MB	Manitoba
MEC	*Ministério da Educação* (Ministry of Education)
MECSS	Ministry of Education, Culture, Science and Sports
MINEDUC	*Ministerio de Educación* (Ministry of Education)
MoE	Ministry of Education
MOOCs	Massive Open Online Courses
MOUs	Memoranda of Understandings
MUCE	Mkwawa University College of Education
MUST	Mongolian University of Science and Technology
NGO	Non-Governmental Organisation
NGREN	Nigerian Research and Education Network
NIALS	Nigerian Institute of Advanced Legal Studies
NOLS	National Open Learning System
NOUN	National Open University of Nigeria
NQC	National Quality Course
NQOC	National Quality Open Course
NQORCs	National Quality Open Resource Courses
NQOVCs	National Quality Open Video Courses
NSFAS	National Student Financial Aid Scheme
NTI	National Teachers' Institute
NUC	National Universities Commission
NWU	North-West University
OA	Open Access
OBP	Open Book Publishers
OCAD	Ontario College of Art and Design
OCW	OpenCourseWare
ODL	Open and Distance Learning
OEC	Open Education Consortium
OEL	Open Educational Licensing
OEP	Open Educational Practices
OER	Open Education Resources
OERu	Open Education Resources Universitas
OGP	Open Government Partnership
ONE	Open Network for Education
OU	Open University

OUT	Open University of Tanzania
P2Pu	Peer to Peer University
PLAR	Prior Learning and Recognition
PNLD	National Textbook Programme
PUC	*Pontificia Universidad Católica* (The Pontifical Catholic University)
PUCV	*Pontificia Universidad Católica of Valparaíso* (The Pontifical Catholic University of Valparaiso)
QORC	Quality Open Resource Course
QOVC	Quality Open Video Course
REF	Research Excellence Framework
REFRER	*Réseau francophone de ressources éducatives réutilisables* (Francophone Network of Reusable Educational Resources)
REL	*Ressources éducatives libres* (Open Educational Resources)
ReMeRI	*Red Mexicana de Repositorios Institucionales* (Mexican Network of Institutional Repositories)
RETRIDOL	Regional Training and Research Institute for Distance and Open Learning
RIPE	*Rede de Intercâmbio de Produção Educativa* (Educational Production Interchange Network)
ROER4D	Research on Open Educational Resources for Development
ROI	Return on the Investment
SA	South Africa
SEB	*Secretaria de Educação Básica* (Secretary of Basic Education)
SFC	Scottish Funding Council
SNI	*Sistema Nacional de Investigadores* (National System of Researchers)
TERNET	Tanzania Education and Research Network
TESSA	Teacher Education in Sub-Saharan Africa
TIE	Tanzania Institute of Education
TPM	Technological Protection Measures
UAB	*Universidade Aberta do Brasil* (Open University of Brazil)
UCDG	University Capacity Development Grant
UCL	University College London
UCT	University of Cape Town
UDSM	University of Dar es Salaam
UFPR	*Universidade Federal do Paraná* (Federal University of Paraná)
UJ	University of Johannesburg
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO IITE	UNESCO Institute for Information Technology in Education
UNISA	University of South Africa
UNITWIN	University Twinning Network
UNN	University of Nigeria Nsukka
UoV	University of Venda
UP	University of Pretoria
US	United States
UWC	University of the Western Cape
VUT	Virtual University of Tunis
WIPO	World Intellectual Property Organization
ZOU	Zimbabwe Open University

Executive Summary

Introduction

Open Educational Resources (OER) are educational resources that are offered freely, are openly available to anyone, and, under some licences, allow others to reuse, adapt, and redistribute the resources with few or no restrictions. The best known of these are the Creative Commons (CC) licences,[1] which provide legal mechanisms to ensure that people retain acknowledgement for their work while allowing it to be shared and which enable copyright holders, if they so wish, to restrict commercial activity or prevent people from adapting the work.

In 2012, the World OER Congress, which was attended by governments and educational and OER experts, emphasized using OER as a means of providing equal access to knowledge. The Congress led to the adoption of the Paris OER Declaration, which calls on governments worldwide to license publicly funded educational materials openly for public use.[2] With adoption of the Ljubljana OER Action Plan at the Second World OER Congress in 2017 and subsequent drafting of an OER Recommendation for possible approval at the 2019 UNESCO General Conference, the concept of OER has achieved global recognition and, at least in principle, mainstream acceptance. Given these realities, and as pressure mounts on education systems due to rising costs and changing skill demands in the global economy, it becomes important for intergovernmental organizations to enter the next phase of critical engagement with the growth and potential of OER.

UNESCO Institute for Information Technology in Education (UNESCO IITE) and OER Africa (an initiative of Saide) partnered to prepare this publication that critically reviews the growth of OER — its achievements and challenges — and its potential impact on education systems around the world.

Methodology

In gathering data for this publication, a two-pronged approach was adopted: completion of a desktop research exercise and development of a series of country case studies (based on a common questionnaire) prepared with input from OER experts from 15 countries in five UNESCO regions. All case studies included input on the OER in the higher education sector, with some including a focus on basic education (six respondents), secondary education (four respondents), and informal/lifelong learning (three respondents). Thus, the coverage of the case studies is not necessarily comprehensive regarding all aspects of OER in the country and reflects the views of the respondents in those specific focus areas. All case studies were sent to respondents for verification and checking before finalization.

Understandings of OER

Case studies generated for this research indicate that some respondents conflate OER with other open initiatives. Most commonly, Open Access (OA) and OER tend to be used interchangeably in some contexts. There were also examples where the concept of OER was conflated with 'free' initiatives. In one instance, a respondent noted that users need to log in or

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1   See Creative Commons. (no date). About the Licenses. Retrieved from https://creativecommons.org/licenses/
2   UNESCO Communication and Information. (no date). Open Educational Resources Congress passes historic declaration. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/in-focus-articles/2012/open-educational-resources-congress-passes-historic-declaration/UNESCO Communication and Information. (no date). UNESCO World OER Congress releases 2012 Paris OER Declaration. 26 June 2012. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/all-news/news/unesco_world_oer_congress_releases_2012_paris_oer_declaration/#.V6R86TgkpMs

request permission to use OER. Furthermore, although two respondents acknowledged that Massive open Online Courses (MOOCs) are not necessarily OER, they nevertheless reported on MOOCs. While there is not necessarily a conflation of the two concepts, it is possible that some respondents do see MOOCs and OER on a continuum, which suggests a fluidity in ideas of 'open'.

The findings from the case study research thus highlight some confusion around understandings of OER. The lack of knowledge about OER and copyright plays a major role in limiting OER growth and calls for more dissemination of knowledge about OER. Important to highlight is that OER emphasizes the right to reuse content.

POLICY COMMITMENTS

Several countries have developed national OER policies and the effects of these have differed from one context to another. Brazil has made great advances in the past decade in establishing laws and ordinances, as well as recently launching a platform with clear policies on copyright and reuse of resources. Nigeria recently developed a national OER policy for higher education institutions, and the country still needs to prepare plans and strategies to encourage adoption and implementation.

However, policy is not a priority for all countries, as some countries have no OER policies. In Tunisia, Tanzania, Slovenia, South Africa, the UK, Germany, and Chile, there is no specific national OER policy. Other countries focus more on other open concepts rather than OER specifically.

Some countries, particularly in the developed world, have no national OER policies but have supportive environments and contexts with funding provided for OER initiatives. In Canada, the respondent noted, there are no policies on OER in any province/territory or in any higher education institution. However, universities have developed guides and OA policies where evidence of inclusion of content in 'open repositories/resources' is one of the criteria for promotion in the Education Leadership stream.[3] Several provincial governments have provided funding for OER initiatives. Additionally, educational licences produced by provinces and the federal government are restrictively licensed using 'crown copyright', which generally (but not always) allows for the free educational use of content. In New Zealand, under the provisions of the New Zealand Government Open Access and Licensing (NZGOAL)[4] framework, School Boards of Trustees are strongly encouraged to adopt CC licensing policies. In Australia, although there are no centrally governed policies or legislation requiring educational materials produced with public funds to be openly licensed, it was reported that OER initiatives have emerged at an increasing rate at both government and institutional levels, and some educational material supported by federal or state education departments has been openly licensed for reuse. In these countries, there is thus a culture of OER support, although this is not backed by explicit national policy.

Data from this research exercise suggests that national government policies around OER may not always be a priority. Furthermore, some countries may have supportive local government guidelines, policies, and requisite funding. If contexts allow for free use of material for educational purposes, it is possible that this has decreased the urgency for national OER policies. However, in other instances (e.g. Tanzania and Tunisia), the lack of supportive policy is seen as an impediment to OER adoption, particularly as no funding is then allocated to OER development and use. Despite few national policies, interest in OER adoption is growing slowly but steadily.

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[3] The University of British Columbia. (2018). Guide to Reappointment, Promotion and Tenure Procedures. Retrieved from http://www.hr.ubc.ca/faculty-relations/files/SAC-Guide.pdf

[4] New Zealand government guidance for agencies to follow when releasing copyright works and non-copyright/ public domain material for reuse by others.

OER Adoption

Countries and institutions have their own reasons for initiating OER projects. Context matters too when considering whether and how OER are adopted. For example, Tunisia illustrates how contextual factors can severely limit the extent to which OER efforts have any visibility/impact; professors retain final decisions about educational materials, and any change in such an educator-centric setting to a collaborative setup would be challenging and require sensitive tackling, particularly in the design of appropriate incentive schemes. Similarly, in Chile, the current higher education context does not generate incentives that support the development of OER at national, institutional, or individual level. The Chilean respondent noted that although a Chilean delegation attended the OER World Congress in 2012, Chile did not formally support the adoption of the Paris declaration. Furthermore, while the educational resources portal EducarChile[5] appears registered as a public service that promotes OER in the OER World Map,[6] analysis of the Terms and Conditions of Use of resources indicates a wide range of restrictions that are not aligned with most definitions of OER. In South Africa, it was reported that there is no demonstrable evidence of wide acceptance of OER creation and distribution, and in Germany OER adoption is also reportedly low, particularly outside the community of German OER experts. Other countries appear to be in the early stages of adoption; for example, in Nigeria, there are efforts to raise awareness of OER. Countries are also engaged in efforts to share OER via online platforms. In contexts where there is extensive access to online content, the imperative to reuse and share resources might not be urgent, particularly if there is a belief that it is difficult and time-consuming to find OER. This view was reported from Australia and New Zealand. In the latter case, there are reportedly no government-supported mechanisms to enable sharing of OER.

The data suggests little evidence of wide acceptance of OER within the surveyed countries and, in many instances, OER initiatives feature largely as 'projects', without systematic integration. OER approaches or initiatives still appear to be an 'add on' in education systems rather than being part of a mainstream approach to creating and adopting materials.

Balance between OER Reuse and Creating New Materials

Data gathered in this research suggests that the extent to which respondents report a balance between OER reuse and creating new materials tends to depend on levels of OER activity in the country. Respondents from countries such as Mongolia, Nigeria, and China did report a balance between OER reuse and creating new OER.

In other countries, the focus is more on creating new OER. For example, the Canadian respondent reported that OER efforts tend to focus on creating new materials rather than adopting or adapting existing OER. Similarly, in the UK, while there is some evidence of OER reuse at the individual level, nearly all large-scale efforts are aimed at producing new materials. The Mexican respondent noted that there is a lack of training in legal and educational issues regarding appropriate reuse, which serves to discourage such efforts. Similarly, in Australia, it was reported that there is uncertainty in the education sector around the reuse of existing materials. As Australian educators have historically relied upon the educational statutory licences in the Copyright Act 1968 to copy material, they do not have experience in making individual decisions around copyright licensing. Furthermore, the Brazilian respondent pointed out that educators have used and adapted existing textbooks, photocopies, pictures, websites and graphics for many years, although most have little, if any, understanding of copyright laws. As this is one of the main challenges faced by Brazilian educators and other stakeholders, the Brazilian respondent argued that the focus should be on striking a balance between what are already common practices, raising awareness, and building the capacity of users to find, reuse, create, and share OER. She argued that this balance can be attained through appropriate support and a clear action plan aimed at future OER training efforts.

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[5]   EducarChile. (no date). Home Page. Retrieved from http://www.educarchile.cl/

[6]   OER World Map. (no date). Ministerio de Educación Chile (MINEDUC). Retrieved from https://oerworldmap.org/resource/urn:uuid:b3ace68a-e719-4d30-88ad-24d78ee834d8

The findings from this research indicate that an assessment of whether OER practices are achieving a balance between creating new materials and adapting/reusing OER may be too simplistic, as this depends on the context and level of OER activity within a country. However, the findings do point to a lack of awareness around reuse, highlighting the need for more efforts to focus on how to reuse OER.

OER Financing and Sustainability

Historically, donor organizations provided funding for OER, and increasingly governments are providing such funding. The findings from the case studies reveal various OER funding sources, and in most instances, governments provide funding. In Australia, it was reported that OER funding is generally provided either by federal or state education departments, via one-off grant funding or through the internal operational budgets of individual institutions. Donors also continue to play a significant role. In Canada, the respondent reported that funding for OER initiatives is via donor grants, provincial governments, and institutions. In South Africa, it was reported that adoption of OER is increasing at universities where either the institution or individual educators can attract funding from international donors and government. In Mexico, the respondent noted that OER are either produced using government funds or by institutions, whereas in Nigeria provision is made for OER within the National Open University of Nigeria (NOUN) course materials development budget. In Brazil, it was reported that there is a significant increase in the development and funding of OER projects, repositories, and portals, whether by public, private, or non-profit organizations, and there are also clear policies for licensing these initiatives. In this context, the growth of the OER movement appears to be serving to increase investment in the design and development of educational resources. OERInfo is the only nationally funded OER programme in Germany, and, compared to the large programmes on digitization, the project has received marginal funding. Higher education projects usually depend on internal institutional funding. Slovenia is reportedly focusing its funds on developing ICT infrastructure and in developing open educational content, using available European Union (EU) funding mechanisms to undertake different OER initiatives. In the UK, it was reported that there is currently little funding available for OER, and investment in OER is decreasing. Universities that have maintained successful OER projects do so through central institutional funding, and institutions like OpenEd and OU have developed sustainable business models as part of their marketing and recruitment strategy. For OERu in New Zealand, central infrastructure costs are funded by membership fee contributions from OERu partner institutions. The OERu also receives a general operating support grant that constitutes approximately 30% of the total costs of operation.

When considering sustainability provisions within policies, strategies and guidelines, in many instances it is unclear how much funding is allocated, and few make mention of funding mechanisms to ensure sustainability. This challenge was elaborated by respondents, as described below.

In contexts where there is no clear allocated funding, OER initiatives are not sustainable (e.g. Tanzania and Tunisia). Respondents from Mongolia, China, and Brazil pointed out that sustainability in national government-funded OER initiatives is affected by changes in government. Other respondents iterated the need for commercial business models in order to ensure sustainability. The Canadian respondent highlighted that OER initiatives have been supported by government grants, a practice that is not necessarily sustainable, and argued that traditional cultures, practices, and processes for procuring textbooks and other content must change. The Australian respondent reported that higher education institutions in Australia provide their educational services under commercial business models, calling for a need for OER to operate alongside business models for the commercial delivery of online educational services. There are also concerns around assuring the ongoing quality and validity of OER over time. In New Zealand, the OERu model was designed for sustainability from inception. It represents a disaggregated service provision model using a networked approach to fund shared technical infrastructure from nominal membership fee contributions,

for providing free access to OER-based online courses and funding recurrent assessment costs on a fee-for-service basis.

Respondents suggested some additional solutions to ensuring the sustainability of initiatives. These include diverting funds from programmes involving large and mainly foreign publishers to support OER textbook programmes, which could include a small student fee for OER adoption and assembly. Another suggestion made, is to use the OER funds to pay local publishers to print or digitally enhance the content, provided that they allow the government and institutions to retain the copyright using a CC licence. Institutions are also reportedly investigating the viability of providing commercial services associated with OER, such as micro-credentialing, badging, or assessment services.

The findings from this research confirm that while some OER efforts are financed through donor funding, promisingly, governments are increasingly funding OER initiatives, via grant funding or via institutions' operational budgets. However, in instances where one-off funding or funding for specific initiatives is provided, there might not always be sufficient funding or strategies to ensure these initiatives' ongoing implementation and sustainability. It is thus highlighted that the longer-term viability and stability of OER initiatives is uncertain unless they are built into the ongoing operational budgets of departments or institutions. Furthermore, sustainability in national government-funded OER initiatives may be affected by changes in government, which suggests a need for commercial business models to ensure sustainability.

Diversity and Inclusion

Data from this research confirms that most OER are produced in 'world languages' such as English, Spanish, Chinese, and French. In most countries, OER are reportedly produced in the dominant language of that country, and only in a few instances are OER produced in indigenous languages.

A significant issue still impacting on the inclusivity of OER is the issue of the digital divide, noted specifically in Brazil, where access to computers and the Internet is still a major challenge. Nevertheless, there is some evidence from the case studies of OER allowing for greater inclusion within countries with good Internet access. For example, in Mongolia, OER initiatives benefit students who reside in rural settlements, and have widened learning opportunities for people with limited mobility. Similarly, in China, there is an initiative to equip rural one-teacher schools with digital devices and digital educational resources to allow children in rural areas to receive a good education where they reside. OERu in New Zealand promotes diversity by encouraging the contribution of courses promoting indigenous knowledge, and all OERu online course materials are published openly without the need to register an account to gain access to the resources. This enables marginalized populations — for example, first-in-family indigenous students — to succeed 'anonymously'.

The Canadian respondent highlighted challenges of inclusion, particularly with regard to the publishing industry, and the use of commercial applications and Digital Rights Management (DRM), which restrict the ways users can copy and reuse content. The respondent from Nigeria mentioned that NOUN makes specific efforts to release its OER materials in three different formats, as this 'democratizes access to OER for academic reuse (odt), self-print (pdf) and for mobile devices (epub)'.

The above discussion highlights that issues of diversity are currently a marginal consideration with regard to OER in most countries. Significantly, no respondent included any substantive discussion of disability. Issues of language translation seem to be the main priority in terms of increasing access to educational materials. However, other issues related to diversity and inclusion — such as customising content to local contexts and needs — were less mentioned.

Research on Educational Impact and Effectiveness

In contexts where there is much OER activity, there concomitantly appears to be more rigorous research activity. Given that the OER movement is still in its infancy in some countries, unsurprisingly, in these countries research on OER use and impact is limited. In other contexts, there may be some OER activity but not much research.

Countries with more OER activity tend to undertake more research, depending on the focus of that activity.

In other countries, the focus may be less on research at a national level than on international issues, as is the case in Germany; research tends to focus on international issues and the European Horizon 2020 projects. There are also regional bodies that focus on OER research: for example, the Latin American Open Regional Community of Social and Educational Research (CLARISE) is a Community of Practice (COP) of researchers from higher education institutions and organizations related to the areas of educational innovation and technology.[7]

Respondents suggested several research issues that are worth exploring. The range of research issues that require further attention points to the need for significant work in almost all areas of OER, ranging from OER use and raising awareness to business models, marketing, credentialing, funding, and sustainability.

Based on data from the respondents, only one example was provided of research directly impacting on policy, as noted by the Brazilian respondent. The respondent noted that many of the research reports in that country provide a clear, evidence-based rationale for how the implementation of existing OER policies could greatly reduce costs of educational material. The findings from this research thus provide few examples of research focusing on the educational effectiveness of OER. Furthermore, there appears to be little focus on research around the cost-effectiveness of openly licensed materials.

Conclusion

Many efforts have been made to promote the OER movement and the use of OER, with funding and support by numerous donors and intergovernmental organizations, governments, and education institutions. There have been some remarkable achievements over the past 20 years as awareness has grown and initiatives have developed. While such developments are positive, however, this research suggests that OER appears to remain for the most part on the margins in education systems, and its impact is influenced by political and governmental changes, as well as lack of systematic and integrated funding to ensure sustainability of the OER initiatives that are implemented. There is confusion in terminology around openness, pointing to a need to clarify understandings of OER and related concepts.

While governments may have expressed commitment to policies in support of OER, this has not necessarily translated into action or funding. Thus, policy is not a pre-condition for a context supportive of OER, although it appears to bolster OER efforts. Additionally, a context supportive of OER (e.g. through funding and creating collaborations) appears to yield more significant benefits than just the presence of policies. Commercial interests and lack of awareness may limit the development and implementation of supportive OER policies.

There appears to be little consideration to tackling issues of diversity and inclusion. In particular, the challenge of the digital divide continues to impact on OER use and participation in the Global South and underserved areas in the Global North. Nevertheless, there is some evidence of OER allowing for greater inclusion within countries, particularly in those with adequate digital infrastructure. Furthermore, while there are several research initiatives to share OER experiences, the data suggests few examples of

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7   CLARISE. (no date). About Us. Retrieved from https://sites.google.com/site/redclarise/

research focusing on the educational effectiveness of OER. There also appears to be little focus on research around the cost-effectiveness of openly licensed materials, and there is no strong evidence that research is systematically undertaken alongside OER policy implementation.

OER efforts are primarily funded by donors, governments, and institutions, and the model adopted differs according to the context. There are also regional efforts to fund OER initiatives. Institutions are either developing their own, internal budgets to accommodate OER, or attracting funding from donors — particularly in contexts where there might not be direct national policies or government funding for OER. There are varied approaches to funding, and it can be argued that the overreliance on external funding leaves OER initiatives vulnerable in terms of sustainability. It may thus be worth focusing efforts on establishing and promoting a culture of sharing such that it becomes a norm — and this can be either at the policy level or via continued, specific grassroots initiatives and support.

INTRODUCTION

In 2002, the term 'Open Educational Resources' (OER) was adopted at UNESCO's Global Forum on Open Courseware to describe the phenomenon of sharing educational resources under open licences. At its core, OER is a simple legal concept: it describes educational resources that are offered freely, are openly available to anyone, and, under some licences, allow others to reuse, adapt, and redistribute the resources with few or no restrictions. The best known of these are the Creative Commons (CC) licences,[8] which provide legal mechanisms to ensure that people retain acknowledgement for their work while allowing it to be shared and which enable copyright holders, if they so wish, to restrict commercial activity or prevent people from adapting the work. OER can include lecture notes, slides, lesson plans, textbooks, student handouts, videos, online tutorials, podcasts, diagrams, entire courses, and any other material designed for use in teaching and learning.

In 2012, the World OER Congress was held in Paris, featuring presentations from key supporters of OER worldwide. The Congress, attended by governments and educational and OER experts, emphasized using OER as a means of providing equal access to knowledge. It showcased innovative policies and initiatives that demonstrate the potential of OER to improve communities. Importantly, the Congress led to the adoption of the Paris OER Declaration, which calls on governments worldwide to license publicly funded educational materials openly for public use.[9]

The Second World OER Congress was held in September 2017 in Ljubljana, Slovenia. Its aim was to achieve a robust mechanism for ensuring high-level governmental and intergovernmental dialogue on OER issues. With adoption of the Ljubljana OER Action Plan at the Second World OER Congress in 2017 and subsequent drafting of an OER Recommendation for possible approval at the 2019 UNESCO General Conference, the concept of OER has achieved global recognition and, at least in principle, mainstream acceptance. This is further reinforced by the growing number of national OER policy initiatives in existence and by rapid growth in access to openly licensed content online (reported by Creative Commons[10] to be nearly 1.5 billion openly licensed resources in 2017 compared to 140 million in 2006).[11]

Given these realities and as rising costs and changing skill demands in the global economy exert increasing pressure on education systems, it becomes important for intergovernmental organizations to enter a new phase of critical engagement with the growth of OER and its potential impact, for better or worse, on education systems around the world. This publication is a partnership between the UNESCO Institute for Information Technology in Education (UNESCO IITE) and OER Africa[12] (an initiative of Saide)[13] to assess whether the stated, but largely unproven, educational potential of OER is yet being realized. Given the global emergence and recognition of OER, the specific objective of this publication is to critically review the adoption of OER and the impact of OER on education systems around the world.

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[8]   See Creative Commons. (no date). About the Licenses. Retrieved from https://creativecommons.org/licenses/
[9]   UNESCO Communication and Information. (no date). Open Educational Resources Congress passes historic declaration. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/in-focus-articles/2012/open-educational-resources-congress-passes-historic-declaration/ UNESCO Communication and Information. (no date). UNESCO World OER Congress releases 2012 Paris OER Declaration. 26 June 2012. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/all-news/news/unesco_world_oer_congress_releases_2012_paris_oer_declaration/#.V6R86TgkpMs
[10]   A non-profit organization focused on expanding the range of creative works available for others to build upon legally and to share, which has released several copyright licences (CC licences) free of charge to the public.
[11]   Creative Commons. (no date). State of the Commons. Retrieved from https://stateof.creativecommons.org/
[12]   https://www.oerafrica.org/
[13]   https://www.saide.org.za/

Methodology

The research focused on the following key questions:

1) Are growing policy commitments to OER accompanied by financial commitments to invest in content creation or is open licensing driving down the perceived economic value of investing in creating high-quality educational content? And are these investments consistent between the developed and the developing world?

2) Is the emergence of OER fostering diversity and inclusion across and within countries or is it facilitating new forms of cultural imperialism? And what roles is OER playing in supporting (or impeding) emergence of educational materials in different languages (and especially in languages that are underrepresented online)?

3) How strong is the connection in policies supportive of OER to clearly defined pedagogical improvements? And is the emergence of OER driving educational innovation or simply entrenching traditional educational practices?

4) What research is being undertaken alongside OER policy implementation to measure the real educational impact and cost-effectiveness of openly licensing educational materials? And, where impact and cost-effectiveness gains have been identified, are these consistent across countries or is open licensing contributing to a greater digital divide?

In gathering data for this publication, a two-pronged approach was adopted: completion of a desktop research exercise and development of a series of country case studies. The case studies were based on a common questionnaire derived from the above questions (see Appendix A). To gather data, identified experts on OER from several countries in each of the five UNESCO regions were requested to complete the questionnaire detailing OER initiatives in their country. These experts were identified based on their involvement in regional workshops in the run-up to the Second World OER Congress, as well as their positions as International Council for Distance Education (ICDE)/UNESCO Chairs in OER. Respondents were asked to focus on one or more educational sectors in their country where there was meaningful evidence of OER activity and provide answers specific to the sector/s in question (see Table 1 for a list of the case study respondents).

Table 1   Case study respondents

Country	Contributor
Australia	Robin Wright, Manager, Acquisitions, Records and Copyright, Swinburne University of Technology
Brazil	Viviane Vladimirschi, Director, E-Connection
Canada	Rory McGreal, UNESCO/COL/ICDE Chair in OER, Athabasca University
Chile	Werner Westermann Juárez, Civic Education Programme, Lead; Library of National Congress of Chile
China	Ronghuai Huang, Dean of Smart Learning Institute, Beijing Normal University
Germany	Jan Pawlowski, Professor, Hochschule Ruhr West (University of Applied Sciences)
Mexico	Maria-Soledad Ramirez-Montoya, UNESCO Chair Movimiento Educativo Abierto para América Latina, Tecnologico de Monterrey
Mongolia	Batbold Zagdragchaa, Director, New Policy Institute
New Zealand	Wayne Mackintosh, UNESCO/ICDE Chair; Director, OER Foundation
Nigeria	Jane-Frances Obiageli Agbu, Faculty at National Open University of Nigeria (NOUN); ICDE Chair in OER; Board Member, Open Education Consortium; Member, National Steering Committee in OER in Nigeria
Slovenia	Mitja Jermol, UNESCO Chair in Open Technologies for OER and Open Learning, Head of Centre for Knowledge Transfer, Jožef Stefan Institute
South Africa	Cheryl Hodgkinson-Williams, Associate Professor, Centre for Innovation in Learning and Teaching (CILT), University of Cape Town
Tanzania	Tolly S.A. Mbwette, Professor of Environmental Engineering and Member of ICDE Executive Committee, College of Engineering & Technology (CoET) University of Dar es Salaam
Tunisia	Sana El Harbi, Professor, University of Sousse
United Kingdom (UK)	Martin Weller, Director of OER Hub, Open University UK

The conclusions drawn in this report are primarily based on reports from respondents. All respondents reported to some degree on the higher education sector in their country, although two noted that the focus was limited to policies. Six respondents focused almost exclusively on the higher education sector, while the remaining nine focused on a combination of higher education and other sectors — most commonly, basic education (six respondents), secondary education (four respondents), and informal/lifelong learning (three respondents). Thus, the coverage of the case studies is not necessarily comprehensive regarding all aspects of OER in the country and is reflective of the views of the respondents in specific focus areas.

Initial responses to questionnaires were reviewed and queries sent to respondents. The data from questionnaires were then prepared as case studies (see Appendix B). One of the challenges faced in preparing the case studies was that respondents were required to complete the questionnaire in English, which, for some, was not their first language. Thus, in some instances, language editing was done. All case studies were sent to respondents for verification and checking before finalization.

Understandings of OER

Case studies generated for this research indicate that some respondents conflate OER with other open initiatives. Most commonly, Open Access (OA) and OER tend to be used interchangeably in some contexts. For example, the Mexican case study differentiates between scientific OER and academic OER. The distinction between 'academic' and 'scientific' resources is reported as follows:

- *Academic OERs are open educational resources related to teaching and dissemination, which are published in an institutional repository. The evaluation of these resources is carried out by academic peers of the institution. Examples of this type of resources are photographs, presentations, infographics, videos, manuals, exams, learning objects, cases.*
- *Scientific OERs are OER related to science and research which are also published in the Institutional Repository. The evaluation of these resources is done through an evaluation process by peers from different institutions and they have been previously published in refereed journals and conferences. Examples of this type of resource are articles, books, book chapters, technical research reports, theses, patent abstracts.*

There were also examples in the case studies of OER being conflated with 'free' initiatives. For example, respondents reported on resources that were free and freely available to use. When asked to clarify whether resources listed were OER, one respondent noted, 'all references cited are free and freely accessible to the general public'. In another example, a respondent highlighted resources as OER, but also noted that users need to log in to access resources or need to request permission to use the resources.

Although two respondents acknowledged that Massive Open Online Courses (MOOCs) are not necessarily OER, they nevertheless mentioned and reported on MOOCs. This does not necessarily mean the two concepts are being conflated, although it is possible that many respondents do see MOOCs and OER on a continuum, which suggests a fluidity in ideas of 'open':

In 2012 Australian universities also began to deliver Massive Open Online Courses (MOOCs) although many of these did not provide openly licensed content.

Concurrently, there has been an increase in the design and development of educational resources, as witnessed through MOOCs, and collaborations such as the Blended Learning Consortium (http://www.blc-fe.org/). These are not necessarily open though. (UK)

The BBC provides a range of learning resources from different perspectives and languages (https://www.bbc.com/bitesize). However, while these resources are often free, they are not always openly licensed. (UK)

One respondent specifically highlighted the idea of openness as a continuum:

However, one might see the 'Open' movement in a broader sense as Open Access and Open Data are further developed than the concept of OER. The German ministry explicitly supports Open Access for scientific publication in publicly funded projects…. It might be recommendable to continue the discussion on Open approaches in a holistic approach in Germany, incorporating Open Access, Open Data, Open Source and Open Education.

Another respondent highlighted that the concept of OER is often not well explained to the general public:

There is some discussion of OER in the South African media[14] which indicates that the OER concept is being discussed, but the concept of OER is not always that well explained or [is] conflated with other 'open movements' such as open source.

Data from the desktop research indicated that the term 'open' is generally loosely applied, having gained currency and being appropriated in many different sectors, such as open

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[14] Lubala, S. (2017, April 28). Open source is the future of teaching. *Mail & Guardian*. Retrieved from https://mg.co.za/article/2017-04-28-00-open-source-is-the-future-of-teaching
Trotter, H. (2018, February 27). Opportunities and obstacles for open education. *University World News*, *494*(1). Retrieved from http://www.universityworldnews.com/article.php?story=20180223045114408
Trotter, H. (2016, June 1). How Intellectual Property (IP) policies affect OER creation at South African universities. Retrieved from http://roer4d.org/2298

government, open architecture, open society, open access to educational materials, and open source software.[15] OER should not be confused with the closely related concept of Open Access (OA). OA refers to research outputs distributed online, which are free of cost and may be licensed with a CC or equivalent licence to promote reuse.[16] Thus, OA refers to scholarly publications and includes open access journals, conference papers, theses, and book chapters. OA can be used as OER if the open content is used in a teaching/learning context. McGreal (2017) notes:

> There is confusion between OER and open access, along with the concept of openness in general; there is a large grey area between open access and OER, in addition to openness. Open Access (OA) to scholarly research is related to OER. Open Access supports open licensing for research rather than education. Nevertheless, OA can be used as OER, if the open content is used in a teaching/learning context. [17]

Furthermore, OER should not be confused with free resources. As McGreal et al. (2016) argue:

> Freely available educational resources are not necessarily OER. Many educational resources made available on the Internet are geared to allowing online access to digitised educational content, but the materials themselves are restrictively licensed. Often, this is not intentional. Educators are generally not familiar with copyright law in their own jurisdictions, never mind internationally. International law and national laws of nearly all nations, and certainly of all those who have signed onto the World Intellectual Property Organization (WIPO), restrict all content under strict copyright (unless the copyright owner specifically releases it under an open licence). In order for educational resources to be OER, they must have an open licence. The Creative Commons licence is the most widely used licensing framework internationally used for OER.[18]

Additionally, most MOOCs allow users only fair-use rights or rights stated in specific licences. Many may not be legally copied, and users may not update them or use them to create their own courses. However, McGreal (2017) argues that non-commercial MOOCs can be regarded 'as part of a continuum' that has proceeded from open source computing, to open access, OER, and open education.[19] Thus, unless a MOOC (i.e. the course content) is openly licensed, it is distinct from OER despite possibly being open to anyone.

The findings from the case study research highlight some confusion around understandings of OER. The lack of knowledge about OER and copyright plays a major role in inhibiting OER growth; clearer understandings of the concept of OER and improved knowledge dissemination are thus required.

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[15] Wikidot. (no date). Determinants of Openness. Retrieved from http://openict4d.wikidot.com/determinants-of-openness
Weller, M. (no date). The Digital Scholar: How Technology Is Transforming Scholarly Practice. Bloomsbury Academic. Retrieved from http://www.bloomsburyacademic.com/view/DigitalScholar_9781849666275/chapter-ba-9781849666275-chapter-009.xml

[16] Wikipedia. (no date) Open Access. Retrieved from https://en.wikipedia.org/wiki/Open_access

[17] McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distributed Learning*, *8*(7), November 2017. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

[18] McGreal, R., Miao, F. & Mishra, S. (2016). Introduction. Open Educational Resources: Policy, Costs and Transformation. In Miao, F., Mishra, S. & McGreal. R. (eds). *Open Educational Resources: Policy, Costs and Transformation*. UNESCO and Commonwealth of Learning. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000244365

[19] McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distributed Learning, 8*(7), November 2017. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

Policy Commitments

Several countries have developed national OER policies and the effects of these have varied according to context.

In Brazil, provisions are in place to ensure that educational materials produced with public funds are openly licensed:

> Two specific policies govern this requirement. Ordinance (415/2018) [20] establishes criteria for the acquisition of educational resources aimed at basic education produced with MEC's financial resources. The normative document sets out the definitions and differences between 'open' and 'free' educational resources and establishes in its article 7 that educational resources acquired or produced with public funds should always be open. Under Article 8, it establishes that legal instruments such as procurement notices must conform to the ordinance with open licensing clauses. [21] The Law of the Federal District (5.592/2015) [22] establishes a policy of open availability of educational resources purchased or developed by direct and indirect administration grants ensuring that they are made available on the Portal of the Government of the Federal District and licensed for free use, including copying, distribution, downloading and redistribution providing … the correct attribution to the author and the use of resources for non-commercial purposes. [23]

With regard to the Ordinance (415/2018), Article 3 establishes that the *Secretaria de Educação Básica* (Secretary of Basic Education) of the *Ministério da Educação* (Ministry of Education) (SEB-MEC) may contract or seek funding from the Federal Public Administration body or entity for the following:

> Production, reception and evaluation of OER, including courses, thematic videotapes and other content intended for training of basic education professionals, obeying the rules governing contracting and decentralization of public administration credits. [24]

In Article 4, the Ordinance (415/2018) establishes that the SEB-MEC may establish partnerships, not involving transfer of financial resources, to produce, use, and evaluate OER or free educational resources. This means that all funding or resourcing commitments must come from the federal government (although it is currently not possible to determine how much funding will be allocated for this Ordinance). The Law of the Federal District (5.592/2015) states that all OER should be purchased or developed by direct and indirect administration grants, but it is unclear to which 'indirect administration grants' this refers. Release of materials produced with public funds is a requirement only for public higher education and basic education institutions.

Thus, the past decade has seen Brazil making great advances in establishing laws and ordinances, as well as recently launching a platform with clear policies on copyright and reuse of resources. Existing policies such as the Institutional Policy of *Universidade Federal do Paraná* (Federal University of Paraná-UFPR) and the Coordination for Improvement of Higher Education Personnel Ordinance (183 of 2016) (*Portaria Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* — CAPES) Ordinance (183 of 2016) provide access to government-funded OER, licensed under open licences or CC licences to higher education educators and students. The National Textbook Plan (2019 and 2020) will provide supplementary digital instructional content, for basic education educators and students, licensed under a Creative Commons Attribution Non-Commercial (CC-BY-NC) licence. Professional

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[20]   Imprensa Nacional. (2018). Diário Oficial da UniãoPORTARIA Nº 451, DE 16 DE MAIO DE 2018. Retrieved from https://tinyurl.com/y9833yc7

[21]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258, p.249

[22]   Sistema Integrado de Normas Jurídicas do Distrito Federal — SINJ-DF. (2015). LEI Nº 5.592, DE 23 DE DEZEMBRO DE 2015 (Autoria do Projeto: Deputado Chico Vigilante). Institui a política de disponibilização de recursos educacionais comprados ou desenvolvidos por subvenção da Administração Direta e Indireta do Distrito Federal. Retrieved from http://www.tc.df.gov.br/SINJ/Norma/1e0384fdc485411fad802fe2f0a94325/Lei_5592_23_12_2015.html

[23]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258

[24]   Imprensa Nacional. (2018). Diário Oficial da UniãoPORTARIA Nº 451, DE 16 DE MAIO DE 2018. Retrieved from https://tinyurl.com/y9833yc7

development for educators of the Open University of Brazil (UAB) is also being provided. As can be seen, Brazil has pioneered many OER policies and actions.

Nigeria has also recently developed a national OER policy. The policy encourages higher education institutions with publicly funded materials to license them under open licences and release them as OER. This is a new policy, and the country still needs to prepare plans and strategies to encourage adoption and implementation. Nevertheless, it is hoped that, as institutions come to understand the benefits of OER, they will adhere to the policy. The national policy also brings hope for increased budgetary allocations specifically for OER.

In China, generally educational resources authorized by the government can be used with no cost. However, it is not clear whether these are free resources or specifically OER. Financial commitments to OER policy are regarded as relatively adequate. Different sectors of the government take on different responsibilities for the process of OER development: the Ministry of Education develops specific educational policies and plans for production and use of OER; the Ministry of Finance creates funding policies to provide OER grants; and provincial and municipal governments implement national policies and provide subsidies for the development of OER.

However, OER policy is clearly not a priority for all countries; some countries lack OER policies altogether.

In Tunisia, most educational materials are not accessible via the Internet and there is almost no focus on OER. There are no policy or legal discussions on the use of free educational materials and hence no policies covering this issue. There is no commitment to OER at the governmental level, and thus no requirements that materials produced with public funds be released as OER.

Similarly, in Tanzania, there are no national policies and there is no legislation guiding the use of OER or the production of study materials using public funds. However, higher education institutions use their own budgets to support OER development.

In Chile, copyright or licensing in general is not a key concern with regard to publicly funded resources; by extension, there is even less interest in issues of open licensing. Although Ministry of Education websites declare in their footers that content is openly licensed (mainly a guideline for public agencies within the framework of the Open Government Partnership — OGP — action plans), that is not extended to the content and resources for K-12 schools repositories: portal YoEstudio[25] and the *Centro de Recursos para el Aprendizaje* (CRA) School Libraries.[26] In both cases, the educational portals do not specify the rights to use the resources they host or distribute. Thus, while there may be in-principle support for OER, in practice, this may not be so.

In Slovenia, there no specific OER policy.

In South Africa, there is no national or institutional policy that mandates that educational materials produced with public funds be openly licensed. The South African respondent highlighted that some higher education policies might encourage academics and/or senior students to publish their work as OER. But there is not the same expectation to publish learning and teaching materials as there is to publish research — which is an income-generating activity for the universities and often for the academics themselves. Section 12 of the South African Copyright Act (98 of 1978) allows reproduction of copyrightable materials for educational purposes. The implication of this inclusion is that academics who teach primarily in face-to-face modes and do not employ blended learning strategies, being already empowered to reuse any materials for the purposes of their teaching mode, are not really required to engage with OER. Furthermore, the proposed Amendment Bill provides, in Clause 13B, for the following:

> *The author of a scientific or other contribution, which is the result of a research activity publicly-funded by at least 50 per cent and which has appeared in a collection, has the right, even after*

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25   YoEstudio. (no date). Home Page. Retrieved from http://www.yoestudio.cl/
26   Bibliotecas Escolares CRA. (no date). Home Page. Retrieved from http://www.bibliotecas-cra.cl/

granting the publisher or editor an exclusive right of use, to make the contribution available to the public under a public licence or by means of an open access institutional repository in the final accepted manuscript version peer-reviewed post print[27].

If the Amendment Bill is approved, this will mandate the open sharing of publicly funded research.

In Mongolia, there was a National OER Programme, which was approved by the Parliament and serves as the country's OER policy. The main objective of the Programme is to promote OER through implementing pilot projects in 2014-2024. Whilst the initiative was financed in 2014–2016, funding for the programme has ceased. tThere is currently no legal requirement for educational materials produced with public funds to be openly licensed. The standard practice in that country is that educational materials produced with public funds are not openly licensed.

Other countries focus more on other open concepts rather than on OER specifically. In Mexico, for example, government policies appear to focus more on OA:

The OER requirement with open licensing comes from the national policy.[28] The May 2014 decree that reformed the Law on Science and Technology, the General Law of Education and the Organic Law of the National Council of Science and Technology, contemplates the establishment of a National Repository to guarantee Open Access to information. For example, this decree establishes that CONACYT must create and operate the National Repository, which is defined as 'the centralized digital platform that, following international standards, stores, maintains and preserves scientific, technological and innovation information, derived from research, as well as from educational and academic products.' The National Repository was released on May 20, 2016. This is the great aggregator of information contained in the institutional repositories that wish to join this strategy. It is also the primary tool for sharing scientific production in Mexico. It is worth noting that all the information resources recovered by the National Repository are available in Open Access free of charge to anyone who wishes to consult and use them.

The Mexican respondent noted that, in general, for educational projects, there is currently no requirement to publish learning materials in publicly funded projects under an open licence except for specific open education projects. A fundamental part of the national OA Policy is institutional repositories, as they coordinate gathering resources produced in the institutions and encourage self-uploading within their academic communities. *Consejo Nacional de Ciencia y Tecnología* (CONACYT)/National Council for Science and Technology) provides resources for financing these platforms. Challenges in implementing this OA Policy relate to the training and experience required to develop resources and ensuring compliance with OA national regulations.

Many countries, particularly in the developed world, have no national OER policies, but have supportive environments and contexts with funding provided for OER initiatives. In Canada, the respondent noted that there are no policies on OER in any province/territory or in any higher education institution. Moreover, OER were not mentioned in a major report on post-secondary education in Canada released in August 2018.[29] However, universities have developed guides and OA policies (e.g. the University of British Columbia's *Guide to Reappointment, Promotion and Tenure Procedures*) where evidence of inclusion of content in 'open repositories/resources' has become one of the criteria for promotion in the Education Leadership stream.[30] Furthermore, the Repository of Open Access Repositories documents 23 institutions and organizations in Canada that have open access policies.[31]

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[27]   Republic of South Africa. (2016). Copyright Amendment Bill. Retrieved from http://infojustice.org/wp-content/uploads/2017/05/South-Africa-Copyright-Amendment-Bill-2017.pdf

[28]   Diario Oficial de Federacion. (2018). Retrieved from http://www.dof.gob.mx/nota_detalle.php?codigo=5513515&fecha=16/02/2018

[29]   Usher, A. (2018). *The State of Post-Secondary Education in Canada, 2018*. Toronto: Higher Education Strategy Associates. Retrieved from http://higheredstrategy.com/wp-content/uploads/2018/08/HESA_SPEC_2018_final.pdf

[30]   The University of British Columbia. (2018). Guide to Reappointment, Promotion and Tenure Procedures. Retrieved from http://www.hr.ubc.ca/faculty-relations/files/SAC-Guide.pdf

[31]   Registry of Open Access Repositories. (no date). Home Page. Retrieved from http://roar.eprints.org/view/geoname/

In addition, several provincial governments have provided funding for OER initiatives. For example, the British Columbia (BC) government provides ongoing financial support to BCcampus to finance OER initiatives at higher education institutions in the province. The Ontario Ministry of Advanced Education and Skills Development created eCampus Ontario in 2016, which supports OER initiatives financially.[32] This support is ongoing. The Alberta (AB) Ministry of Advanced Education in 2014 supported a major OER initiative with a CAD3 million grant. This initiative led to more than 30 OER projects and reportedly brought savings to students and institutions amounting to millions of dollars. The province of Manitoba (MB) also opened a small open-textbook initiative with Campus Manitoba, which entails reviewing and adapting BCcampus open texts for local use. Thus, funding for support of OER is available within current structures.

Additionally, educational licences allow for free use of educational content:

> *Educational materials produced by the provinces and the federal government are restrictively licensed using 'crown copyright'. This generally (but not always) allows for the free educational use of content, but the different provinces have their own versions, which although similar, are not the same. Several federal government departments have removed 'non-commercial' restrictions so there is a trend towards more openness allowing government documents to be freely used by both public and private sector organizations. The relevant federal legislation is the Copyright Act, Section 12, which applies to all works 'prepared or published by or under the direction or control of Her Majesty or any government department.' This is called crown copyright and is perpetual.*

Provinces have legal responsibility for education and have some control over educational content, restricting its use to public institutions within the province. In Ontario, Canada's largest province, the Queen's Printer[33] allows for open access to some content, including for education, even for commercial purposes, under its Open Government Licence.[34] Similar licences are available from the Queen's Printer in the other anglophone/bilingual provinces and territories. The exception to this is *Les Publications du Québec*[35] and other departments of the Quebec government that have restrictive copyright licences requiring permissions even for educational purposes.

OER mandates are not a requirement in any jurisdiction in Canada. However, OER produced under grant-supported OER initiatives in BC, Alberta, and Ontario must be licensed under a CC Attribution (CC-BY) licence, thereby enabling online sharing of OER that have been created. Furthermore, as noted above, 'crown copyright' generally allows for free educational use of content. Thus, in Canada, although there is no federal government strategy specifically supporting OER or other forms of open education, there is much activity at the provincial level.

In New Zealand, under the provisions of the New Zealand Government Open Access and Licensing (NZGOAL)[36] framework, the government requires that State Services agencies make their copyright works that are of interest or use for citizens available online under the most open of licensing terms in NZGOAL: the Creative Commons Attribution license. Under this framework, School Boards of Trustees are 'strongly encouraged' to adopt CC licensing policies. Additionally, OER advocates voluntarily release research and educational materials under open licences. Open licensing incentives outside of Crown Copyright under the NZGOAL framework are not currently supported by financial or resource incentives, and as a rule other educational materials produced with public funds in New Zealand are not openly licensed.

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[32]   ECampus Ontario. (no date). Tap into a World of Open Knowledge. Retrieved from https://www.ecampuson-tario.ca/open-education-resources/

[33]   Ontario Government. (no date). Copyright Information: © Queen's Printer for Ontario. Retrieved from https://www.ontario.ca/page/copyright-information-c-queens-printer-ontario

[34]   Ontario Government. (no date). Open Government Licence — Ontario. Retrieved from https://www.ontario.ca/page/open-government-licence-ontario

[35]   Publications Québec. (no date). Authorization to reproduce government material. Retrieved from http://www.droitauteur.gouv.qc.ca/en/autorisation.php

[36]   New Zealand government guidance for agencies to follow when releasing copyright works and non-copyright/public domain material for reuse by others.

Germany currently has no legal regulations or recommendations supporting OER. However, the new German government has expressed its intention to support OER at a national level.[37]

In the UK, there is no national OER policy. The Association for Learning Technology (ALT) made a call to action for policy makers[38] to highlight how open education and OER can expand inclusive and equitable access to education and lifelong learning, widen participation, and create new opportunities for the next generation of educators and students, preparing them to become fully engaged digital citizens. Scotland signed an Open Declaration,[39] signalling its government's support for OER. Recently, work has begun in lobbying for UK OpenTextbook approaches, similar to those prevalent in North America, but this is at an early stage.[40] However, some universities, such as Edinburgh, Nottingham, and the Open University (OU), host OER repositories (but without an explicit policy).[41] The OU has a policy that all new courses should specify five percent for open release. Only open access publications and research data are mandated to be released openly, according to open access policies.

The respondent for Australia reported:

> *Australia does not have any central government requirement for educational resources produced with public funding to be openly licensed. However; the Australian Government and educational administering bodies have recognised the importance of OER and CC licensing and understand that OER policies can assist in a range of copyright compliance and education policy issues. In recent years OER initiatives have emerged at an increasing rate at both government and institutional levels, along with increasing formalisation of the initiatives and practices.*

Additionally, in Australia, some educational material supported by federal or state education departments has been openly licensed for reuse. The decision to make material available under open licences may be due to federal or state open government policy commitments, grant funding requirements, and/or operational decisions made by specific institutions. There is thus a culture of OER support, although this is not backed by explicit policy. A number of organizations, industry bodies, and initiatives have made policy commitments, provided support, and/or assisted with development of an environment that supports use of OER or the adoption of Open Educational Practices (OEP)[42] in the Australian education environment.

The impetus towards wider adoption of OER in Australia arises from growing government and institutional commitment to open access to publicly funded resources and an increasing move towards online education in both higher and secondary education. In the higher education sector, several universities were early adopters and participants in the use and development of OER. These included institutions involved in the Open Education Resources Universitas (OERu) and Peer to Peer University (P2Pu) projects.

Data from the desktop research highlights that governments have an interest in ensuring that public investments in education make a meaningful, cost-effective contribution to socio-economic development. If done responsibly, sharing educational materials produced using public funding can improve the quality and accessibility of education delivery across national education systems by making OER more readily available for use by all education

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[37] Koalitionsvertrag der Bundesregierung. (2018). Retrieved from https://www.bundesregierung.de/resource/blob/975224/847984/5b8bc23590d4cb2892b31c987ad672b7/2018-03-14-koalitionsvertrag-data.pdf?download=1

[38] Association for Learning Technology. (2017). Open Education and OER — A guide and call to action for policy makers. Retrieved from https://www.alt.ac.uk/news/all_news/open-education-and-oer-guide-and-call-action-policy-makers

[39] Open Scotland. Scottish Open Declaration 0.2. (no date). Retrieved from http://declaration.openscot.net/scottish-open-education-declaration-0-2/

[40] See the following as examples of exploratory work on how open textbooks may gain interest and associated policy: UK Open Textbooks. (no date). Home Page. Retrieved from http://ukopentextbooks.org/; JISC. (no date). Institution as e-textbook publisher. Retrieved from https://www.jisc.ac.uk/rd/projects/institution-as-e-textbook-publisher

[41] See, for example, University of Nottingham. (no date). U-Now Open CourseWare. Retrieved from https://rdmc.nottingham.ac.uk/handle/internal/79.

[42] OEP refers to the broader practices and pedagogies that may be employed to create an educational environment in which OER are used or created. Definition retrieved from http://discourse.col.org/t/are-open-educational-practices-oep-different-from-oer/48

providers, not just the recipients of public funds.[43] Rossini (2009) argues that governments, schools, and universities should make taxpayer-funded resources OER.[44] Wiley et al. (2012) also argue that 'all taxpayer-funded educational and research materials should be OER.'[45] Given that governments often play a key role in policy development and funding of educational institutions and that policies on education funding also indicate key priorities, governments are ideally positioned to encourage or mandate institutions to release materials as OER and to license materials developed with public funding under an open licence. Governments can also use open licensing regimes to increase the leverage of public investments, by facilitating widespread reuse of those investments with minimal additional spending.[46] Furthermore, the policy route may be a better approach for mainstreaming OER, as policies should thus be less affected by political changes in democratic settings.

The presence of a national OER policy can be a useful gauge of the country's level of commitment to OER. Data from this research exercise suggests that national policies around OER may not always be a priority for governments. While it has been argued by some OER proponents that the lack of such frameworks can limit and delay the process of OER adoption or might even actively discourage institutions from pursuing OER undertakings, in some contexts institutions and organizations have driven the process of OER adoption regardless. This finding is supported by data from the 2017 Global OER Survey, which noted that there are relatively few national policies that specifically focus on OER. Interestingly, in regions with extensive OER activity, such efforts are often not being driven by a national policy — suggesting the effectiveness of bottom-up initiatives in promoting OER.[47] Furthermore, some countries may have supportive local government guidelines, policies, and requisite funding (e.g. Canada, Brazil, and Australia). If contexts allow for free use of material for educational purposes, it is possible that this has decreased the urgency for national OER policies. However, in other instances (e.g. Tanzania and Tunisia), the lack of supportive policy is seen as an impediment to OER adoption, particularly as no funding is then allocated to OER development and use. Despite the fact that few national OER policies exist, interest in OER adoption is growing slowly but steadily.

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43   UNESCO/COL. (2011). Guidelines for Open Educational Resources (OER) in Higher Education. Retrieved from http://www.col.org/resources/publications/Pages/detail.aspx?PID=364

44   Rossini, C. (2009). Technology and Education: The Emergency of Openness. Open Education 2009, Vancouver. Retrieved from http://www.slideshare.net/carolina.rossini/oer-policy-and-developing-countries

45   Wiley, D., Green, C. & Soares, L. (2012). Dramatically bringing down the cost of education with OER: How open education resources unlock the door to free learning. Retrieved from http://www.educause.edu/library/resources/dramatically-bringing-down-cost-education-oer-how-open-education-resources-unlock-door-free-learning

46   UNESCO/COL. (2011). Guidelines for Open Educational Resources (OER) in Higher Education. Retrieved from http://www.col.org/resources/publications/Pages/detail.aspx?PID=364

47   COL (2017). *Open Educational Resources: Global Report 2017.* Burnaby: COL. Retrieved from http://oasis.col.org/bitstream/handle/11599/2788/2017_COL_OER-Global-Report.pdf

OER Adoption

Countries and institutions have their own reasons for initiating OER projects. Context matters too when considering whether and how OER is adopted. For example, in South Africa, there is no demonstrable evidence of wide acceptance of OER creation and distribution per se. This may be related to provisions in the Copyright Act of 1978, which grant employers (universities) default copyright ownership over employees' 'creations' (e.g. textbooks, presentations, worked examples) undertaken in the course of their work. However, institutions can determine their own intellectual property policies granting employees (academics) copyright over their own work or assigning copyright to the institution. Trotter (2016) reports that 20 of the 25 universities in South Africa retain the copyright over academics' work and only five assign copyright to academics allowing them to release their work under a licence of their choosing.[48]

Furthermore, lack of awareness may also exist at the institutional level. A cross-regional study by De Oliviera Neto et al. (2017) found that, of 34 educators who responded from four higher education institutions in South Africa, 35% reported using OER, 32% said they were not sure, and 32% indicated they had not used OER. Only 15% reported adapting existing OER, while 85% did not. Eighteen percent of educators confirmed they had indeed created openly licensed materials, but 82% had not created OER.[49]

In Germany, OER adoption is also low, particularly outside the community of German OER experts in all sectors of education and training. For example, in higher education, there are no guidelines/recommendations or national portals for knowledge/OER exchange. OER are still considered as 'not invented here' by most educators. In schools, the situation is different as there is much informal exchange, although not on the basis of specific open licences.[50] The willingness of educators in the schooling sector to participate in OER initiatives is higher than in other educational sectors, but there is a low level of OER expertise. There is thus enormous potential for adopting OER in schools, but a broad approach to education on OER requirements and open licences is needed.

Tunisia illustrates how contextual factors can severely limit the extent to which OER efforts have any visibility/impact. Professors in Tunisia act in a cultural context and education system where they have total command in the classroom and retain the final say over all educational materials. Any change from this closed, educator-centric approach to a collaborative setup is thus very challenging and needs to be tackled with sensitivity, particularly with regard to the design of appropriate incentive schemes. With regard to the latter, however, under current regulation, faculty members are tenured within two/three years; thereafter, there is an absence of any monetary incentive that might encourage them to use OER. This reality makes it very difficult (if not impossible) to introduce any change in the higher education sector — particularly a change that requires supplementary efforts.

Similarly, in Chile, the current context in higher education does not generate incentives that support the development of OER at national, institutional, or individual level. Although a Chilean delegation attended the OER World Congress in 2012, Chile did not formally adopt the Paris OER Declaration. Thus, publicly funded textbooks are the exclusive property of the publishers, which sell the same book in the private market at a price 12 or 15 times higher than it costs. Furthermore, the educational resources portal EducarChile,[51] a semi-public entity, which is represented by the Ministry of Education and the Chile Foundation, appears

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48   Trotter, H. (2016, June 1). How Intellectual Property (IP) policies affect OER creation at South African universities. Retrieved from http://roer4d.org/2298

49   De Oliveira Neto, J.D., Pete, J., Daryono, J. & 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). Retrieved from https://doi.org/10.5281/zenodo.599535

50   For example, https://www.lehrer-online.de/ or https://www.4teachers.de/ are used

51   EducarChile. (no date). Home Page. Retrieved from http://www.educarchile.cl/

in the OER World Map[52] as registered as a public service that promotes OER; analysis of the Terms and Conditions of Use of resources, however, indicates a wide range of restrictions that are not aligned with most definitions of OER. And, while EducarChile includes resources that are openly licensed — e.g. videos from the Khan Academy portal[53] — the rights of use over these resources are not described.

The indifference to openly licensed educational resources, digital or not, from public policy is more explicit in the field of higher education. *Ministerio de Educación Chile* (MINEDUC), through its *División de Educación Superior* (Division of Higher Education — DIVESUP), has various development grants open to bidding, and this remains the most relevant way to fund higher education institutions. In the bidding conditions/terms of these grants, it is made explicit that 'ownership (physical and intellectual) of the goods and works created in the framework of the execution and implementation of this Performance Agreement will be included in the assets of the institutions.'[54] There is thus no incentive to generate OER from publicly funded higher education projects. Moreover, copyright is recognized as a tool to protect intellectual property in these grants, but CC or other licences are not recognized as such. In this context, institutions conceive their educational and research resources and developments as competitive assets, and therefore are unwilling to share their material and research results openly:

> *Under the criteria of competitiveness and exclusivity of rights, institutions do not have fertile ground for openness, especially the OER, nourished by a culture of participatory learning, with emphasis on creation, sharing and collaboration between institutions and actors.*

The fact that academic careers are not centred on the field of teaching and student learning but rather on research and indexed publication fosters competitiveness in the struggle for publicly funded grants. These grants explicitly reinforce competitiveness as they have clear incentives focused on commercializing results. Furthermore, the scholarly publishing ecosystem that is dominated by large monopolies and their commercial models appears to value treasuring personal academic assets.

Other countries appear to be in the early stages of OER adoption. For example, in Nigeria, the National Universities Commission (NUC), in partnership with the Committee of Vice Chancellors of Nigerian Universities (CVC), established a foundation called the Nigerian Research and Education Network (NGREN) to ensure that universities can communicate, collaborate, access, and share resources across national and international boundaries — primarily for the purpose of research and learning but with added capabilities to offer the efficiencies of unified communications and consolidation of digital content. Efforts are under way to make the resources available as OER. Additionally, focus is on raising awareness of OER. For example, the Nigerian Institute of Advanced Legal Studies (NIALS) is the public lead of CC Nigeria and has provided a platform to engage with and provide adequate knowledge of CC to key policy makers and other stakeholders in the industry.

Several countries are leading efforts to share OER via online platforms:

- In Brazil, the *Plataforma -Ministro da Educação (MEC) de Recursos Educacionais Digitais (RED)*[55] (Ministry of Education Platform of Digital Educational Resources) was developed to host OER. It functions as a 'social network' and offers access to users to search for and/or deposit OER, although it cannot be considered an OER repository per se, as the platform does not contain its own resources. Instead, it organizes and links to resources from other existing MEC online repositories such as *TV Escola* (TV School), *Portal do Professor* (Teachers' Portal), and *Banco Internacional de Objetos Educacionais e Domínio Público* (The International Database of Learning Objects and Public Domain), as well as from external partners. It therefore allows access to both

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52   OER World Map. (no date). Ministerio de Educación Chile (MINEDUC). Retrieved from https://oerworldmap. org/resource/urn:uuid:b3ace68a-e719-4d30-88ad-24d78ee834d8

53   See http://www.educarchile.cl/ech/pro/app/search?sc=1009%3A&ml=10000&co=Khan+academy

54   There are different funding instruments for universities where this ownership clause is present.

55   Integrated Platform of Digital Educational Resources. (no date). Home Page. Retrieved from https://plataformaintegrada.mec.gov.br/home

all-rights-reserved copyrighted resources (with free access) and OER. Users can upload or curate resources.[56,57]

- In China, at the K-12 level, there is a 'national public platform for educational resources' and a provincial 'public platform of educational resources'. It is not clear from the Chinese case study generated for this research, though, whether these resources are all openly licensed.

- In Slovenia, while the government seldom directly funds the creation of OER, it does require each recipient of national public funding (between 2015 and 2020) to publish the works under open licences. Slovenian publications repositories, research data repositories, archives, and software for scientific journal publishing are required to be compatible with OpenAIRE guidelines. All published open access scientific monographs are required to be included in the Directory of Open Access Books (DOAB). However, these requirements refer to OA and not OER.

- In Canada, the principal mechanism for sharing OER (textbooks or courses) is BCcampus Open Ed, which is a repository for storing these OER.[58] Alberta, Manitoba and eCampus Ontario have all agreed to share their openly licensed textbooks and/or partner with BCcampus on improving and enhancing this repository. The Open Textbook Library of eCampus Ontario is also partnering with BCcampus and Manitoba on developing systems and processes for reviewing and adopting online textbooks.

- In Mexico, all resources stored in the *Tecnológico de Monterrey*'s institutional repository use CC licences, and approximately 30% of these resources were supported with public funds, with the balance having been developed with institutional funds. The country has several OER and OA programmes. For example, a weekly report on the creation of Institutional Repositories, carried out by the National Repository portal, found that 58 Institutional Repositories are currently cooperating, encompassing over 26,000 information resources and resulting in 980,230 queries since their implementation. With the publication of the Open Science policy in 2017,[59] significant programmes were established, such as Journal Programmes; Scientific Information Resources Consortium; Repository Programme; Programme of Public Communication of Science; Integrated information systems on scientific information, technological development, and innovation; and Connectivity programme. The aim of these programmes is for citizens to benefit from widespread dissemination of scientific, technological, and innovation knowledge.

In contexts where there is extensive access to online content, the imperative to reuse and share resources might not be urgent, particularly if there is a belief that it is difficult and time-consuming to find OER. This view was reported from Australia and New Zealand. In the latter case, there are no government-supported mechanisms to enable sharing of OER:

> However, this may not be a necessary requirement given that the open web, combined with open standards would be sufficient to provide the technical infrastructure for sharing. Producers of proprietary content already have a state subsidised monopoly by virtue of the 'all rights reserved' copyright ensured by the national Copyright Act. A legislative requirement to license all content produced with public funds under a permissive open licence would be more than adequate, in my opinion, to foster mainstream adoption of OER in higher education.

The data from respondents suggests little evidence of wide acceptance of OER within the surveyed countries and, in most instances, OER initiatives feature largely as 'projects', without systematic integration. There are several notable initiatives, but OER approaches or initiatives still appear to be an 'add on' in education systems rather than being part of a mainstream approach to creating and adopting materials.

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[56]   Integrated Platform of Digital Educational Resources. (no date). Terms of Use. Retrieved from http://plataformaintegrada.mec.gov.br/termos-de-uso

[57]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258

[58]   BCcampus. (no date). OpenEd. Retrieved from https://open.bccampus.ca/find-open-textbooks/

[59]   CONACYT (2017). Política de Ciencia abierta. Retrieved from https://www.repositorionacionalcti.mx/docs/seminario_RI_y_su_interoperabilidad_con_el_RN/01_Politica_de_Ciencia_Abierta.pdf

Balance between OER Reuse and Creating New Materials

Data gathered in this research suggests that the extent to which respondents report a balance between OER reuse and creating new materials tends to depend on levels of OER activity in the country. In Tunisia, where there are no national or institutional OER initiatives, the emphasis is on production of new OER mainly within the context of internationally funded projects.

However, several countries did report a balance between OER reuse and creating new OER:

- In Mongolia, although there are still few OER initiatives, there are adapted materials such as Khan Academy video lessons and a Mongolian language dictionary, and new OER in the form of lessons in video form.

- In Nigeria, growth of awareness and use of OER is actively increasing investment in both the design and establishment of tertiary educational resources. For instance, OER developed by NOUN have been reused — 'tweaked' and remixed — by other tertiary education institutions in Nigeria. There is a reported increase in the level and speed of academia embracing OER over the past three years. Consequently, an appropriate balance is being maintained between reusing existing OER and producing new materials.

- In China, OER initiatives funded by government are mainly producing new materials to increase the coverage of learning resources, whereas OER initiatives by companies are mainly reusing or adapting existing materials.

- In New Zealand, it is estimated that 70% of the OERu courses are assembled from existing OER, with the remaining 30% produced as new materials and/or existing closed materials being released under an open licence for use within the OERu network.

- In South Africa, it was reported that OER use and/or adaptation is difficult to assess as the most permissive licensing allows for reuse without a share-alike commitment. However, the Research on Open Educational Resources for Development (ROER4D) study found that OER adaptation of 15% is similar to the average of 18% revealed across all 28 institutions surveyed in nine Global South countries. OER creation by higher education educators in South Africa (18%) is a little lower that the average of 23% in these countries.[60]

The level of OER adaptation also depends on the reason/rationale for adoption of an OER approach. Each institution adopts and adapts OER to suit the institution's style and needs:

> There is a reasonable balance since for fundamentals of any course the principles may be similar. However, the materials have to be adapted to the local national context if materials are for local consumption only. However, courses that involve students enrolled from several countries automatically force the academicians to prepare OERs to suit regional or global contexts if students are admitted globally like for courses that are offered jointly between OUT,[61] UNESCO Paris and The Tanzania Institute of Education (TIE) for Masters Degree in Curriculum Design and Development of The Open University of Tanzania.

In Canada, there is an imbalance; OER efforts tend to focus on creating new materials rather than adapting or adopting existing OER:

> However, as more faculty are becoming aware of the existence of OER in accessible repositories like that of BCcampus, adoption/adaption is beginning to become more common. There is a strong reluctance among many Canadian faculty to adopt US-based courses. In many humanities and social science courses in particular, faculty in Canada have a different orientation than those in the USA. These faculty, in the absence of Canadian content, prefer to create their own. Thus, activities tend to focus more on local production rather than adoption/adaption, but this seems to be changing to a more balanced approach.

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60   De Oliveira Neto, J.D., Pete, J., Daryono, J. & 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). Retrieved from https://doi.org/10.5281/zenodo.599535
61   Open University of Tanzania

Similarly, in the UK, at an individual level, there is some evidence of OER reuse,[62] but nearly all large-scale efforts are aimed at producing new materials. In this context, it is recognized that there needs to be a stronger emphasis on the benefits of reuse as one of the primary advantages of OER.

For Mexico, it was also reported that there was no balance between the production of new materials and the reuse (adaptation) of existing OER. This is due to a lack of training in legal and educational areas regarding appropriate reuse.[63]

In Australia, there is no evidence available regarding the balance between OER efforts reusing and adapting existing materials and those producing new materials. There is also some uncertainty among those in the education sector around issues of reuse of existing materials. Australian educators have historically relied upon the educational statutory licences in the Copyright Act 1968 to copy material and therefore are often not experienced with making individual decisions around copyright licensing. This was an issue that influenced the development of the Open Educational Licensing (OEL) Toolkit,[64] which aims to assist educators with making decisions around their use and creation of OER.

The South African respondent argued that countries in the Global South should be creating more of their own OER that use local epistemic perspectives, examples, and languages:

More adaptation would fulfil the value proposition of OER more directly and allow for local-ization and translation. Higher use (i.e. re-use 'as-is') is not unilaterally recommended as the challenges are that this type of OER copying may unwittingly entrench Western epistemic positions, sustain the hegemony of the English language and unintentionally weaken alter-native perspectives on knowledge.

The Canadian respondent argued that OER can eliminate the duplication of efforts, allowing educators (and students) to take full advantage of commonly available curricula by incorpo-rating content developed and paid for elsewhere:

> *The ability to change OER is important for educators who wish to adapt or update the content. This can lead to significantly enhancing the quality of the curricula on an ongoing basis, ensur-ing the design of more effective learning environments. OER, because they can be used, reused, adapted, etc. at will by teachers, learners and course designers can be seen as an investment in higher quality more collaborative learning. OER can make it easy for learners to change, aug-ment or remove the content; this can form the basis for learners to construct knowledge through collaboration.*

However, the Brazilian respondent pointed out that educators have used and adapted exist-ing textbooks, photocopies, pictures, websites, and graphics for many years, although most have little, if any, understanding of copyright laws:

> *As part of their career plan, many of them have also been engaged in producing educational ma-terials from scratch. The use, adaptation and production of OER requires different skillsets from teachers such as knowing where to search for materials in existing repositories, knowing how to use open source software to re-use, revise, remix and redistribute materials and knowing how to license materials using Creative Commons licences or open licences.*

As this is one of the main challenges faced by Brazilian educators and other stakeholders, the Brazilian respondent argued that the focus should be on striking a balance between what are already common practices, raising awareness, and building the capacity of users to find, reuse, create, and share OER.[65] She argued that this balance can be attained through appropriate support and a clear action plan aimed at future OER training efforts.

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62   De los Arcos, B., Farrow, R., Perryman, L.-A., Pitt, R. & Weller, M. (2014). OER Evidence Report 2013-2014. OER Research Hub. Retrieved from https://oerresearchhub.files.wordpress.com/2014/11/oerrh-evidence-re-port-2014.pdf

63   Ramírez-Montoya, M.S. (2012). Academic networks and knowledge construction. *Revista Española de Pedagogía, LXX* (251), 27–44. Retrieved from http://catedra.ruv.itesm.mx/handle/987654321/747

64   Open Education Licensing. (no date). OEL Toolkit. Retrieved from http://www.oel.edu.au/

65   Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

Furthermore, data from the desktop research suggests that while sharing and reuse is central to the OER movement there is little evidence in the literature that this practice takes place. Nevertheless, a number of reasons have been proposed for this lack of reuse,[66] including:

- Lack of full understanding of the resources, and therefore inability to effectively reuse them;

- Lack of pedagogical skills to reuse resources;

- Lack of accessible technologies;

- Lack of necessary skills to make informed judgements about how to use technologies;

- Insufficient digital literacy/lack of ICT skills;

- Lack of understanding of open licences and how they work;

- Difficulty evaluating the usefulness and determining the value and quality of OER;

- Lack of awareness regarding possibilities for OER use; and

- Lack of technical capacities to repurpose OER material for teaching and learning needs.

The findings from this research indicate that an assessment of whether OER practices are achieving a balance between creating new materials and reusing OER may be too simplistic, as this depends on the context and level of OER activity within a country. However, the findings do point to a lack of awareness around reuse, highlighting the need for more efforts to focus on how to reuse OER.

[66]   Beaven, T. (2018). 'Dark reuse': An empirical study of teachers' OER engagement. *Open Praxis, 10*(4), October–December 2018, pp. 377–391. Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/889/502

COL   (2017). *Open Educational Resources: Global Report 2017.* Burnaby: COL. Retrieved from http://oasis.col.org/bitstream/handle/11599/2788/2017_COL_OER-Global-Report.pdf Hatakka, M. (2009). Build it and They Will Come? Inhibiting Factors for Reuse of Open Content in Developing Countries. *EJISDC, 37*(5), 1–16. Retrieved from https://onlinelibrary.wiley.com/doi/epdf/10.1002/j.1681-4835.2009.tb00260.x

OER Financing and Sustainability

Historically, donor organizations provided funding for OER, and increasingly governments are providing such funding. The findings from the case studies reveal various OER funding sources, and in most instances, governments provide funding.

In Australia, the respondent noted that OER funding has, in most cases, been provided either by federal or state education departments, via one-off grant funding, or through the internal operational budgets of individual institutions. Government-funded bodies, such as Education Services Australia,[67] support initiatives involving openly licensed resources in the secondary education sector. In higher education, OER initiatives are decentralized and often rely on funding from individual institutions, or funds have been received via individual research grants from bodies such as the Department of Education and Training. Support for ongoing OER initiatives generally requires incorporation of the resource development and support into ongoing operational budgets.

The South African respondent reported that adoption of OER is increasing at universities where either the institution or individual educators are able to attract funding from international donors and government to support OER initiatives. For example, at the University of Cape Town (UCT), OER initiatives have been supported through the Vice-Chancellor's special project fund and seed-funding provided for the development of MOOCs through a UCT-funded project. The Centre for Innovation in Learning and Teaching (CILT — formerly the Centre for Educational Technology) has been able to attract donor funding each year from 2007 to date in order to pursue an OER and Open Educational Practices (OEP) agenda. Furthermore, the South African Department of Higher Education and Training (DHET) has shown that it is willing to fund cross-institutional OER development activities (such as the OER Term Bank), which is an encouraging development. The DHET has also been able to attract funding from the European Union to fund additional OER projects.

In Canada, the respondent highlighted that funding for OER initiatives is via donor grants, provincial governments, and institutions. Investment in design and development of educational resources varies considerably among institutions and even among individual faculty within institutions. For example, at Athabasca University (AU), there have been openly licensed course development projects with provincial grants of more than CAD50,000, so there is increased investment in the design and development of OER. Some faculty have also adopted whole OER courses or textbooks, at no cost, and thus have saved significant development time.

The Mexican respondent reported that academic OER are produced either by government funds or by the institutions responsible for that production, such as the case of *Tecnológico de Monterrey's* OER portal (TEMOA) and the Observatory. Scientific OER are usually produced by government funds mainly from CONACYT,[68] and several institutions have developed repositories as a result.[69] In general, CONACYT's policies promoting OER are financed,

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[67]   Education Services Australia. (no date). Retrieved from https://www.esa.edu.au/

[68]   CONACYT (2017). Política de Ciencia abierta. Retrieved from https://www.repositorionacionalcti.mx/docs/seminario_RI_y_su_interoperabilidad_con_el_RN/01_Politica_de_Ciencia_Abierta.pdf

[69]   CONACYT (2016). Publicación de Resultados — Convocatoria 2015 para Desarrollar los Repositorios Institucionales de Acceso Abierto a la Información Científica, Tecnológica y de Innovación. Retrieved from https://www.conacyt.gob.mx/index.php/sni/convocatorias-conacyt/convocatorias-direccion-adjunta-de-planeacion-y-evaluacion/convocatoria-2015-repositorios-institucionales-aaict/11150-resultados-convocatoria-2015-3/file
CONACYT (2017). Publicación de Resultados — Convocatoria 2016 para Desarrollar Repositorios Institucionales de Acceso Abierto a la información Científica, Tecnológica y de Innovación. Retrieved from https://www.conacyt.gob.mx/index.php/convocatorias/convocatorias-direccion-adjunta-de-planeacion-y-evaluacion/convocatoria-2016-repositorios-institucionales-aaicti/14344-resultados-de-la-convocatoria-2016/file
CONACYT. (2018). Publicación de Resultados — Convocatoria 2017 para Desarrollar Repositorios Institucionales de Ciencia Abierta. Retrieved from https://www.conacyt.gob.mx/index.php/convocatorias/convocatorias-direccion-adjunta-de-planeacion-y-evaluacion/convocatoria-2017-para-desarrollar-repositorios-institucionales-de-ciencia-abierta/17709-resultados-convocatoria-2017-1/file

but these are usually insufficient to fund follow-up processes. For example, in 2015, CONACYT launched calls for public universities to develop their open repositories; although the repositories were built, however, these initiatives have no medium- or long-term mechanisms for their update and follow-up, nor strategies for their appropriation by the academic community.

For the OERu in New Zealand, central infrastructure costs are reportedly funded by membership fee contributions from OERu partner institutions. The OERu also receives a general operating support grant that constitutes approximately 30% of the total costs of operation. Recruiting an additional 25 contributing partners will achieve a sustainable operation without reliance on third party donor funding. The recurrent costs for partners to provide assessment services are recouped using a fee-for-service model. Courses designed and assembled for OERu are typically used in parallel on campus as part of normal design and development at the institution that contributed the course for OERu. There are a few examples where OERu courses will be offered as credit-bearing opportunities for local students at partner institutions. This will likely demonstrate potential savings in design and development costs because these courses can be reused without investing in course development.

The Nigerian respondent noted that there are some provisions made for OER within the NOUN course materials development budget, rather than as a separate budget item. This funding arrangement means that insufficient funds are available to implement OER optimally. The Nigeria respondent believes that a separate, OER-specific budget will aid OER content development, as converting existing government-funded course materials into OER, for example, requires dedicated time and resources. With the newly developed national OER policy, it is likely that the issue of financial commitment to OER will receive more attention. Thus, the national policy brings hope for increased budgetary allocations specifically for OER.

To date, the German Federal Ministry of Education and Research has only had one 18-month programme (OERInfo) supporting a national coordination hub and 24 other model projects. OERInfo is the only nationally funded OER programme in Germany, and, compared to the large programmes on digitization, the project has received minimal funding. Other projects, particularly in higher education, depend on internal institutional funding. There is little experience with commercial business models and thus the sustainability of the existing initiatives is not clear.

Establishing a financially sustainable environment in which to design and develop OER has been a three-phase process in Slovenia. The basis is good ICT infrastructure for educational purposes (e.g. broadband connection for the entire network of schools), which calls for large financial investments. For the period 2014–2020, approximately 17 million euros is being invested into the finalization of the required infrastructure and ICT equipment. Additionally, funds need to be secured to facilitate the development and deployment of open educational content. In the period 2017–2022, approximately 12.5 million euros is being invested into a range of activities related to teacher training and development. Slovenia makes good use of available European Union (EU) funding mechanisms (e.g. European Structural and Investment Funds, Erasmus+ programme, and Horizon 2020) to undertake different OER initiatives. The funding is secured within the framework of the Multiannual Financial Framework and national priorities are set in advance through negotiations with responsible EU institutions. With a wide variety of funding resources available at EU level, sustainability of OER initiatives does not represent a major challenge, although funding priorities are politically set. Within the current global and EU context (e.g. smart, sustainable economies, with great emphasis on the role of education and lifelong learning), there is a strong belief that understanding of the need for further development in the field of OER will be recognized and sufficiently financially supported. However, overreliance of OER initiatives on EU funding resources introduces an element of vulnerability in terms of sustainability.

In Brazil, there has been a significant increase in the development and funding of OER projects, repositories, and portals, whether by public, private, or non-profit organizations, and there are also clear policies for licensing these initiatives. Previously, digital content initiatives such as the Teacher's Portal (*Portal do Professor*), International Database of Educational

Resources (*Banco Internacional de Objetos Educacionais*), and Interactive Virtual Network of Education (RIVED) were not considered authentic OER initiatives as there were no licences attached to their resources.[70] There is also a wider variety of initiatives: Virtual Campus of Public Health Brazil (*Campus Virtual da Saúde Pública* — CVSP), Free School of the House of Digital Culture *(Escola Livre da Casa de Cultura Digital)*, e-Unicamp (*Universidade de Campinas* — Unicamp), and the Scientific Electronic Library Online (Scielo). These cater to diverse target audiences and the general public, and are all aimed at disseminating knowledge and promoting the sharing and creation of OER in fields such as healthcare and national and indigenous culture and research. Thus, in Brazil, the growth in OER appears to be increasing investment in the design and development of educational resources generally.

However, in the UK, the respondent noted that there is currently little funding available for OER. Investment in OER is decreasing from a peak around 2010, as seen with the significant investment from the Joint Information Systems Committee (JISC) around then and the subsequent closure of JORUM and other initiatives at universities. The major reason that most JISC UKOER projects failed to reach sustainability and usually closed soon after the funding ceased, was due to lack of funding. The UK higher education sector is constructed largely as a business reliant on student fees, rather than as a publicly funded good. The initial altruistic argument for OER, in sharing knowledge for the benefit of society, is difficult to realize in such an environment. Universities that have maintained successful OER projects do so through central institutional funding. In some institutions, like OpenEd and OU, sustainable business models have been created as part of their marketing and recruitment strategies. However, while OER funding has often ceased, there has been a lot of investment in MOOCs, particularly in FutureLearn. Thus, open education that is couched in more economic terms, such as in the case of MOOCs where the sale of certificates is proposed as a revenue-generating model, is more likely to be adopted.

In summary, the available funding for OER differs according to country context, although increasingly governments are supporting initiatives either through grants or operational budgets. This research noted that in countries' OER policies, strategies, and guidelines, for the most part there is little or no mention of funding mechanisms to ensure sustainability.

Sustainability of OER

Many OER initiatives have been seeded with significant funding:

> *Sustainability in relation to OER is closely linked to the business model or approach that an individual, group or institution adopts to release, manage and support OER. It is not just about sustaining existing OER but about embedding processes and transforming practices to support ongoing OER production and release.[71]*

The findings from this study highlight that in contexts with no clear, allocated funding, OER initiatives are not sustainable. In Tunisia, for example, OER initiatives are not sustainable because there is no explicitly defined mechanism to generate funding. There is no business model behind the production of OER; and, more generally, no mechanism to create value from OER.

Similarly, in Tanzania, OER initiatives are not sustainable based on current donor funding sources.

Three respondents pointed out that sustainability in national government-funded OER initiatives is affected by changes in government. The Mongolian respondent noted that, in that country, national-level OER development was financed by the government between 2014 and 2016. Thereafter, financing ceased due to the country's recent financial hardships, and there was almost no investment in OER at institutional level, thus compromising the sustainability of these initiatives.

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[70] Dos Santos, A.I. (2011). *Open educational resources in Brazil: State-of-the-art, challenges and prospects for development and innovation*. UNESCO Institute for Information Technologies in Education. Moscow, Russian Federation.

[71] McGill, L. Open Educational Resources. (2013). Sustainability. Retrieved from https://openeducationalresources.pbworks.com/w/page/26789871/Sustainability

In China, it was highlighted that, while its OER initiatives are currently sustainable, this depends on policy continuity and financial support from government and organizations:

For example, the NQC[72] initiative in 2003 developed to the NQOC[73] initiative in 2011 which lasted till now. The government issued OER policies at the different time ensured the sustainability. The NQOC…were selected every year and granted honours and subsidy.

While currently initiatives in Brazil appear to be relatively sustainable, three out of five are either privately funded or funded by the UNESCO Office in Brazil. These are Edukatu, *Escola Digital*, and *Ciênsação*. The other two initiatives, e-Unicamp (*Universidade de Campinas*) and Network for Exchange of Educational Production (*Rede de Intercâmbio de Produção Educativa* — RIPE) are government-funded, which means their sustainability could be negatively impacted if the government decides to discontinue funding. The lack of clear policies and/or instructions on available OER initiatives and corresponding sites also compromises sustainability. For example, initiatives such as the Teacher's Portal (*Portal do Professor*), which are aimed at providing closed resources (with free access) and OER and fostering collaborative practices, lack clear policies about how users can use, retain, reuse, revise, remix and redistribute these resources. The Brazilian respondent also pointed out that the issue of sustainability has not yet received attention in Brazil. OER initiatives that are funded by the federal government or other governmental organizations such as the MEC are subject to discontinuation if they lack financial and/or resource commitments. After the 2018 elections, it is difficult to assess which or how many government-funded OER initiatives will continue to receive funding.

> *As an example of this, on the website of the Curriculum + initiative, which is funded by Secretary of Education of the State of São Paulo, there was a disclaimer stating that 'in compliance with the law that governs elections (Law 9,504 / 1997), the remaining contents of this site will be unavailable from July 7, 2018 until the end of the state election in São Paulo'.[74] Implications for this are that it will basically be up to the future candidates elected to decide which initiatives will be continued and which will be discontinued. In general terms, privately funded initiatives such as REA Dante (OER Dante Alighieri Elementary and High School), Programaê, Porto OpenCourseWare (OpenCourseWare of the Visconde de Porto Seguro Elementary and High School), and Escola Digital (Digital School) appear to be more sustainable in the long term since they are not contingent on public funds.*

Furthermore, although the National Textbook Plan (*Plano Nacional do Livro Didático*) (2019 and 2020) initiative was recently approved, in Brazil textbook publishing companies still possess great economic, political, and media power. These publishing companies are concerned about the sustainability of OER practices and how such practices will affect their market power, calling for a need for them to change their business models. Thus, the sustainability of OER initiatives is a real issue of concern, and further research is required to assess the sustainability of ongoing and future large-scale publicly funded OER initiatives.

In Chile, the respondent noted that there are a few isolated OER initiatives and these are neither sustainable nor respond to a specific strategy. These initiatives mainly develop new materials, and there is little awareness of the opportunities around reusing or remixing content and resources. There is also decreasing investment in digital hardware resources; for example, the 2013 budget was USD8.6 million, but this fell to USD2.7 million in 2017 and 2018.[75]

Other respondents iterated the need for commercial business models in order to ensure sustainability. The Canadian respondent highlighted that OER initiatives have been supported by government grants, a practice that is not necessarily sustainable:

> *Traditional cultures, practices and processes for procuring textbooks and other content must be changed. OER are not sustainable if it is expected that special government grants are to be relied on. Sustainability is possible however if the current budgets for textbooks, which can be quite*

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[72]   National Quality Course
[73]   National Quality Open Course
[74]   The contents of the site are available again, which indicates the elected state governor has decided to continue providing funds for this initiative.
[75]   Biblioteca del Congreso Nacional de Chile. (no date). Comparador. Retrieved from https://www.bcn.cl/presupuesto/comparacion/A-24432

substantial, are diverted to support OER. Most savings at the higher education level have been for students and not the institutions. At AU,[76] however, where the course fee has always been seen as part of tuition, there have been substantial savings associated with OER adoption. Some of these savings should be allocated towards supporting more OER initiatives. At other universities, an OER development fee at a much lower cost than the average CAD500 — CAD1000 per year that Canadian students pay for textbooks could be implemented to ensure OER sustainability.

The Australian respondent reported that higher education institutions in Australia provide their educational services under commercial business models. Thus, there is a need for OER to operate alongside business models for the commercial delivery of online educational services. The reliance on grant funding for the development of OER projects has meant that, in many cases, the ongoing stability of OER initiatives can be uncertain unless they are built into the ongoing operational budgets of departments or institutions. The cost of ensuring that OER will remain up to date is often difficult to ascertain at the outset of projects and there has been some concern about the ongoing quality and validity of such materials over time. Some institutions are actively investigating the viability of providing commercial services associated with OER, such as micro-credentialing, badging, or assessment services. Developments in this area are likely to be important to encourage the wider incorporation of OER into the ongoing operations of the Australian education sector. Ongoing commitment to and funding for OER initiatives in Australia is likely to be dependent on the emergence of well-used and effective local online sharing platforms and projects that provide successful demonstrations of business models and pedagogical value arising from the implementation of OER.

In New Zealand, the OERu model was designed for sustainability from inception. It represents a disaggregated service provision model using a networked approach to fund shared technical infrastructure from nominal membership fee contributions, for providing free access to OER-based online courses and funding recurrent assessment costs on a fee-for-service basis. The OERu partners have published two documents describing the OERu open business model:

• Business model brochure;[77] and

• Open business model canvas.[78]

Currently, 70% of the OERu operations are funded from sustainable sources, with only 30% reliant on third party donor funding. It is conceivable that the OERu will achieve a financially sustainable model to offer OER-based open online courses at no cost to students, with pathways to achieve formal academic credit.

Respondents suggested some solutions to ensuring the sustainability of initiatives. For example, the Canadian respondent noted the following:

To promote OER use and sustainability, finances can be diverted from programmes that presently consist of payments to large, mainly foreign, publishers, and used to support OER programmes. For example, the removal of a CAD200 textbook from a course represents a significant saving for students. A small student fee could then be applied that can be used for OER adoption and assembly. Another possibility to promote sustainability while supporting the local economy is to pay local publishers with the OER funds to print or digitally enhance the content, providing that they allow the government and institutions to retain the copyright using a Creative Commons licence. In addition, most institutions spend considerable time and money in chasing down and requesting copyright permissions from publishers and authors. As the use of OER increases, these costs are reduced and can be diverted to supporting the introduction of even more OER.

The Canadian respondent also highlighted that openly licensed content is not only free but 'also free of costs associated with negotiating licences and clearing copyright by contacting publishers or authors'. However, he pointed out that there are other costs associated with designing and developing educational resources, regardless of whether these are OER or

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[76]   Athabasca University

[77]   OERu. (no date). Business Model Canvas. Retrieved from http://wikieducator.org/images/5/58/OERu_ Business_Model_Brochure.pdf

[78]   OERu. (no date). OERu Business Model Canvas. Retrieved from http://wikieducator.org/images/8/86/1248_ OERu_BusinessModel_Canvas_PRESS.pdf

proprietary resources requiring investment. These costs include Internet bandwidth and connectivity, organizational infrastructure (equipment), training, and production/adapting/assembling of content.

Data from the desktop research indicates that the first OER projects and initiatives were often funded by foundations such as the William and Flora Hewlett Foundation, or national initiatives such as JISC in the UK.[79] Philanthropy has invested heavily in OER because of its potential to meet the needs of diverse learners, accelerate pedagogical innovation, engage the community, and lower costs.[80] Huttner et al. (2018) argue that despite active philanthropic investment in OER development, which has helped to spur OER's mainstream growth, the source of capital for future development and distribution is uncertain.[81] Reliance on grant funding for the development of OER projects has meant that, in many cases, the longer-term ongoing stability of OER initiatives can be uncertain unless they are built into the ongoing operational budgets of countries or institutions. There has also been considerable funding from national governments. And, in some contexts, government funding for OER is increasing. For example, in 2017 in the US, the Texas legislature approved a measure that provides USD20 million for the Texas Education Agency to develop OER courses. And in March 2018, the US Congress authorized a USD5 million OER programme that will fund competitive grants for universities to develop open textbooks.[82]

The findings from this research confirm that OER efforts are financed through donor funding and that, promisingly, governments are increasingly funding OER initiatives, via grant funding or institutions' operational budgets. However, in instances where one-off funding or funding for specific initiatives is provided, there might not always be sufficient funding or strategies to safeguard ongoing implementation and sustainability. Furthermore, sustainability in national government-funded OER initiatives may be affected by changes in government, which suggests a need for commercial business models in order to ensure sustainability.

[79]   Weller, M., De los Arcos, B., Farrow, R., Pitt, B. & McAndrew, P. (2015). The Impact of OER on Teaching and Learning Practice. *Open Praxis, 7*(4), 351–361. Retrieved from https://oro.open.ac.uk/44963/1/227-1106-2-PB-3.pdf

[80]   Huttner, N., Green, L. & Cowher, R. (2018). Seeking a sustainable OER ecosystem. Redstone Open. Retrieved from https://hewlett.org/library/seeking-a-sustainable-oer-ecosystem/

[81]   Huttner, N., Green, L. & Cowher, R. (2018). Seeking a sustainable OER ecosystem. Redstone Open. Retrieved from https://hewlett.org/library/seeking-a-sustainable-oer-ecosystem/

[82]   Diskey, J. (2018). Is OER Sustainable? 3 Examples that Suggest 'Yes'. Retrieved November 28, 2018 from http://www.copyright.com/blog/oer-sustainable-3-examples-suggest-yes/

Diversity and Inclusion

Development and use of OER has the potential to create equitable learning experiences for all students. Diversity and inclusivity in OER usually mean including a wide range of perspectives and viewpoints in content to ensure that more readers identify with and relate to the materials.[83] OER can also be used to preserve and distribute indigenous knowledge (that has traditionally been open).[84] Furthermore, for an OER to be accessible, people of all abilities need to be able to access the content. So, diversity may also incorporate designing material to accommodate people with diverse learning styles and ensuring that content can be accessed by all, regardless of disability. This allows the materials to be more engaging to students as they recognize themselves or their life experiences in the materials; to be more appealing to educators in a variety of educational settings; and to create a more interesting reading and learning experience. When using OER in different contexts, it may be useful to customize materials for specific needs. This may entail, for example, translating the resource into a different language, adjusting existing content to meet local cultural, regional, and geographical needs, or revising material for a different learning environment.[85]

Several respondents noted the potential for OER to promote inclusivity and diversity. For example, the Brazilian respondent noted that open sharing can enable ongoing translation of resources into different languages and their adaptation to suit different educational contexts.[86] Indeed, one of the main considerations around OER and diversity is the issue of language. Data from the desktop research reveals that currently, certain languages are inadequately represented in the OER field, as the domain is dominated by a few global languages, English being just one example.[87] Producing OER in local languages allows for increased diversity, quality, and relevance of content. Furthermore, translation and adaptation of OER allows access to different cultures. Data from this research confirms that most OER are produced in 'world languages' such as English, Spanish, Chinese, and French. In most countries, OER are produced in the dominant language of that country, and in only a few instances are OER produced in indigenous languages:

- In Australia, OER are predominantly produced in English although a few OER are now being produced in Aboriginal languages. For example: Charles Darwin University hosts the Living Archive of Aboriginal Languages,[88] a digital repository of endangered literature in Australian indigenous languages from around the Northern Territory, which is made available under a CC BY-NC-ND licence. Nodes,[89] PreVET,[90] and Fliplets[91] are contextualized, multimodal learning resources tailored for remote indigenous students and made available under a CC BY-NC-ND licence. Furthermore, the Indigenous Fisheries Training Network includes student-created OER videos from Warruwi,[92] which are made available under a CC BY-SA licence.

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83   SUNY OER Services. (no date). Including All Students. Retrieved from http://commons.suny.edu/sunyoercommunitycourse/creating-licensing-publishing-oer/including-all-students/

84   McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distributed Learning, 8*(7), November 2017. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

85   Aesoph, L. (no date). Self-publishing guide — Accessibility, Diversity, and Inclusion. BCcampus. Retrieved from https://opentextbc.ca/selfpublishguide/chapter/accessibility-and-inclusion/

86   Rossini, C. (2009). Technology and Education: The Emergency of Openness. Open Education 2009, Vancouver. Retrieved from http://www.slideshare.net/carolina.rossini/oer-policy-and-developing-countries

87   Bradley, L. & Vigmo, S. (2014). Open Educational Resources (OER) in less used languages: A state of the art report. LangOER consortium. Retrieved from http://langoer.eun.org/c/document_library/get_file?uuid=1d1f23d3-d38d-4298-b8d1-c7422c1c205d&groupId=395028

88   Charles Darwin University. (no date). Living Archive of Aboriginal Languages. Retrieved from https://livingarchive.cdu.edu.au/

89   Nodes. (no date). Home Page. Retrieved from http://nodes.net.au/

90   PreVET. (no date). Home page. Retrieved from http://prevet.net.au/

91   Fliplets. (no date). Home Page. Retrieved from http://www.fliplets.net.au/

92   Indigenous Fisheries Training Network. (no date). Home page. Retrieved from https://indigenousfisheriestrainingframework.wordpress.com/

- In Germany, the main language for OER (and learning materials in general) is German. Some universities targeting international students have developed some OER in English. Additionally, some OER were developed for specific purposes and target groups. For example, some have been developed in Turkish and Arabic for refugee schools. However, there are no broad initiatives focusing on multi-language support.

- The main language in Mexico is Spanish and most OER are in Spanish. There are no OER for the 68 indigenous languages in Mexico and their 364 linguistic variants.

- There are eleven official languages in South Africa, and English is the fourth most common first language in the country (9.6%) but is understood in most urban areas and is the dominant language in government and the media. For most South African universities, the language of instruction is English. OER are predominantly produced in English, but there is one project, the OER Term Bank, that is intentionally multilingual and includes common academic terms in all eleven languages.

- The main language in the UK is English and most OER are produced in English. There are a few OER produced in Welsh or Gaelic.[93]

- In Brazil, Portuguese is the main language and OER are predominantly produced in Portuguese.

- In China, Chinese is the main language and OER are mainly produced in Chinese and English.

- The predominant languages in Tanzania are English and Kiswahili, but thus far OER have been produced only in English.

- In Mongolia, the main language is Mongolian and OER are predominantly produced in that language.

- The main languages in Nigeria are English, Yoruba, Housa, and Igbo. However, OER in Nigeria are predominantly produced in English.

- The main languages in Canada are English and French, and most OER are produced in English, although some are in French. Very few OER are produced in indigenous languages. The Alberta initiative was open to Canadian First Nations (indigenous) organizations. Several organizations received funding to raise awareness of OER within their communities. In one project, Maskwacis First Nation Cultural College received funding from the Ministry of Advanced Education for the development of indigenous content aimed at driving 'stronger Indigenous perspectives in Alberta post-secondary learning'. The project was designed to support the need for indigenous students to learn in new technological environments and become digital citizens, while maintaining their indigenous perspectives.[94] This college adopted/adapted OER for use in a variety of courses and translated the CC licence names into the Cree language. BCcampus is implementing an OER initiative on indigenous education.[95] eCampus Ontario is sponsoring an OER project in indigenous story-telling[96] and indigenous cooking.[97]

- The main language in Chile is Spanish and OER are mainly in Spanish with a few English versions.

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[93]   There are some resources in Welsh (e.g. http://www.open.edu/openlearncreate/theme/openlearncymru/home.php). Gaelic and Welsh language learning are the most common types of resources (https://learnwelsh.cymru/ & https://go-gaelic.scot/classroom-resources/#files).

[94]   McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distributed Learning, 8*(7), November 2017. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

[95]   Ebeattie. (2016). Supporting the Indigenization of higher education in B.C. Retrieved from https://bccampus.ca/2016/04/19/supporting-the-indigenization-of-higher-education-in-b-c/

[96]   ECampus Ontario. (no date). Digital Indigenous Storytelling. Retrieved from https://www.ecampusontario.ca/research_funding/digital-indigenous-storytelling/

[97]   ECampus Ontario. (no date). Open Textbook Initiative. Retrieved from https://www.ecampusontario.ca/open-textbook-funding/

- The official languages in New Zealand are English, Te Reo Māori, and New Zealand Sign Language. OER is predominantly produced in English.

- Officially, Tunisia is an Arab country, and therefore Arabic is the official language, yet French is widely used. Legislative texts, for example, are published in both languages (Arabic and French). Moreover, the spoken language is the Tunisian Dialect, which is a mix of Arabic, French and Italian. However, most university courses are taught in French, and a very small proportion of courses is delivered in Arabic. The resources in the Virtual University of Tunis (VUT) repository are predominately in French.

- The main language in Slovenia is Slovenian, and OER are mainly in Slovenian and English. Slovenia has produced learning software to automatically translate OER with a high degree of accuracy. The country is involved in translating OER from English into several languages (German, Italian, Portuguese, Greek, Dutch, Czech, Bulgarian, Croatian, Polish, Russian, and Chinese) and designing language models for Slovenian language combinations, including text-to-speech (TTS) and automatic-speech-recognition (ASR) based on novel neural networks algorithms.

Data from the desktop research indicates that developing, sharing, and maintaining OER can be expensive, which can lead to the exclusion of smaller, less wealthy stakeholders who do not have access to the resources needed to participate actively with OER creation. This may result in more OER being available in Western countries, from their philosophy and world-view, which may raise concerns of neo-colonialism. While these OER can be adapted to local contexts, this also requires resources, including digital learning resources.[98] Thus, one of the main issues still impacting on the inclusivity of OER is the issue of the digital divide. This is more broadly noted in the ROER4D initiative on sub-Saharan Africa as OER differentiation:

> The worldwide OER collection, although in principle giving online access for free to all, may not be equally accessible to all independent of location on the globe or in a country. This situation is technically referred to as OER differentiation which represents the gap between the centre and the periphery, between the literate and the illiterate, between the urban and the rural, between the haves and the have-nots, in their opportunities and capabilities to access and use OER.[99]

The ROER4D studies use a definition of OER differentiation as:

> the existing inequalities in the use of OER in society, that involves not only unequal access to OER, but goes further to include the inequalities that exist between groups of people in their ability and capability to actually create, use or re-use, repurpose, and holistically utilize OER for individual and common good. [100]

The authors argue that underlying OER differentiation there is digital differentiation (the digital divide), which concerns physical access to new ICT technologies such as the Internet. 'Digital divide' also refers to the gap between demographics and regions that have access to modern ICT (including the Internet), and those that have restricted access.[101] The Brazilian respondent specifically highlighted this as:

> Access to computers and the Internet is still a major challenge for most Brazilian basic education public schools inasmuch as there is low availability of equipment and limited Internet connection… Furthermore, the marginalized voices of the Brazilian society should be afforded opportunities to become literate with ICT skills so that they can make an informed decision about making use of OER. From this perspective, none of the OER initiatives included in this research speak to the inclusion of marginalized voices.

[98] Baker, N. (2018). It's open to all, right? Who is excluded from and by open educational resources (OERs)? Presentation at OER18: Open to All, 9th annual conference for Open Education research, practice and policy, 18 — 19 April 2018, Bristol, UK. Retrieved from https://oer18.oerconf.org/sessions/its-open-to-all-right-who-is-excluded-from-and-by-open-educational-resources-oers-1928/

[99] Pete, J., Mulder, F. & Oliveira Neto, J. (2017). Differentiation in Access to, and the Use and Sharing of (Open) Educational Resources among Students and Lecturers at Kenyan Universities. *Open Praxis, 9*(2), 173–194. Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/574

[100] Pete, J., Mulder, F., Oliviera Neto, J.D. & Ludewig Omollo, K. (2018). Differentiation in Access to, and the Use and Sharing of (Open) Educational Resources among Students and Lecturers at Technical and Comprehensive Ghanaian Universities. *Open Praxis, 10*(4). Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/917

[101] TechTarget. (2014). Digital Divide. Retrieved from https://whatis.techtarget.com/definition/digital-divide

The Slovenian respondent noted that the current basis for design and use of OER is well-operating ICT infrastructure for educational purposes (e.g. broadband connection for the entire network of schools), which Slovenia is currently focusing on.

There is some evidence of OER allowing for greater inclusion within countries. For example, Mongolia is a sparsely populated country with adequate Internet coverage. In this country, OER are beneficial for students who reside in rural settlements and OER initiatives have widened learning opportunities for people with limited mobility. The use of Khan Academy video lessons has helped parents help their children to understand materials from formal textbooks. Furthermore, initiatives promoting the Mongolian language assist those Mongolian children who permanently live and study in foreign countries, and thus became less proficient in their native language, to better learn the language. However, these OER initiatives are affected by the fact that OER-specific policies and funding are limited.

In China, at the basic education level, inclusivity of OER was advanced via the 'full coverage of digital educational resources for One-teacher school' project.[102] The project aims to equip rural one-teacher schools with digital devices and digital educational resources to better serve the needs of children in rural areas, who can then receive a good education where they reside.

Experiences from OERu in New Zealand highlight that, while accessibility, inclusion, and diversity are important strategic objectives underpinned by the values of widening equitable access to post-secondary education, achievements in this regard are constrained by the existing budget. Nevertheless, OERu promotes diversity in the following ways:

- As an international collaboration, it encourages the contribution of courses promoting indigenous knowledge. For example, it has four micro-courses on indigenous Australia: 'Indigenous Australians: The dreaming and relationships to country',[103] 'Indigenous Australian histories',[104] 'Human rights and indigenous Australian peoples',[105] and 'Contemporary realities for indigenous Australians'.[106]

- All OERu online course materials are published openly without the need to register an account in order to gain access to the resources. This enables marginalized populations — for example, first-in-family indigenous students — to succeed 'anonymously'.

Another initiative (drawn from the desktop research) focusing on improving the inclusivity of OER is the Erasmus+ project MOONLITE. In this project, OER and MOOCs are being used to support the inclusion of refugees and migrants into European society, its employment market, and higher education. One challenge in this programme is the large number of resources involved and finding an effective way to assess the relevance of a given OER before starting to use it. A solution for this problem may be found in the use of appropriate metadata. The authors note that 'differences in the use of metadata to classify OERs and subsequently by users to search for them, can hinder their effectiveness'. They argue that effective metadata would need to be more extensive and include culturally specific, linguistic, techno-pedagogic, and contextually relevant information, not suffering from any habitual European institutional bias.[107]

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[102] Ministry of Education of the Republic of China. (2012). Notice of the Ministry of Education on Launching the Project of 'Full Coverage of Digital Education Resources for Teaching Points '. Retrieved from http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s3342/201211/144800.html

[103] OERu. (no date). Indigenous Australians: The dreaming and relationships to country. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/indigenous-australians-the-dreaming-and-relationships-to-country/

[104] OERu. (no date). Indigenous Australian histories. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/indigenous-australian-histories/

[105] OERu. (no date). Human rights and indigenous Australian peoples. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/human-rights-and-indigenous-australian-peoples/

[106] OERu. (no date). Contemporary realities for indigenous Australians. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/contemporary-realities-for-indigenous-australians/

[107] Traxler, J., Read, T. & Barcena, E. (2018). Open but not open enough: Extending OER metadata to facilitate refugee access to open educational resources and practices. Presentation at OER18: Open to All, 9th annual conference for Open Education research, practice and policy, 18–19 April 2018, Bristol, UK. Retrieved from https://oer18.oerconf.org/sessions/open-but-not-open-enough-extending-oer-metadata-to-facilitate-refugee-access-to-open-educational-resources-and-practices-1917/

The respondent from Canada highlighted challenges of inclusion, particularly with regard to the publishing industry:

> *The free sharing of OER can be regarded as essential for promoting the creation of content. Commercial publishers can technically control how, when, where, and with what specific brands of technological assistance that licensees are able to access content and applications. For example, some ebook publishers abridge the content and ensure that it is so difficult if not impossible to read that it becomes worthless as an educational tool. Moreover, publishers also deliberately cripple their devices to ensure that only their 'approved' uses are possible. This is often problematic for disabled users. The visually impaired, for example, are denied use of a text to speech function and in many cases cannot even increase the text size. Moreover, many proprietary systems still disable highlighting, annotating, hyperlinking, and even dictionary access — and these features are important for educational uses. Frequent traveling students and teachers are also handicapped when 'Geo-Blocking' (applying geographical restrictions) is included in the applications they use. For example, commercial content purchased in Canada will not work in the UK or France.*

He further highlighted the challenge of different formats:

> *Different formats are nearly always problematic when mixing and mashing materials. OER can be changed and altered for use in different formats without permission unlike commercial content. Hyperlinking is a normal learning activity that is often disabled in commercial applications. The devices are often purposely crippled, or proprietary standards are used so that content and applications cannot be ported to other devices. Permissions of all kinds also need to be re-sought for tampering with the material for re-use, re-purposing or mixing, even when fair dealing allows for it. This can become an impractical burden putting a real damper on any attempts to provide learning for all, which relies on the existence of large collections of open and accessible resources.*

The challenge of publishers 'locking' users' devices to restrict the way users can copy content was also mentioned by the Canadian respondent as a barrier to diversity:

> *Technological Protection Measures (TPM), otherwise known as Digital Rights Management (DRM) refers to digital locks that commercial publishers attach to their content. TPM restricts (or cripples) the user's device, while tracking their activities. It is used by publishers to control, limit and restrict how learners and others can use their materials. These restrictions extend to both the hardware and the software. DRM can limit the devices that you are able to employ in accessing an application or content. It can restrict you to using the proprietor's website and purchasing the proprietor's materials under strict licensing conditions, determining how, when, where you can use the application or content and with what devices. Online learning is particularly affected by DRM. Learning environments need flexibility and cannot live with commercial restrictions that limit the capabilities of digital media. Learning is also based on trust among the participating students and instructors. As they share resources, the respondents must have confidence that their personal information is not used for purposes other than those of learning and sharing with other students and the teacher.*

> *DRM are further supported by End User Licence Agreements, prohibiting users from accessing content or changing parameters in the content even if they have a fair dealing right to do so. These digital licences wherein users must click on 'I Agree' in order to access the content or applications are also a major impediment to learning. Licensing restrictions can add needless complications to downloading the content, sometimes making it so difficult that users simply give up. Format shifting, as has been noted is made technically difficult, and this is reinforced with these restrictive licensing that prohibit the practice. Even if one wants to retain the same format, proprietary content is licensed to only one computer ('for use solely on this device'), so learners who switch computers even with the same operating system are often restricted from doing so, or at a minimum they must contact the owners and request special permissions. Licences prohibit, not only copying and printing, but also modifying, removing, deleting, and augmenting (improving) or 'in any way exploiting any of the eBook's content'. Licences also prohibit the transfer of content to other students, for example when teachers wish to use a variety of devices with different groups of students in later semesters.*

Within these rights, publishers wield enormous control, and this extends to application licences:

> *Application licences also exempt the publishers from ALL liability under consumer protection law. There is no 'product' to purchase. The 'purchaser' has no rights, and no requirements are placed on the publisher, nor is there any requirement that the application even works. And, the publishers have no liability if they decide to remove an application or any content for whatever reason, legitimate or otherwise. They can also change these and other clauses of the contract at any time. In fact, whenever software is upgraded the contract can be changed and often is, but rarely for the benefit of the user.*

The respondent from Nigeria mentioned that NOUN makes specific efforts to release its OER materials in three different formats: epub, odt and pdf. It is believed that this 'democratizes access to OER for academic reuse (odt), self-print (pdf) and for mobile devices (epub)'.

The findings from the desktop research reveal that even though there are some open content initiatives originating from developing countries, most initiatives are produced by individuals, organizations, or institutions from developed countries.[108] The findings from the 2017 Global OER Survey note that stakeholder survey respondents appeared more likely to have used or currently use OER repositories created in the Global North than the Global South.[109] Nevertheless, there are indications that OER initiatives are moving towards South–South exchanges, whereas previously knowledge flowed unidirectionally: from the North to the South. For example, Lusophone students in Brazil are accessing Portuguese language OER created by the African Virtual University.[110]

The above discussion highlights that issues of diversity are currently a marginal consideration when it comes to OER initiatives and activities in most countries. Significantly (with the exception of the Canadian respondent, who flagged the challenge of publishers' control having the effect of excluding the visually impaired from participation), respondents did not include any discussion around disability. Other issues related to diversity and inclusion, such as customizing content to local contexts and needs, also did not feature much in the discussion. Issues of translation came across in the case studies as the main priority in terms of increasing access to educational materials.

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[108] Hatakka, M. (2009). Build it and They Will Come? Inhibiting Factors for Reuse of Open Content in Developing Countries. *EJISDC, 37*(5), 1–16. Retrieved from https://onlinelibrary.wiley.com/doi/epdf/10.1002/j.1681-4835.2009.tb00260.x

[109] COL (2017). *Open Educational Resources: Global Report 2017*. Burnaby: COL. Retrieved from http://oasis.col.org/bitstream/handle/11599/2788/2017_COL_OER-Global-Report.pdf

[110] McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distributed Learning, 8*(7), November 2017. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

RESEARCH ON EDUCATIONAL IMPACT AND EFFECTIVENESS

There are often stated beliefs about what OER can or will achieve — for example, improving learning outcomes, supporting active learning, improving teaching practice, reducing costs, encouraging localization and translation of content, promoting individualized learning, increasing learner efficiency, and offering equal access to knowledge for all. As OER projects were created and developed, the focus was more 'on developing and releasing OER content rather than researching its impact, and so reliable data is often absent'. Now, as OER initiatives and involvement grow, reliable evidence regarding the nuanced impact and effectiveness of OER is required.[111]

Data from the case studies reveal that in countries where the OER movement is still in its infancy, it is unsurprising that correspondingly little research has been done on OER use and impact. For example, Tunisia has no research reports providing any rationale for policy and funding to promote OER. Similarly, to date only limited research into OER has been undertaken in Tanzania — and most of it has been in assessing interest in accessing and adopting OER, which is largely influenced by the state of ICT infrastructure. Existing research has not documented the work that Open University of Tanzania (OUT) has done in OER, but there are some efforts to promote OER research, particularly via student PhDs.

In Mexico, there is no monitoring and evaluation policy to measure the impact and progress of each OER initiative, and it is thus difficult to assess the impact and effectiveness of projects. Respondents from South Africa and Chile pointed to the value of the ROER4D initiative. In Chile, one research project focused on understanding the effectiveness of OER in terms of first-year mathematics students' academic performance.[112] Chile was also one of the countries participating in the study, *Open Access and OER in Latin America: A Survey of the Policy Landscape in Chile, Colombia and Uruguay*, which provided an overview of the mechanisms (funding, policy, legislative, and procedural) adopted by Latin American governments with respect to OA and OER initiatives in the higher education sector.[113]

In Mongolia, a ROER4D research study focused on OER adoption and use in Mongolia's higher education sector found that despite government and funder efforts to promote OER, OER awareness remains modest among higher education instructors and administrators, and therefore OER adoption rates in Mongolia are low. As a result, a culture around OER engagement has not yet emerged.[114] In China, it is reported that there is empirical research and evaluation, and there are literature reviews and discussion papers on OER. Slovenia has conducted mainly computationally based artificial intelligence research and exploration of policy innovation for OER and around the introduction of a wider open education system. Most of these efforts were developed via national and European research projects.

In countries where there is more OER activity, there tends to be more — and more rigorous — OER-specific research, depending on the focus of that activity. For example, the New Zealand respondent noted that the research conducted has focused primarily on implementation of the OERu. As the OERu proceeds with implementation, more authentic data from student engagement and more detailed cost analyses will be gathered. While this could provide an evidence-based rationale for policy and financial commitments, this research focus

[111] Weller, M., De los Arcos, B., Farrow, R., Pitt, B. & McAndrew, P. (2015). The Impact of OER on Teaching and Learning Practice. *Open Praxis, 7*(4), 351–361. Retrieved from https://oro.open.ac.uk/44963/1/227-1106-2-PB-3.pdf

[112] Westermann, W. (no date). Effectiveness of OER use in first year higher education students' mathematical course performance: A case study. Retrieved from http://roer4d.org/sp-9-oer-use-in-first-year-mathematics

[113] Amalia, T. (2017). Open Access and OER in Latin America: A survey of the policy landscape in Chile, Colombia and Uruguay (Advance online publication). Retrieved from https://zenodo.org/record/161280#.W5Z8TYB-FuR

[114] Zagdragchaa, B. & Trotter, H. (2017). Cultural-historical factors influencing OER adoption in Mongolia's higher education sector. In C. Hodgkinson-Williams & P.B. Arinto (eds). *Adoption and Impact of OER in the Global South,* 389–424. Retrieved from https://doi.org/10.5281/zenodo.599609

is not a priority, as the university's limited capacity focuses on implementation as opposed to research.

Research is one of the UK's strengths in OER, and this has increased in rigour from the early implementations, which often failed to conduct post-project evaluations. OER conferences are organized annually in the UK and the quality of papers presented is high. The OER Hub is globally recognized as a leading OER research unit. For example, OER Hub has been investigating the impact of OER, using eleven hypotheses and a mixed-methods approach to establish an evidence base. One of its research papers explores the findings relating to teaching and learning:

> The findings reveal a set of direct impacts, including an increase in factors relating to student performance, increased reflection on the part of educators, and the use of OER to trial and supplement formal study. There are also indirect impacts, whose benefits will be seen after several iterations. These include the wide scale reporting of adaptation, and the increase in sharing and open practice that results from OER usage.[115]

Similarly, in Australia, existing OER research (including projects funded by the Department of Education and Training) has provided a rigorous analysis of Australia's experience with OER. Reports from government-funded research into OER in Australia and Australian academic publications on OER, have provided significant evidence of the potential benefits of OER in Australia. However, much of this was conducted while the OER environment was in its early stages of development, and often focused on specific practical outcomes.

In other countries, the focus might not be on research at a national level, but more on international issues. For example, research on OER in Germany tends to focus on international issues and the European Horizon 2020 projects, and not specifically on Germany. Nevertheless, there are some programme-specific research activities, although these are generally application/practice oriented.[116] There are also regional bodies that are focusing attention on research in the OER space. For example, in Latin America, the Latin American Open Regional Community of Social and Educational Research (CLARISE), created in 2011, is a Community of Practice (COP) comprising researchers from higher education institutions and organizations related to the areas of educational innovation and technology. Its efforts focus on forming collaborative learning networks to promote and give visibility and free access to cultural, scientific, and academic authors and institutions in Latin America.[117]

The Canadian respondent opined that Canadian research on OER issues is very rigorous, evidenced by the large number of published articles in internationally respected peer-reviewed scholarly journals as well as the leading scholarly journal for OER issues, *The International Review of Research in Open and Distributed Learning* (IRRODL). There have been several initiatives in western Canada on the evaluation of OER by faculty in various subject areas (BCcampus, AlbertaOER/ABOER, Manitoba OTI). The respondent noted that the preponderance of research points to a range of positive results related to OER implementation, particularly cost savings for students but also more flexibility for educators, including the ability to adapt and update their course content. He highlighted that while there is evidence on the benefits and challenges of OER, it has yet to be taken seriously by many educational policy makers (with some exceptions) at the institutional and/or provincial levels. The range of research topics call for research approaches that are exploratory and evaluative. The Canadian respondent highlighted that some research indicates significant positive effects on student retention and even on final grades at the community college level.[118]

Brazilian research on OER is also noteworthy, and it was reported in the case study that several academic articles have been published thus far. Zancanaro and Amiel (2017) conducted

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[115] Weller, M., De los Arcos, B., Farrow, R., Pitt, B. & McAndrew, P. (2015). The Impact of OER on Teaching and Learning Practice. *Open Praxis, 7*(4), 351–361. Retrieved from https://oro.open.ac.uk/44963/1/227-1106-2-PB-3.pdf

[116] Mayrberger, K. (2018). Projekte der BMBF-Förderung OERinfo 2017/2018. Sonderband zum Fachmagazin Synergie. Universität Hamburg, 2018. Retrieved from https://www.synergie.uni-hamburg.de/media/sonder-baende/oer-info-2017-2018.pdf

[117] CLARISE. (no date). About Us. Retrieved from https://sites.google.com/site/redclarise/

[118] See Contact North. (no date). Open Education Resources (OER) Applications from Around the World. Retrieved from https://teachonline.ca/tools-trends/open-education-resources-oer-applications-around-world/taxonomy-term

a bibliometric analysis of the Portuguese-language research on OER published until May 2015 gathered from multiple databases and journals. They identified selected scientific publications divided into the following categories: 33 articles published in journals, 29 works published in conference proceedings, 16 book chapters, two books, 17 dissertations, four theses, and one postdoctoral report. In terms of main authors, institutions and countries, 169 different authors were identified.[119] It is worth noting that 'Brazil stands out with 77.5% of the authors, which one might expect given its size and population. Portugal has 14.2%, the UK has 5.9%, the US has 1.2%, and Germany and South Africa have 0.6%, completing the list of countries with authors publishing in Portuguese'.[120] Findings from the study also indicate the following:

> Most of the analyzed works (46.7%) were written by a single author; 18.7% by two of them; 20.6% by three; 10.3% by four; 1.9% by five, and 1.9% by six authors. Data indicate that academic production is spread amongst a large number of authors and institutions. Despite the existence of institutions that have more salient production it cannot be concluded that there is a core group producing knowledge on OER. A small group of authors have a regular and significant production on the theme, which is not reflected in the representation of the institutions. This means that authors who produce more on the theme are not necessarily linked to the institutions with the largest number of affiliated authors.[121]

Brazil does not have any open access journals. Additionally, most of the major open education and OER conferences are held abroad in the English language. The upshot is that authors or researchers who are not affiliated to any institution may prefer to publish their studies in international open access journals in English in order to obtain international visibility. Nevertheless, there is a Workshop Open Educational Resources (WREA), which was formed in 2012 and has held three meetings since (the most recent being in 2017).

Respondents noted that there were several key research questions and issues that need to be explored regarding OER in their country. Suggested areas for research included:

OER use and adoption
- How are OER used, modified, and changed (within and between countries)?
- How do educators use OER? What factors hinder educators in creating and using OER?
- Why is OER under-utilized in basic education?
- How do students use OER and open textbooks?

Improving awareness of OER
- How can public awareness of OER, and OER adoption, be promoted?
- How should educators and students be made aware of and encouraged to use OER?
- What strategies can instill and promote a culture of collaboration among educators?
- What are the perceptions of the value proposition of OER to institutions?
- What are the perceptions of educators regarding OER adoption and use?

Educational effectiveness
- Does OER use improve student recruitment and/or retention?
- What is the impact of OER on students in different universities?
- What examples illustrate innovative pedagogical and educational outcomes resulting from the use of OER?

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[119] Zancanaro, A. & Amiel, T. (2017). The academic production on open educational resources in Portuguese. *RIED: Revista Iberoamericana de Educación a Distancia, 20*(1), 81–104, p.91

[120] Zancanaro, A. & Amiel, T. (2017). The academic production on open educational resources in Portuguese. *RIED: Revista Iberoamericana de Educación a Distancia, 20*(1), 81–104, p.91

[121] Ibid, p. 98

Funding and sustainability

- How will new and existing OER policies be funded?

- What are the funding mechanisms to support OER development?

- How can OER be effectively maintained by a wider sharing community?

- What mechanisms need to be in place to ensure the maintenance and ongoing quality and sustainability of OER?

Understanding costs and developing viable OER business models

- What are the costs of developing content from scratch and adapting existing OER?

- Which OER business models are promising and sustainable?

- What role can OER play in the commercial delivery of online education?

Quality of OER

- What actions or mechanisms should be in place, if any, to ensure the quality of locally produced OER?

- How can quality assessments and procedures be designed to assure the quality of rapidly changing resources?

Policy development and implementation

- What pre-conditions and factors are needed in order for OER policy to be adopted at institutional level?

- How should policy be practically implemented?

Intellectual property rights

- How effective is training on intellectual property rights for researchers and educators?

Improve diversity of OER

- Should OER research focus on interactive/mobile technologies rather than textual content?

- What are the language barriers in adopting OER?

Credentialing

The New Zealand respondent highlighted the need for research on implementing trans-national micro-credentialing and articulation with formal qualification pathways, while the Canadian respondent highlighted the need for research to focus on credentialing:

> A major function of the university is to assess and 'credentialise' learning by conferring qualifications and degrees. As organizations, universities are well equipped and experienced to assess the quality of learning for formal academic credit. OER are transforming the ways individuals create, share and learn from content that is freely available on the web. The problem is that learners, who access these OER and acquire knowledge and skills either formally or informally, cannot readily receive appropriate formal recognition for their efforts. This is a serious issue for Canada with a growing number of educated and trained immigrants who cannot get their learning and skills recognized. There is very little, if any, research in this area. Thus, research is needed on mapping the existing situation, analysing scalable approaches to formal assessment and accreditation, documenting lessons learnt and proposing conceptual frameworks for the implementation of open assessment. This can include research into the efficacy and quality of Prior Learning and Recognition (PLAR) and Challenge-for-Credit approaches.

Policy makers need evidence-based research on successful (and unsuccessful) policy implementations in order to assess the effectiveness of different OER projects and to discover gaps between policy and practice.[122] In terms of data from the respondents, only one

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[122]   McGreal, R., Miao, F. & Mishra, S. (2016). Introduction. Open Educational Resources: Policy, Costs and Transformation. In Miao, F., Mishra, S. & McGreal. R. (eds). *Open Educational Resources: Policy, Costs and Transformation*. UNESCO and Commonwealth of Learning. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000244365

example was provided of research directly impacting on policy, as noted by the Brazilian respondent. The respondent noted that many of the research reports in that country provide a clear, evidence-based rationale for how the implementation of existing OER policies could greatly reduce costs of educational material. For example, Rossini and Gonzalez's (2012) report, *OER: The debate in public policy and market opportunities*, which is included as a chapter in the 'OER Book' (*Recursos Educacionais Abertos: práticas colaborativas e políticas públicas*) highlights that the Brazilian government's public investment in teaching materials for the National Textbook Programme (PNLD) was approximately USD216,158,859, including acquisition, distribution, and quality control expenses. Given this expenditure and the overall structural weakness of this programme, the authors provide several recommendations and solutions for government authorities. These include:

- The separation in the PNLD of the acquisition phase of the content and acquisition phase of the printed books, accompanied by a distinct policy of copyright.

- Instead of buying only the books printed directly from the publishers, the government should, firstly, acquire the authors' copyright and reward them with remuneration that values the creative work, and, secondly, order the production of books by means of competition between companies capable of carrying out the editorial production of the works, according to the technical parameters required by the government.

- Taking advantage of the fact of owning the copyright, the government should make the books available on the Internet with a licence that allows the non-commercial use of the works. The provision of the content of all textbooks acquired annually by the PNLD on the Internet through a licence authorizing the non-commercial use of the works, including copying by reproduction or other means, would have many positive effects on the teaching and learning process across the country. The main ones would be the increase of the theoretical and pedagogical diversity, the promotion of the autonomy of the teacher within the classroom, and a relative emancipation of the process of teaching and learning in relation to the school manual.[123]

These recommendations were extremely useful and have resulted in a new policy for the PNLD.

Data from this research points to several examples of research focusing on the educational effectiveness of OER, many of which are project-based. Furthermore, there appears to be little focus on research around the cost-effectiveness of openly licensed materials. While respondents provided several examples of research on OER, aside from the case of Brazil there is no clear evidence that research is systematically undertaken alongside OER policy implementation. Important to consider is a recent study by Grimaldi et al. (2018), which compiled all studies that compared students using OER to non-OER materials. The study found that a possible reason that OER research has produced so many null results is that the research designs used to date are inadequate to test access effects. The authors argue that the fact that so many research studies failed to find positive effects is thus not surprising.[124] The range of research issues that require further attention points to the need for significant work in almost all areas of OER, ranging from OER use to business models, marketing, credentialing, funding, and sustainability.

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[123]   Rossini, C. & Gonzalez, C. (2012). REA: o debate em política pública e as oportunidades para o mercado. In B. Santana, C. Rossini & N.L. Pretto (eds). *Recursos educacionais abertos: práticas colaborativas e políticas públicas, 1* (pp. 35–70).
[124]   In press

CONCLUSION

Many efforts have been made to promote the OER movement and the use of OER, with funding and support by numerous donors and intergovernmental organizations (including UNESCO and the Commonwealth of Learning), governments, and education institutions. This has resulted in significant growth of OER in some contexts, and there are some remarkable achievements as awareness grows and initiatives like OERu develop. However, despite acknowledgement, following the Second World OER Congress, of the need to achieve mainstream acceptance of OER, data from this study indicates that OER for the most part remains on the margins in education systems, and that its impact is influenced by political and governmental changes, and lack of systematic and integrated funding to ensure sustainability of the OER initiatives that are implemented.

There also appears to be a lack of awareness of OER, and it is concerning that there is widespread confusion in understanding terminology around 'open'. While Open Access, Open Education, 'free resources', MOOCs, and OER are somewhat related in their underlying goal of increasing access to information, their focus and ability to reuse differs. Anyone can access information via the Internet, but if it is restrictively licensed it cannot be downloaded or reused. So, while MOOCs could be OER, these are not necessarily so depending on their licence. Additionally, OA and OER are distinct concepts, and OA articles could potentially be used as OER if the open content is used in a teaching/learning context. Important to note is that what makes materials OER is that they are free, do not require permission for use, and allow users to adapt and find new ways to use (i.e. reuse and/or remix) them. Thus, in addition to raising awareness of OER and its potential, much work must still focus on clarifying understandings of OER.

Following the 2012 World OER Congress, which called on governments worldwide to license publicly funded educational materials openly for public use, several governments worked towards creating OER policies. Most OER developments have taken place recently, countries are still in the initial stages of implementing policies and initiatives, and a strong evidence base has yet to emerge to support further policy development.[125] In practice, data from this study suggests that the existence of policies does not necessarily correlate with the level of OER activity in a country. It appears that larger investments in OER are from more developed countries, and these typically have less policy emphasis. A context supportive of OER (e.g. through funding and creating collaborations) appears to yield more significant benefits and improved sustainability than just the presence of policies. Furthermore, the effectiveness of OER policies is not always apparent, and grassroots initiatives appear to be equally (if not more) effective driving forces of OER in countries. There is thus limited evidence that OER policies are driving pedagogical innovation. Furthermore, commercial interests and lack of awareness may limit the development and implementation of supportive OER policies.

While governments may have expressed commitment to policies in support of OER, this has not necessarily translated into action or funding; there is little evidence that policy commitments are accompanied by financial commitments to invest in content creation. Thus, policy is not a pre-condition for a context supportive of OER, although it appears to bolster OER efforts.

The findings from this study indicate that little consideration has been given within the OER movement to tackling issues of diversity and inclusion. In particular, the challenge of the digital divide continues to impact on OER use and participation in the Global South and underserved areas in the Global North. Nevertheless, there is some evidence of OER allowing for greater inclusion within countries, particularly in those with adequate digital infrastructure. There are a few initiatives that directly attempt to address inclusivity of OER, particularly among indigenous populations in Australia, New Zealand, and Canada. However,

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[125] Miao, F., Mishra, S. & McGreal, R. (2016). Conclusion. In Miao, F., Mishra, S. & McGreal, R. (eds). *Open Educational Resources: Policy, Costs and Transformation*. UNESCO and Commonwealth of Learning. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000244365

the research found instances of resources being cited as OER and yet password protected, which raises questions around how open such resources really are. In such contexts, one can question the inclusivity of the materials. The research also found a number of efforts to translate OER in order to widen their reach. However, these appear to be discreet, targeted initiatives.

While there are several research initiatives to share OER experiences, the data indicates that there are few examples of research focusing on the educational effectiveness of OER. Furthermore, there appears to be very little focus on research around the cost-effectiveness of openly licensed materials. There is no strong evidence that research is systematically undertaken alongside OER policy implementation. The range of research issues that require serious further attention indicates work to be undertaken in almost all areas of OER, ranging from OER use to business models, marketing, credentialing, funding, and sustainability.

When it comes to financing, OER efforts are still primarily funded by donors, governments, and institutions, and the model adopted differs according to the context. There are also regional efforts to fund OER efforts. Institutions are either developing their own, internal budgets to accommodate OER or attracting funding from donors, particularly in contexts where there might not be direct national policies or government funding for OER. There are varied approaches to funding, and it can be argued that the overreliance on external funding leaves OER initiatives vulnerable in terms of sustainability. It may thus be worth focusing efforts on establishing and promoting a culture of sharing such that it becomes a norm — and this can be either at the policy level or via continued, specific grassroots initiatives and support. Countries are at various stages of OER adoption: many still need to focus on raising awareness about OER and their potential benefits (including clarifying what OER means). What is also clear, and as highlighted by Miao et al. (2016), is that 'there are no simple solutions or one size fits all to mainstream contexts that are diverse'.[126]

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[126] Miao, F., Mishra, S. & McGreal, R. (2016). Conclusion. In Miao, F., Mishra, S. & McGreal, R. (eds). *Open Educational Resources: Policy, Costs and Transformation*. UNESCO and Commonwealth of Learning. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000244365

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APPENDIX A: QUESTIONNAIRE

Please complete the following questions as fully as possible. The data from these questionnaires will be used to generate data sheets on the status of OER in your country. If you are uncertain about the quantity of information to add, rather add more than less data (and please also feel free to share any supporting documents). If you are unsure about the answers to any of the questions, please conduct your own searches (literature searches/interviews).

Given the questions posed, you are welcome to choose to focus on one specific educational sector in your country and provide answers to questions for that sector only. If you choose to focus only on one sector, please specify in the introduction which sector you propose to cover. Please note that, for preference, we would like you to select a sector in which there is sufficient OER activity in the country to justify documenting it.

Please provide all your answers in the blocks next to or below each question, using a Word processing programme, as this will facilitate analysis of the responses. They will expand automatically to accommodate your answer as you begin typing.

When you have compiled the information, we would be grateful if you could email your response to Ekaterina Pushkareva at e.pushkareva@unesco.org

1) Name:

2) Country:

3) Organization:

4) Position:

5) Email:

INTRODUCTION

6) Please indicate which educational sector/s you have covered in your responses to this questionnaire.

7) To the best of your knowledge, what were the origins of OER in your country? Who/which organization/s first introduced the concept, in what educational sectors, and why?

8) Since the concept was first introduced, has there been wider acceptance of the concept or is there ongoing resistance in the mainstream? Please provide examples to illustrate the reasons for your answer.

OER POLICIES

This section will provide an overview of OER policies within the country as well as relevant policy issues.

9) What policies support the development and use of OER in your country, both at national and institutional levels? (explicit policies supporting OER / indicating a commitment to OER, policies that are supportive of increased collaboration, sharing of course materials, and harnessing of OER, the level of these policies (national, regional, organizational, etc.), the scope, applicability/audience, relation to other educational policies, financial commitment to policies, implementation plans related to policies)

Name of policy (add URL if available)	Level (national, regional, organizational, etc.) and sectoral focus of policy	Brief overview of policy's main purpose/scope of coverage	Summary of financial commitments contained in policy (if any)

10) Are educational materials produced with public funds openly licensed and, if so, what policies/legislation govern this requirement?

11) In your opinion, are policy commitments to OER in general accompanied by adequate financial or resourcing commitments? If so, please explain how. If not, please describe what improvements are required in this regard.

12) If release of materials produced with public funds as OER is a requirement, please indicate what, if any, mechanisms are in place to enable online sharing of these resources.

13) Please add any other relevant issues pertaining to OER policies in your country.

OER Use and Adoption

This section will provide a snapshot of some notable OER initiatives. It should note which education sector/level the initiative focuses on, as well as the relevant partners in these initiatives. Examples of use of OER, particularly those operating on a large scale, would be most useful.

14) Please list OER initiative(s), the model of OER creation, the target audience/education stakeholders, licensing conditions, how long these initiatives have been running for, and the support for these initiatives.

Name of OER Initiative (with URL if possible)	Participating Organizations	Brief Description of Initiative	Target Audience/ Education Stakeholders	Source of funding (with brief indication of potential for sustainability)

15) What are the main languages in your country? And in what language(s) are OER predominantly produced?

OER Financing and Sustainability

This section will focus on how OER is financed, and considerations for ensuring the sustainability of OER.

16) Is the growth of OER is increasing or decreasing investment in design and development of educational resources? Please justify your answer with practical examples.

17) Is there a balance between OER efforts using and adapting existing materials compared to producing new materials? Do you think the balance being struck is appropriate and why?

18) What, if any, initiatives are focused specifically on ensuring that investment in OER contributes to greater diversity of educational materials and inclusion of marginalized voices in the resulting content? Please provide as much detail of specific examples as possible.

19) Drawing from the examples in the previous section, please reflect briefly on how sustainable you think OER initiatives are currently in your country? Are the current sources of funding for these initiatives sustainable? Please justify your answer in as much detail as possible.

Research and Evaluation

This section focuses on research and evaluation efforts around OER use and consideration of key issues that need to be researched.

20) What research has your country conducted pertaining to OER use in education? Please provide references or relevant links (URLs) to significant research projects or initiatives in your country.

21) In general, how rigorous do you think current research on and evaluation of OER is in your country? Do you think the resulting research reports provide a clear, evidence-based rationale for policy and financial commitments to OER for those who are not yet persuaded? Please justify your answer with practical examples where possible.

22) What key research questions/issues do you think need to be explored regarding OER in your country that are not currently receiving attention?

Conclusion

23) What 2-3 actions do you think could enable your country to realize the educational potential of OER more effectively?

Appendix B — Country Case Studies

Australia

Introduction

The Australian case study focuses on the Australian Higher Education and Secondary Education sectors.

The use of Open Educational Resources (OER) has evolved slowly in the Australian education sector alongside the expanded use of digital technologies and online education delivery after the Digital Agenda reforms to the Australian *Copyright Act 1968* in 2001. Many of the ideas underlying OER — open licensing of digital resources, increasing online delivery, the benefits of sharing and reuse, were explored by the Australian Higher Education sector from the mid-2010s as universities established institutional digital repositories to provide Open Access to scholarly publications. In 2012 Australian universities also began to deliver Massive Open Online Courses (MOOCs) although many did not include openly licensed content.

The Australian chapter of Creative Commons Australia[127] has been based at the Queensland University of Technology since 2005. Along with the Open Access to Knowledge OAK Law project (2006 — 2008) it has contributed to an expanding awareness and understanding of open licensing in the education sector.[128] Early OER projects in the Australian education sector were often championed by individual academics, librarians, or institutions interested in the possibilities OER offered for innovative online pedagogy. Funding for individual OER research or development initiatives has generally been provided via government research project grants or by individual institutions. There has not been any centralised policy direction in the higher education sector around the use of OER or its role in the delivery of educational services. Instead individual institutions have embraced different aspects of OER and in some cases incorporated them into their ongoing operations.

Australia does not have any central government requirement for educational resources produced with public funding to be openly licensed for reuse. However; the Australian Government and educational bodies are informed about the use of OER and CC licensing in the sector and the potential benefits and innovative possibilities they offer. In recent years OER initiatives have emerged at an increasing rate at both government and institutional levels. Many institutions are participating international initiatives such as OERu or expanding their engagement with open education platforms such as MOOCs.

Several organizations, industry bodies and initiatives have made policy commitments, provided support or assisted with the development of an environment which supports the use of OER or the adoption of Open Educational Practices (OEP) in the Australia education environment. These include:

- **Australian Research Council / National Health and Medical Research Council** In 2013 and 2012 Australia's main research funding bodies; the Australian Research Council (ARC)[129] and the National Health and Medical Research Council (NHMRC)[130] adopted open access policies. These aim to maximise the benefits arising from knowledge produced with publicly funded research by requiring grant recipients to comply with the policies and provide open access to research outputs that result from grant funding. The ARC requires that any research outputs arising from ARC supported

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127   Creative Commons Australia. (no date). Home Page. Retrieved from https://creativecommons.org.au/
128   Fitzgerald, B.F., Fitzgerald, A.M., Perry, M. Kiel-Chisholm, S.D., Driscoll, E.P., Thampapillai, D. and Coates, J.M. (2006). Open Access to Knowledge (OAK) Law Project Report No. 1: Creating a legal framework for copyright management of open access within the Australian academic and research sector. QUT Faculty of Law — The OAK Law Project, Brisbane, Qld. Retrieved from https://eprints.qut.edu.au/6099/
129   Australian Research Council. (no date). Home Page. Retrieved from https://www.arc.gov.au/
130   National Health and Medical Research Council. (no date). Home Page. Retrieved from https://nhmrc.gov.au/

research must be made openly accessible within a twelve-month period from the date of publication.[131] The NHMRC policy mandates the open access sharing of publications and encourages innovative open access to research data.

- **National Copyright Unit** — In the Australian secondary education sector the National Copyright Unit (NCU), is responsible for copyright policy and administration in schools and Technical and Further Education (TAFE) organisations. The NCU provides advice, training and resources to Australian schools and educators, including promoting and providing information on OER to the Australian school and TAFE public college sectors and policy makers.[132]

- **CAUL Australasian Institutional Repository Support Service** From 2009 to 2012 the Council of Australian University Librarians (CAUL) operated the CAUL Australasian Institutional Repository Support Service (CAIRSS) project. This provided support for managers of institutional repositories in the higher education sector in Australia and New Zealand including information about copyright and licensing.[133]

- **Australasian Open Access Strategy Group** — The Australasian Open Access Strategy Group (AOASG) established in 2013, advocates for open access outcomes from publicly funded research and assists with raising awareness and building capacity to enhance open access. It is supported by ten Australian and eight New Zealand organisations with a commitment to Open Access.[134]

- **AusGOAL** — The Australian Government's AusGOAL open access and licensing framework is no longer operating. However it ran from 2011 to 2016 and provided support and guidance to government and related sectors and aimed to facilitate open access to publicly supported information.[135]

The drive towards the wider adoption of OER in Australia has developed in the context of both a government and institutional commitment to open access to publicly funded resources and an increasing move to online education in both higher and secondary education. In the Higher Education sector, a number of universities were early adopters and participants in the use and development of OER. These included institutions involved in the Open Education Resources Universitas (OERu) and P2Pu projects. Currently five Australian universities are partners in OERu.[136]

Much of the early introduction of OER in the Australia Higher Education sector was driven by individual educators, resource developers and information professionals, such as librarians involved with the OA movement, and by academics interested in exploring the innovative pedagogical opportunities offered by OER. Prominent among these were: Dr Carina Bossu from the University of Tasmania who was the chief investigator on the "Adoption, use and management of OER to enhance teaching and learning in Australia"[137] and "Curriculum Design for Open Education" projects,[138] and Professor Sandra Wills from Charles Sturt University who was the project leader of the "Students, Universities and Open Education" research project.[139] Copyright officers from Australian universities were also keenly interested in the interaction of OER with the statutory educational licences in the Australian

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[131] Australian Research Council. (no date). ARC Open Access Policy. Retrieved from https://www.arc.gov.au/policies-strategies/policy/arc-open-access-policy

[132] Smartcopying. (2019). About Us. Retrieved from http://smartcopying.edu.au/copyright-guidelines/footer-menu/about-us

[133] Council of Australian University Librarians. (2019). Background — CAIRSS and COSIAC. Retrieved from http://archive2010.caul.edu.au/caul-programs/research/cairss-background

[134] Australian Open Access Strategy Group. (no date). About the AOASG. Retrieved from https://aoasg.org.au/about/

[135] AusGOAL. (no date). Retrieved from https://twitter.com/ausgoal

[136] OERu. (no date). OERu partners. Retrieved from https://oeru.org/oeru-partners/

[137] Bossu, C., Brown, M. and Bull, D. (2014). Adoption, use and management of open educational resources to enhance teaching and learning in Australia. Retrieved from https://ltr.edu.au/resources/CG10_1687_Bossu_Report_2014.pdf

[138] CD4OE. (no date). Curriculum design for open education. Retrieved from https://wikieducator.org/course/Curriculum_design_for_open_education/

[139] OPenEdOz. (2016). Students, Universities and Open Education. Retrieved from http://openedoz.org/wp-content/uploads/2017/02/ID14-3972_CSU_Wills_Final-Report_2016.pdf

Copyright Act 1968. The "Open Education Licensing" project[140] undertaken by Swinburne University of Technology and the University of Tasmania was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training) from 2014 to 2016. It developed an online interactive toolkit to assist staff from the Higher Education sector with understanding copyright law and open licences when making business and pedagogical decisions around OER and the online delivery of educational services.

The acceptance and understanding of OER in the Australian Higher Education and Secondary education sectors has occurred slowly as part of wider debates around the increased adoption of digital technologies, Open Access, and online learning in the sector. Earlier acceptance of the concept by teachers and policy makers may have been limited by lack of understanding about copyright and open licensing as well as concerns about the potential value of OER in online pedagogy; the quality and sustainability of OER; its interaction with commercial business models for online educational services and the lack of a perceived compelling need for these type of resources.

The Australian *Copyright Act 1968* includes a legislated statutory licence that allows schools and universities to provide students with online access to limited sections of copyright material for educational purpose. Educational institutions now also provide a large amount of online content to their students via commercially licenced databases of educational content.

The increasing transition to online and blended learning in Australia has not been widely associated with a clear demand for the sharing and reuse of resources. The need for educators to engage with and understand copyright and open licensing may have restricted a more rapid uptake of the ideas underpinning OER throughout the sector. From speaking with curriculum developers, the National Copyright Unit (NCU) found that there was a lot of confusion regarding OER and Creative Commons generally, and a widespread belief that it was difficult and time consuming to find OER.

However; educators in the Australian higher education sector are increasingly engaging with OER. The Office for Learning and Teaching (now Department of Education and Training) provided grant funding for a number of research projects that investigated OER over the past five years. Individual institutions are increasingly producing and disseminating their own OER, and there is an expanding awareness across the sector of OER available from other jurisdictions. The Open Education Licensing (OEL) project[141] made the OEL Toolkit available for use by all Australian educators in 2017. This provides information for educators and policy makers about using and creating OER. An increasing number of openly licensed online educational resources are being created and hosted in Australia including open textbooks, educational resource websites and university MOOCs on both commercial and open platforms.

OER Policies

Guidelines on Licensing Public Sector Information for Australian Government Entities, September 2016 — https://www.communications.gov.au/file/20121/ download?token=TpQQkrpH

The Australian Government supports open access to its information and encourages Commonwealth Government entities to make licensing decisions around the release of public sector information (PSI). Where possible this is made freely available under a CC BY licence. The guidelines do not make mention of financial commitment.

Australian Government Public Data Policy Statement — https://www.pmc.gov.au/public-data/public-data-policy; https://www.pmc.gov.au/sites/default/files/publications/ aust_govt_public_data_policy_statement_1.pdf

The Public Data Policy is part of the Australian Government's National Innovation and Science Agenda. It commits Commonwealth Government entities to:

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[140]   Open Education Licensing. (2019). Home Page. Retrieved from http://www.oel.edu.au/
[141]   Open Education Licensing. (no date). Home Page. Retrieved from http://www.oel.edu.au/

- specific actions designed to optimise the use and reuse of public data;

- release non-sensitive data as open by default; and

- collaborate with the private and research sectors to extend the value of public data for the benefit of the Australian public.

This policy document does not make mention of financial commitment.

FAIR https://www.fair-access.net.au/fair-statement

The FAIR statement was developed in 2016, under the auspices of the Universities Australia Deputy Vice Chancellors (Research) Committee. It affirms the need to make Australia's publicly funded research outputs findable, accessible, interoperable and reusable (F.A.I.R.), recognising this will require different approaches across different type of research output, a long-term national commitment, and consideration of the global change agenda. The statement does not make any mention regarding funding.

Queensland University of Technology (QUT), Manual of Policies and Procedures Chapter C7.2 Open Educational Resources — http://www.mopp.qut.edu.au/C/C_07_02.jsp

The guidelines are available from https://www.library.qut.edu.au/copyrightguide/teachingsupp/oer/

QUT is committed to the creation and dissemination of knowledge for the benefit of society. This includes supporting the use and sharing of OER to widen access to education, and to improve both the cost-efficiency and quality of teaching and learning outcomes. The QUT policies and procedures for OER apply to staff, students and visitors of the university; they do not mention funding.

University of Tasmania (UTAS)- http://www.teaching-learning.utas.edu.au/ content-and-resources/open-educational-resources/open-education-at-utas

UTAS has developed and implemented several strategies and policies to support the development of Open Educational Practices by UTAS staff. They do not make any mention of financial commitment.

University of Southern Queensland (USQ)- https://www.usq.edu.au/open-practice/ open-education/using-oer; https://www.usq.edu.au/open-practice/open-education/ support-for-oer

USQ has demonstrated a commitment to open education since 2007 when ten USQ courses were offered as part of the MIT Open CourseWare Consortium (now the Open Education Consortium). Since then, USQ has encouraged the use of open materials and joined international partnerships to share open courses and content globally.

Australia does not have centrally governed policies or legislation requiring educational materials produced with public funds to be openly licensed. But some educational material supported by Federal or State education departments has been openly licensed for reuse. See for example licensing information for the following educational resources:

- https://www.digitaltechnologieshub.edu.au/footer/terms-of-use; and

- http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/dyn_calculus/project/copyright.html

The decision to make material available under open licences may be as a result of Federal or State open government policy commitments, grant funding requirements, and/or operational decisions made by specific institutions.

In most cases, funding commitments to OER in Australia have been provided either by Federal or State education departments, via one-off grant funding or through the internal operational budgets of individual institutions. The reliance on grant funding for the development of OER projects has meant that in many cases the longer-term ongoing stability of OER initiatives can be uncertain unless they are built into the ongoing

operational budgets of departments or institutions. The cost of ensuring that OER remain up-to-date is often difficult to determine at the outset of projects and there has been some concern about the ongoing quality and validity of OER over time. It would be valuable for further research to be undertaken into how OER can be effectively maintained by a wider sharing community and/or by being built into usage or teaching structures.

In Australia higher education institutions provide their educational products and services under commercial business models. Therefore; OER will need to operate alongside business models for the commercial delivery of online educational services, both nationally and internationally. Some institutions are actively investigating the viability of providing commercial services associated with OER such as micro-credentials, badging or assessment services. Developments in this area are likely to play an important part in encouraging the wider incorporation of OER into the ongoing operations of the Australian higher education sector. However the wider benefits flowing from OER, such as improved marketing, attraction and retention of students are now also increasingly being recognised.

OER Use and Adoption

Open Education Licensing Project — http://www.oel.edu.au/

This initiative of Swinburne University of Technology and University of Tasmania was undertaken with the aim of assisting higher education teachers and educational content developers to use and develop OER. In 2015/16 the project surveyed information professionals in Australian universities about their understanding and experience with licensing for open education. As a result, it produced the OEL Toolkit to assist educators with using and creating OER. The initiative was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Developing Australian Academics' Capacity: Supporting the Adoption of Open Educational Practices in Curriculum Design — https://ltr.edu.au/, https://ltr.edu.au/resources/SD13_3407_Bossu_Report_2016.pdf; https://wikieducator.org/course/Curriculum_design_for_open_education/

This free, open and online professional development micro-course for curriculum design in higher education was developed in 2015. It aimed to develop the capacity of Australian academics to adopt and incorporate OER and OEP into curriculum development. This is an initiative of the University of Tasmania (Lead institution) and University of Southern Queensland, and was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Students, Universities and Open Education — https://ltr.edu.au/; https://ltr.edu.au/resources/ID14_3972_Wills_Report_2016.pdf

In 2015 this project run by Charles Sturt University, University of Tasmania, and University of Technology Sydney; investigated the missing voice of students in understanding emerging technology-based OEP and considered how student learning outcomes can be enhanced with OEP. Targeting higher education teachers and educational developers, the project developed a National Roadmap for an Australian Open Education Strategy, to foster uptake of OER and open courses. This initiative was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Feasibility Protocol for OER and OEP: A decision making tool for higher education https://ltr.edu.au/; https://ltr.edu.au/resources/CG10_1687_Bossu_Feasibility%20 Protocol_2014.pdf

This initiative of University of New England (Lead Institution), University of Southern Queensland, and Massey University created a Feasibility Protocol to assist senior executives in making decisions regarding institutional adoption of OER and OEP. It is a set of guiding principles that prompts questions and raises issues when wishing to take advantage of OER and OEP. The initiative was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Adoption, use and management of open educational resources to enhance teaching and learning in Australia — https://ltr.edu.au, https://ltr.edu.au/resources/CG10_1687_Bossu_Report_2014.pdf, https://wikiresearcher.org/OER_in_Australia

This project in 2014 aimed to increase understanding and awareness about OER across the higher education sector in Australia and to enable the development of a sector framework for OEP (Feasibility Protocol) — as mentioned above. It was also funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Supporting OER engagement at Australian Universities: An overview of the intellectual property rights, copyright and policy considerations for OER — https://ltr.edu.au, https://ltr.edu.au/resources/CG10_1687_Bossu_OER%20engagement_2014.pdf

This initiative of University of New England provided an overview of the key intellectual property rights and licensing considerations in OER. It was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Bridging the gap: Teaching adaptations across the disciplines and sharing content for curriculum renewal (The Adapt Project) — https://ltr.edu.au/resources/ID11_1949_Whelehan_report_2013.pdf

In 2013, University of Tasmania, Monash University, University of Queensland, and University of Western Australia undertook a project to identify a community of academics teaching Adaptation Studies and encourage them to share resources under open content licences via an online repository. The project was funded by the Australian Federal Government Office for Learning and Teaching (now Department of Education and Training).

Digital Technologies Hub — https://www.digitaltechnologieshub.edu.au/

This initiative of Education Services Australia targets secondary teachers, school leaders, students, and families. It aims to support the implementation of quality Digital Technologies programmes and curriculum in schools and to support after school activities. Developed by Education Services Australia 2016, resources are made available under CC BY licence. This initiative was funded by the Australian Federal Government Department of Education and Training.

Student Wellbeing Hub — https://studentwellbeinghub.edu.au

This initiative provides information and resources for students, teachers and parents to assist them to create and maintain a safe and welcoming school environment. Developed by Education Services Australia 2017 and funded by the Australian Federal Government Department of Education and Training, the resources are made available under a CC BY licence.

Australasian Open Educational Practice Special Interest Group (OEPSIG Oz) — https://oepoz.wordpress.com

This is a practitioner-facilitated community established in 2018 to bring open educators together to explore issues of common interest, and to advocate for the place of OEP in L&T discussions, strategy, and policy.

Smartcopying — https://www.smartcopying.edu.au/open-education/open-education-resources/where-to-find-oer-materials/oer-in-australia

This is a specialist copyright team responsible for copyright policy and administration for Australian schools (government and private) and TAFE (public colleges). It is funded by the Australian Federal and State Government Departments of Education and Training

Scootle — http://www.scootle.edu.au/ec/p/creativeCommons

This is a national digital learning repository which provides Australian teachers with access to more than 20,000 digital learning items, provided by a wide array of contributors and aligned to core areas of the Australian Curriculum. It includes selected OER listed by year level K-12, learning area and resource type. The initiative is run by Education Services Australia and is funded by the Australian Federal Government Department of Education and Training.

University of Southern Queensland OpenCourseWare — https://www.usq.edu.au/open-practice/open-education/using-oer

USQ Library supports the use and creation of open access content.

Collection of interactive learning objects for NSW secondary school

NSW Department of Education and Communities has created resources for NSW Secondary Schools set out in creative and interactive web-layouts:

- Dynamic Calculus http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/dyn_calculus/

- Julius Caesar http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/juliuscaesar/

- Forces and Fields http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/Forces_and_fields_creative_commons/

- Tensile Testing http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/tensile_testing/

- A New Kind of Alchemy http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/alchemy/

These were published by the Centre for Learning Innovation for the State of NSW in 2008/9, and made available under a CC BY-NC-SA 2.5 Australia licence. The initiative is funded by NSW State Government.

LaTrobe University ebureau — https://library.latrobe.edu.au/ebureau/ebook.html, https://www.latrobe.edu.au/ltlt/resource-library/sources-archived/using-open-educational-resources-oers

The La Trobe eBureau publishes engaging, high quality, open-access etextbooks written by their academic staff to support online and blended learning. The etextbooks are licensed under CC BY-NC-ND 4.0, and the initiative is funded by LaTrobe University.

OERLN Textbook Initiative — RMIT University — https://emedia.rmit.edu.au/oer/ (under construction)

RMIT University   Higher Education is currently establishing an OER Library Network of OER University Librarians in Australia. This is being funded by the Australian Technology Network of Universities

OER Financing and Sustainability

The development of OER initiatives in Higher Education in Australia is not centrally organised and often relies upon funding from individual institutions or grant applications. The majority of OER projects have been produced with either institutional funding or individual research grants from bodies such as the Australian Government Office for Learning and Teaching (now Department of Education and Training). Support for ongoing OER initiatives generally relies upon incorporation of the resource development and support into the institution's ongoing operational budget. Some initiatives using openly licensed resources in the secondary sector are delivered as ongoing resources through government funded bodies such as Education Services Australia.[142] There is no information available to indicate whether OER has as yet had any impact on investment in the design and development of educational resources in Australia. Government and institutions have been affected by the expansion of digital technologies and online education, but it is unclear whether or to what extent their activities have been influenced by OER.

There is no evidence available relating to the balance between OER efforts using and adapting existing materials compared to producing new materials. There is undoubtedly some uncertainty in the education sector around the reuse of existing materials. Australian teachers

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[142]   Education Services Australia. (no date). Home Page. Retrieved from https://www.esa.edu.au/

have historically relied upon the educational statutory licences in the *Copyright Act* 1968 to copy material and therefore are often not experienced with making individual decisions around copyright licensing. This was an issue that influenced the development of the OEL Toolkit[143] which aims to assist educators to make decisions around their use and creation of OER.

OER in Australia are predominantly produced in English. Some OER are now being produced in Aboriginal languages. Some specific initiatives are: Charles Darwin University hosts the Living Archive of Aboriginal Languages,[144] a digital repository of endangered literature in Australian Indigenous languages from around the Northern Territory which is made available under a CC BY-NC-ND licence. Nodes,[145] PreVET,[146] and Fliplets[147] are contextualised, multimodal learning resources tailored for remote Indigenous students developed by a partnership between the Northern Territory Department of Education and Commonwealth Governments. They are made available under a CC BY-NC-ND licence. Furthermore, the Indigenous Fisheries Training Network includes student created OER videos from Warruwi[148] which are made available under a CC BY-SA licence.

Future ongoing commitment to and funding for OER initiatives in Australia is likely to be dependent upon the emergence of well-used and effective local online OERO sharing platforms and projects that demonstrate successful business models, benefits to students and pedagogical value arising from the implementation of OER.

RESEARCH AND EVALUATION

The Australian Federal Government through the Office for Learning and Teaching (now Department of Education and Training) has funded a number of research projects that investigated different aspects of OER use in education in Australia. For a full list search on Open Education at https://ltr.edu.au/. Some recent examples of research conducted into OER use in education in Australia include:

- Developing Australian academics' capacity: supporting the adoption of open educational practices into curriculum design — http://wikieducator.org/course/Curriculum_design_for_open_education/

- Students, Universities and Open Education — http://www.openedoz.org/

- Open for learning: Using Open Data Tools and Techniques to Support Student Learning — http://newmediaresearch.educ.monash.edu.au/lnm/open-for-learning-office-for-learning-and-teaching/

- Adoption, use and management of open educational resources to enhance teaching and learning in Australia — http://wikiresearcher.org/OER_in_Australia

Several academic articles have also been published on OER use in education in Australia. These include:

- Bossu, C., Brown, M., and Bull, D. (2011). Playing catch-up: Investigating public and institutional policies for OER practices in Australia. *Journal of Open, Flexible and Distance Learning*, *15*(2), 41–45.

- Bossu, C., Brown, M., Bull, D. (2012). Opening up down under: The Role of Open Educational Resources in Promoting Social Inclusion in Australia. *Distance Education*, *33*(2), 151–164.

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143   Open Education Licensing. (no date). OEL Toolkit. Retrieved from http://www.oel.edu.au/
144   Charles Darwin University. (no date). Living Archive of Aboriginal Languages. Retrieved from https://livingarchive.cdu.edu.au/
145   Nodes. (no date). Home Page. Retrieved from http://nodes.net.au/
146   PreVET. (no date). Home page. Retrieved from http://prevet.net.au/
147   Fliplets. (no date). Home Page. Retrieved from http://www.fliplets.net.au/
148   Indigenous Fisheries Training Network. (no date). Home page. Retrieved from https://indigenousfisheriestrainingframework.wordpress.com/

- Hannon, J., Huggar, S., Orchard, A., and Stone, N. (2014). OER in practice: Organisational change by bootstrapping. *International Journal of Educational Technology in Higher Education, 11*(3), 134–151.

Existing research into OER in Australia, including projects funded by the OLT (now Department of Education and Training) has provided a rigorous analysis of Australia's experience with OER in certain situations, but much of it was conducted while the OER environment was in its early stages of development, and often focused on specific practical outcomes.

Future research would be beneficial if it could provide a broad analysis of the use of OER in Australia. This would enable comparison with developments in other countries and further exploration of specific situations where OER could provide value in the Australian context. It would also be useful to undertake evaluative research into the methods and volumes of use of open textbooks by Australian educators as this continues to develop. There may also be scope for investigating successful examples of OER being incorporated into existing business models for the delivery of online education by Australian educational service providers.

The existing reports from government funded research into OER in Australia and Australian academic publications on OER, have provided evidence of the potential benefits of OER in Australia. However, other external issues are also likely to play a role in any Australian government or institutional decisions around policy and financial commitments to OER by those who are yet to be persuaded of the broader value of OER. In particular, further exploration of the role of OER as part of the commercial delivery of online education in Australian is needed and could offer valuable insights.

The following research issues are worth exploring:

- The role of sharing and the reuse of digital resources as part of online teaching and learning in Australia's academic culture.

- Examples of innovative pedagogical and educational outcomes resulting from the use of OER in the Australian Higher Education and Secondary sectors.

- Developing effective business models including the use of OER for online education in Australia.

- Implementing mechanisms to ensure the maintenance and ongoing quality and sustainability of OER in the Australian education sector.

Conclusion

The following would assist Australia with realising the educational potential of OER more effectively:

- Training for educators and content developers in understanding open licensing and its potential to deliver innovative online education in the digital environment.

- Development of a wider culture of sharing learning resources in the higher education sector.

- Dissemination of research into the potential educational, commercial and pedagogical benefits of OER for the Australian higher education sector.

Brazil

Introduction

The focus of the Brazilian case study is on K-12 education or basic education, although some higher education policies, initiatives, and research are also included.

Brazil is the largest country in South America with a population of over 200 million. The country has faced long-standing challenges with regard to the development and growth of public education. For example, the 2015 Organization for Economic Co-operation and Development (OECD) report ranked Brazil 60 out of 75 in Math and Science achievement test scores among 15-year-old students.[149] Although 'the quality of schools' educational resources has greatly improved since 2003, a shortage of computers in schools may hinder the development of information and communication technology (ICT) skills among the population.[150] The latter not only directly impacts the 45 million students enrolled in Brazil's K-12 public schools but also the teachers who work in these schools.[151] There are currently over 150,000 public basic education institutions in Brazil.[152] Wide dissemination of basic education is therefore imperative to promote 'innovation in line with the priorities of a renewed social agenda, focused on the knowledge era'[153] and on establishing Brazil as a developed nation.

To fill the gaps in the public-school system and democratize access to knowledge by promoting inclusive and equitable education to more citizens, Brazilian educators have recommended increasing the use of open education and open educational resources (OER)[154]

> *The development of Brazil will be quicker, more democratic and safer once its citizens are able to make use of information and knowledge as the main raw material for decision-making, enriching the lives of all citizens.[155]*

With regard to the origins of OER in Brazil, the term OER was translated into Portuguese in 2006 as *Recursos Educacionais Abertos* (REA), and 'was used in the context of widening participation in higher education and increasing access to knowledge via distance education'.[156] MIT OpenCourseWare and OpenLearn were the main drivers for the introduction of the term REA in Brazil. Despite the fact that the term REA was found in literature since 2007, it is worth stressing that earlier government initiatives geared towards creating and sharing digital resources were not real OER initiatives in the sense that they were neither called OER initiatives nor were these digital resources licensed under open licences such as Creative Commons (CC).[157] Dos Santos (2011) noted the following in this regard:

> *Most of these initiatives have been established as strategies of the Brazilian Plan for the Development of Education (PDE)[158], which is a document that establishes the action plan of the National Education Plan (PNE).[159] These strategies were targeting, amongst other priorities, the production of resources and the access to digital content for both teachers and learners in the country, with open digital content initiatives (e.g. Teacher's Portal (Portal do Professor)[160], International Database of Educational Resources (Banco Internacional de Objetos*

149   Faulkner, R. (2015, May 14). OECD ranks Brazil schools 60th out of 75 countries. The Rio Times. Retrieved from http://riotimesonline.com/brazil-news/rio-business/oecd-ranks-brazil-schools-60th-out-of-75-countries/
150   OECD (2015). Education at a glance 2015: OECD indicators. Paris, Fr: OECD Publishing. doi:10.1787/eag-2015-46-en. p. 2
151   Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (2011). Censo escolar. Retrieved from http://portal.inep.gov.br/rss_censo-escolar/-/asset_publisher/oV0H/content/id/19910
152   Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (2016). Censo escolar. Retrieved from http://download.inep.gov.br/educacao_basica/censo_escolar/notas_estatisticas/2017/notas_estatisticas_censo_escolar_da_educacao_basica_2016.pdf
153   Rossini, C.A.A. (2010). Green-Paper: The state and challenges of OER in Brazil: from readers to writers? Berkman Center Research Publication. Retrieved from http://beespace.net/blog/wp-content/uploads/2009/09/PaperOEROSI080909.pdf, p.6
154   Dos Santos, A.I. (2009). O conceito de abertura em EAD. In F. Litto & M. Formiga (eds). *Educação a Distância — O Estado da Arte,* 290-296. São Paulo, BR: Pearson — Prentice Hall.
      Haddad, F. (2009). Preface. In F. Litto & M. Formiga (eds). *Educação a Distância — O Estado da Arte* . São Paulo, BR: Pearson-Prentice Hall.
      Litto, F.M. (2009). Recursos educacionais abertos. In F. Litto & M. Formiga (eds). *Educação a Distância — O Estado da Arte* (p.308.). São Paulo, BR: Pearson-Prentice Hall.
      Litto, F.M. (2014). As interfaces da EAD na educação brasileira. *Revista USP*, 100, 57–66. doi:10.11606/issn.2316-9036.v0i100p57-66
155   Litto, F.M. (2009) Recursos educacionais abertos. In F. Litto & M. Formiga (eds). *Educação a Distância — O Estado da Arte*, p.308. São Paulo, BR: Pearson-Prentice Hall.
156   Dos Santos, A. I. (2011). Open educational resources in Brazil: State-of-the-art, challenges and prospects for development and innovation. UNESCO Institute for Information Technologies in Education. Moscow, Russian Federation. p. 13
157   Ibid
158   PDE — Plano de Desenvolvimento da Educação.
159   PNE — Plano Nacional de Educação.
160   Portal Do Professor. (no date). Home Page. Retrieved from http://portaldoprofessor.mec.gov.br/index.html

Educacionais)[161]. Initiatives such as RIVED (Interactive Virtual Network of Education — Rede Interativa Virtual de Educação),[162] were set up as a network of virtual learning objects rather than of open educational resources.[163]

The RIVED initiative dates to 1999 and was primarily focused on the concept of learning objects. Since RIVED was conceived at a time when the concept of OER did not yet exist and there is no licence attached to RIVED's resources even though the resources are free of charge. While RIVED provides free, open, and unlicensed digital content, it does not exactly fit the definition of OER or of what OER are intended be (resources that allow reuse and adaptation and are licensed under an open licence or a CC licence). While such initiatives were in harmony with government plans to make digital multimedia content available for teachers to use in classrooms and focused on providing teachers with supplementary resources to enrich their lessons to compensate for insufficient teaching resources in the country, much of the earlier open content repositories were not intended to be established as OER initiatives as such.[164]

Since the open content initiatives offered by the federal government during the late 1990s and early 2000s, OER has gained traction among educators both in the public and private sectors. This is largely due to the support of the OER-Brazil Community and the advocacy work of OER.br[165], resulting in Brazil becoming a globally recognized leader in the OER movement. OER.br is coordinated by the Educadigital Institute with funding from the Open Society Foundation.[166] As of late 2018, early 2019, the OER.br site was apparently deactivated, and its contents were moved. OER.br currently goes by the name Iniciativa Educação Aberta[167] (Open Education Initiative). The site hosts OER policies, initiatives, publications and the RELiA plataform. RELiA is a platform that organizes the curating of OER and was created via a joint partnership between OER.br and the Educadigital Institute. The main goal of the platform is to help educators, students and other stakeholders to search for and to share OER. All content made available on the website is licensed under a CC — Attribution — ShareAlike (CC-BY -SA 4.0) licence. The Iniciativa Educação Aberta initiative is funded by the Shuttleworth Foundation, Educadigital Institute, UNESCO and the University of Campinas. All things considered, since 2011, a series of actions and events have had a huge impact on raising awareness on OER of policy makers and educators in both public and private sectors, disseminating OER, and creating policies that foster the adoption and use of OER.

OER Policies

Ordinance of the Ministry of Education (415/2018) — https://tinyurl.com/y9833yc7

This is a national policy of the Ministry of Education (MEC) that targets K-12 education

The Ministry of Education (MEC) published on May 16, 2018, in the Official Gazette, a new ordinance that establishes criteria for acquisition of educational resources aimed at basic education, produced with MEC's financial resources. The normative document sets out the definitions and differences between 'open' and 'free' educational resources and establishes in its article 7 that educational resources acquired or produced with public funds should always be open. Under Article 8, it is established that legal instruments such as procurement notices must conform to the ordinance with open licensing clauses. This is the first normative instrument that formalizes the implementation of an open education policy that began to be built by MEC from Commitment # 6 of the 3rd Open Government Action Plan (OGP-Brasil).[168]

[161] Banco Internacional de Objetos Educacionais. (no date). Home Page. Retrieved from http://objetoseducacionais2.mec.gov.br

[162] RIVED- .Rede Internacional Virtual de Educação. (no date). Home Page. Retrieved from http://rived.mec.gov.br

[163] Dos Santos, A.I. (2011). Open educational resources in Brazil: State-of-the-art, challenges and prospects for development and innovation. UNESCO Institute for Information Technologies in Education. Moscow, Russian Federation. p.15

[164] Ibid

[165] Recursos Educacionais Abertos. (no date). Home Page. Retrieved from www.rea.net.br

[166] Gonsales, P. (2015). The Internet and opportunities for education. In D. Sebriam & P. Gonsales (Eds.), *Open innovation in education: Concept and business models*, p. 35.

[167] Iniciativa Educação Aberta. (no date). Home Page. Retrieved from https://aberta.org.br

[168] Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 249.

Article 3 establishes that the Secretaria de Educação Básica (Secretary of Basic Education) (SEB-MEC)[169] of the MEC may contract or seek funding from the Federal Public Administration body or entity for the production, reception and evaluation of OER, including courses, thematic videotapes and other content intended for training of basic education professionals, obeying the rules governing contracting and decentralization of public administration credits. In Article 4, the Ordinance (415/2018) establishes that the SEB-MEC may establish partnerships, not involving transfer of financial resources, for the production, reception and evaluation of OER or free educational resources. This means that all funding or resourcing commitments must come from the federal government although at this time it was not possible to determine how much funding will be allocated for this Ordinance.

Municipal Decree of São Paulo (52,681/2011) — http://www3.prefeitura.sp.gov.br/cadlem/secretarias/negocios_juridicos/cadlem/integra.asp?alt=27092011D%20526810000

This is a state-level policy targeting K-12 education.

> This decree provides for open compulsory licensing of intellectual works produced or subsidized for educational, pedagogical and related purposes, within the framework of the municipal public school system. The current administration, inaugurated in 2016, has been carrying out actions aimed at fostering a culture of openness, either through the availability of data, or through educational materials produced collaboratively with open licences. Pátio Digital[170], which is an open government initiative of the city of São Paulo, strengthens these actions inasmuch as it provides actions guided by transparency and open data, government-society collaboration and technological innovation. At the headquarters, meetings are held with the participation of stakeholders to solve the challenges of school administration. Among the first actions, there is a public call for the development of mobile apps for school meals.[171]

Financial commitment to the policy is not stipulated.

Law of the Federal District (5.592/2015) — http://www.tc.df.gov.br/SINJ/Norma/1e0384fdc485411fad802fe2f0a94325/Lei_5592_23_12_2015.html

This is a state level law which:

> establishes a policy of open availability of educational resources purchased or developed by direct and indirect administration grants, ensuring that they are made available on the Internet and licensed for free use, including copying, distribution, downloading and redistribution provided that attribution be made to the author and that resources be used for non-commercial purposes.[172].

Although the law states that all OER should be purchased or developed by direct and indirect administration grants, it is not clear on which 'indirect administration grants' would be eligible or fit these criteria.

Resolution National Council of Education (Conselho Nacional de Educação / CES) no.1 of March 11, 2016 — http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=35541-res-cne-ces-001-14032016-pdf&category_slug=marco-2016-pdf&Itemid=30192

This national resolution of the MEC emphasizes the importance of OER for higher education institutions and for distance education activities. The resolution is aimed at:

> Ensuring the creation, availability, use and management of open educational technologies and resources through free licences that facilitate their use, review, translation, adaptation, recombination, distribution and free sharing by the citizen, subject to the relevant copyright (CES, 2016, p.2, Article, 2)[173]

Amiel, Gonsales & Sebriam (2018) posit that

> The language used in this resolution is clearer and more directive than the one presented in the PNE. Here institutions should 'ensure' the creation and availability of OER with the clear

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[169]   SEB -MEC — Secretaria de Educação Básica do Ministério de Educação.
[170]   Pátio Digital. (no date). Home Page. Retrieved from http://patiodigital.prefeitura.sp.gov.br
[171]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 250
[172]   Ibid
[173]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 251.

objective of allowing open practices. It is also important to highlight the reference to 'citizen' — pointing to the use of the public resource in favor of the public. The use of OER may drastically reduce the cost of distribution and access to educational resources by allowing them, once purchased, to be downloaded, copied, reused and altered in different contexts and by different actors. This Resolution was important and served as a support for the promotion of OER at the Open University of Brazil (UAB).[174]

Financial commitment to the policy is not stipulated.

Institutional Policy of the Federal University of Paraná (Política Instucional da Universidade Federal do Paraná — UFPR)(2015) — http://www.soc.ufpr.br/portal/wp-content/uploads/2016/12/CEPE-10-14-Progressão-Magistério-Superior_Alterada5.pdf

The Federal University of Paraná[175] (UFPR) pioneered the implementation of REA Paraná. The UFPR was the first university to establish a policy that promotes the use of OER by means of providing a bonus to those teachers who engage in open educational practices and disseminate them.[176] Resolution 10/14 (CEPE) addresses teacher promotion and career advancement.[177] There has also been adherence to the UFPR OER initiative by other higher education institutions such as the Federal Institute of Paraná (Instituto Federal do Paraná); the Federal University of Latin American Integration (Universisidade Federal da Integração Latino-Americana); the State University of Maringá (Universidade Estadual de Maringá); the State University of Londrina (Universidade Estadual de Londrina); and the State University of Ponta Grossa (Universidade Estadual de Ponta Grossa). The UFPR has its own OER repository.[178] Financial commitment is not stipulated in its policies.

Coordination for Improvement of Higher Education Personnel Ordinance (183 of 2016) (Portaria Coordenação de Aperfeiçoamento de Pessoal de Nível Superior-CAPES) — http://www.capes.gov.br/images/stories/download/legislacao/24102016-PORTARIA-N-183-2016.pdf

This is a national ordinance that decrees the open licensing of all educational resources produced for the Open University of Brazil (UAB) system. The Ordinance was based on the recommendations provided by the CNE/CES Resolution No. 1 of March 2016 and was created with the purpose of promoting greater exchange and collaboration in the production of educational resources in the UAB system. Associated to this ordinance, the development of the EduCAPES Portal was announced (described below).[179] Financial commitment to the ordinance is not stipulated.

Commitment # 6 of the Third Plan of Action of the Open Government Partnership (2016-2018) (Compromisso #6 do 3º Plano de Ação da Parceria Governo Aberto (2016-2018) — http://governoaberto.cgu.gov.br/noticias/2017/3o-plano-de-acao-nacional-na-parceria-para-governo-aberto/3o-plano-versao-web-eng.pdf

This commitment was co-created between the MEC and members of civil society. The commitment is geared towards incorporating in education policy the potential of digital culture in order to foster autonomy for the use, reuse and adaptation of digital educational resources placing value on the plurality and diversity of Brazilian education.[180] Financial commitment is not stipulated.

Brazilian Strategy for Digital Transformation (Estratégia Digital Brasileira para Transformação Digital) (2018) http://www.mctic.gov.br/mctic/export/sites/institucional/backend/galeria/arquivos/2017/10/02/EBTD_Documento_Base_CP.pdf

This is a national government strategy aimed at the scientific and academic community.

174 Ibid).
175 REAPARANÁ. (no date). Home Page. Retrieved from http://reaparana.com.br/portal/
176 Meier, M.J. & Da Silva, H.O. (2018) REA Paraná: práticas colaborativas e práticas educacionais abertas, inventários e avaliações. In M. R. C Duran, T.Amiel, C.J. da Costa (eds). *Utopias e distopias da tecnologia na educação a distância e aberta*. Campinas/Niterói: Unicamp/UFF.
177 Universidade Federal do Paraná. (no date). RESOLUÇÃO N° 10/14 — CEPE. Retrieved from http://www.pro-gepe.ufpr.br/progepe/documentos/outros/Cepe1014.pdf
178 See https://acervodigital.ufpr.br/handle/1884/35989
179 Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), p. 252
180 Ibid

The Brazilian Strategy for Digital Transformation (E-Digital[181]), based on the National System for Digital Transformation, was implemented by the Federal Government on 03/21/2018 via Decree 9.319 / 2018 and contains a long discussion on OER underscoring that they can promote greater access to quality education by fostering new educational practices driven by digital culture [182]

Financial commitment is not stipulated.

Federal Law Project (1513/2011) — http://www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=505535

Some legislators and public administrators have become aware of the need to make available educational material financed with public money for free and open access to taxpayers. The Federal law project aims to ensure that public purchases or the hiring of educational services and materials are governed by free licences, allowing the dissemination and broadening of access to these goods throughout society. The law is still pending approval.[183] Financial commitment is not stipulated.

Draft State Law of São Paulo (989/2011) — https://www.al.sp.gov.br/propositura/?id=1040323

This state–level law was based on the premise that any knowledge bought or developed with public resources by the state public administration would be considered an open resource. It was unanimously approved by the Legislative Assembly of São Paulo at the end of 2012 but was vetoed by the governor who claimed that only the Executive branch is apt to propose measures referring to 'use of information technology and the Internet' in their activities'.[184] The law did not stipulate financial commitment.

Draft State Law of Paraná (185/2014) — http://www.rea.net.br/site/politica-publica/projeto-de-lei-do-estado-do-parana/

This state-level law was inspired by the Federal Law Project and provided for the implementation of a policy for the availability of educational resources purchased or developed via a direct or indirect state grant. The law was filed in 2015 with the same argument used to veto the Draft State Law of the State of São Paulo.[185] Financial commitment is not stipulated.

National Textbook Plan (Plano Nacional do Livro Didático) (2019 and 2020) — http://www.fnde.gov.br/programas/programas-do-livro/consultas/editais-programas-livro/item/10521-pnld-2019; http://www.fnde.gov.br/programas/programas-do-livro/consultas/editais-programas-livro/item/11555-edital-pnld-2020

These are national plans of the Ministry of Education, which target Basic Education. It stipulates the use of Creative Commons Attribution Non-Commercial Licence (CC-BY-NC) for digital materials that complement teachers' textbooks. These materials include pedagogical and evaluation instructional materials for child education, bimonthly/quarterly development plans, instructional learning sequences, learning follow-up proposals and audiovisual material for elementary education. Similar clauses were included in the 2020 law including the demand for free licences in 75% of the audiovisual material, which is now compulsory.[186] The plan does not make mention of financial commitment.

Given the policies described above, there are clearly some provisions in place in Brazil that ensure that educational materials produced with public funds are openly licensed. Two specific policies govern this requirement:

- Ordinance (415/2018) establishes criteria for the acquisition of educational resources aimed at basic education produced with MEC's financial resources. The normative document sets out the definitions and differences between 'open' and 'free' educational

[181]   Brasília. (2018). Estratégia Brasileira para a Transformação Digital (E-Digital). Retrieved from http://www.mctic.gov.br/mctic/export/sites/institucional/estrategiadigital.pdf
[182]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 253
[183]   Ibid
[184]   Ibid
[185]   Ibid
[186]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258.

resources and establishes in its article 7 that educational resources acquired or produced with public funds should always be open. Under Article 8, it establishes that legal instruments such as procurement notices must conform to the ordinance with open licensing clauses.[187]

- The Law of the Federal District (5.592/2015) establishes a policy of open availability of educational resources purchased or developed by direct and indirect administration grants ensuring that they are made available on the Portal of the Government of the Federal District and licensed for free use, including copying, distribution, downloading and redistribution providing that the correct attribution to the author and the use of resources for non-commercial purposes.[188]

The release of materials produced with public funds is a requirement only for public higher education and basic education institutions. During the past decade, there have been great advancements in terms of establishing laws, ordinances and recently the launching of a platform with clear policies on copyright and reuse of resources in Brazil. Existing policies such as the Institutional Policy of the Federal University of Paraná (UFPR) and the CAPES Ordinance (183 of 2016) provide access to government funded OER, licensed under open licences or CC licences to higher education teachers and students. The National Textbook Plan (2019 and 2020) will provide CC-BY-NC supplementary digital instructional content for basic education teachers and students. Professional development for teachers of the Open University of Brazil (UAB) is also being provided. Overall, globally or on a regional scale, Brazil has pioneered many OER policies and actions. Considering that the OE and OER field are heavily dominated by the Global North and their organizations and the fact that there is almost no funding for continuous actions, nor translations of local production into other languages, there are still many challenges for Brazil to overcome despite its many achievements and advancements in the OER movement.[189]

OER Use and Adoption

Educadigital — http://www.educadigital.org.br/site/

Educadigital is an initiative of Instituto Educadigital and targets teachers, civil society, the general public, school administrators, and researchers. Founded in 2010, Educadigital Institute (IED) is a non-profit organization and a world leader in innovative projects for the pedagogical use of digital technologies, both inside and outside schools. It works in partnership with schools, social organizations, business and governmental organizations in the design, execution and development of training projects for children, teenagers and adults. The site is licensed under CC BY-NC 4.0 licence. Educadigital is privately funded. The site mentions several partners therefore the institution's potential for sustainability is good.

Open Education Initiative — https://aberta.org.br

This initiative brings together productions and projects of the UNESCO Chair in Open Education and the Educadigital Institute, both of which promote the use of OER in Brazil. Works found on the site of the initiative include: academic research, publications, production of resources and repositories as well as face-to-face and distance education learning opportunities that have been developed by the two institution since 2007. The site was launched in 2018 and is licensed under a CC BY-NC 4.0 licence. The site is funded by the Shuttleworth Foundation, Educadigital Institute, UNESCO and the University of Campinas therefore the initiative's potential for sustainability is good.

The Physics of Daily Life — http://pat.educacao.ba.gov.br/

The Physics and Daily Life project was developed by the Bahia State Department of Education in partnership with the State University of Bahia. The objective of this project is to provide digital educational content in the area of Physics that can be used to support/extend teaching practices in secondary schools aimed at updating and improving the quality of

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187   Ibid
188   Ibid
189   Ibid

teaching in this discipline. The project is funded by the National Fund for the Development of Education (FNDE); Ministry of Education; Ministry of Science and Technology; and the Government of the State of Bahia. The material is licensed under CC-BY-NC-SA licence.

Educational Web Environment — http://pat.educacao.ba.gov.br/

This is the educational platform of the Government of the State of Bahia where the school community can find digital content licensed under free licences and obtain access to open source software to aid in the production of media. The target audience is students, teachers, educators, basic education and higher education institutions. The initiative is funded through public funds via a series of government decrees and laws. Content is licensed under a CC licence.

Literacy project for young people and adults (Aprender para Contar — Alfabetização de Pessoas Jovens e Adultas) — http://www.educadigital.org.br/eja/baixe-e-leia/

Booklet aimed at providing educational literacy instructional material for teachers who teach young people and adults.[190] The booklet contains language studies, mathematics studies and digital literacy studies. The content is licensed under CC-BY-NC. This is an initiative of Hedra, Educadigital, and OER-Brazil Community.

Civil Society Projects and Actions (Projetos e Ações da Sociedade Civil)

Taking advantage of the Year of Open, the UNESCO Chair in Open Education, based at Núcleo de Informática Aplicada à Educação/Unicamp, established a partnership with the Educadigital Institute for launching the Open Education Initiative (IEA) website.[191] This project is focused on using a single channel to assemble all the activities of the two groups promoting OER and open education in Brazil. The IEA is the culmination of joint work which includes, for example, the mapping of open repositories in Latin America (MIRA Project, funded by the Hewlett Foundation) and an open course on OER and Open Education (EA) being offered by the Open University of Brazil (UAB) in 2018 with the support of DED/CAPES.[192]

Digital Library of the Federal Senate (Bilblioteca Digital do Senado Federal- BDSF) — http://www2.senado.leg.br/bdsf/

The Digital Library is an initiative of the Federal Senate, Superior Court of Justice (STJ), and Brazilian Institute of Information in Science and Technology (IBICT). Founded in 2006, the Digital Library of the Federal Senate (BDSF) is hosted on DSpace, which is the most widely used open source software in the world for the deployment of digital libraries and follows important international standards for information sharing. Continued efforts are made to improve and stabilize the system, as well as to increase and improve its collection ensuring its ongoing preservation and dissemination. The digital collection is varied containing books, rare works, magazine articles, newspaper news, intellectual production of Senators and Federal officials, legislation in text and audio, among other documents, and targets the general population. This initiative is funded by the government.

Integrated Platform Digital Educational Resources — Ministry of Education (Plataforma Integrada) (RED-MEC) — https://plataformaintegrada.mec.gov.br/home

This is a national initiative of the Ministry of Education, and targets stakeholders in basic education. Launched in 2017, the Ministry of Education's new Digital Education Resource Platform (RED) has been redesigned to hold OER. It functions as a social network and in its current phase it is a portal[193] that aggregates open resources from other existing MEC repositories such as TV Escola(TV School), Portal do Professor (Teachers' Portal), and Banco Internacional de Objetos Educacionais e Domínio Público (International Bank of Educational Objects and Public Domain) as well as from external partners. It therefore allows access to closed resources (with free access) and open resources. Currently, teachers of the public basic education network are permitted to upload resources and by the end of the year any

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[190] EJA- Ensino de Jovens e Adultos.
[191] Iniciativa Educação Aberta. (no date). Home Page. Retrieved from http://aberta.org.br/
[192] Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), p. 255
[193] Unlike a repository it does not contain its own resources. Instead, it only organizes, assembles and indicates existing resources in other repositories.

user will be able to use the platform to curate resources. The platform determines the use of free licences for all uploaded content as indicated by its terms of use. A managing committee is responsible for overseeing the platform.[194]

Brasiliana Library (Biblioteca Brasiliana Guita e José Mindlin) — https://digital.bbm.usp.br/handle/bbm-ext/1

Founded in 2005, the Brasiliana library has a vast bibliographical and documentary collection on rare Brazilian subjects in the country and in the world. It is aimed at facilitating the access of students, researchers and the general public to its collection as well as promoting the dissemination of studies of Brazilian subjects through specific programmes and projects. According to Brasiliana's usage policy, use is allowed if the author is acknowledged and for non-commercial purposes. The initiative is funded by University of Sao Paulo and the National Bank for Development (Banco Nacional do Desenvovimento -BNDES). Its target audience is the general population, higher education students, and researchers.

Virtual Campus of Public Health Brazil (Campus Virtual da Saúde Pública — CVSP) — http://brasil.campusvirtualsp.org/

The CVSP is a space to develop interdisciplinary cooperation in the field of public health training. It is a communication and learning space that resulted from a partnership between PAHO and other countries of the Americas. A decentralized network of individuals, institutions and organizations share education courses, resources, services and activities with the common goal of strengthening the skills of the public health workforce. It uses ICTs applied to health education in order to become a space for creativity and innovation. This is a joint initiative of Pan American Health Organization (PAHO), World Health Organization, Regional Observatory of Human Resources in Health, UMA-SUS Open University of the SUS, and Fio Cruz Institute. It targets healthcare professionals and is funded by the Pan American Health Organization. All materials are licensed under a CC BY-NC 3.0 licence.

Digital Content — Federal Fluminense University (Conteúdos Digitais — Universidade Federal Fluminenses-UFF) — http://www.cdme.im-uff.mat.br/

In the Digital Content for teaching and learning mathematics and statistics repository, users are able to locate digital teaching objects for online and offline use such as software, experiments and audio. This is an initiative of the Federal Fluminense University, Faculty of Electrical and Computer Engineering at Unicamp, State Secretary of Education, PROAC Pro-Rectory of Academic Affairs, Ministry of Education, and Ministry of Science and Technology. The target audience are high school teachers. It is funded by the National Fund for Development in Education (Fundo Nacional de Desenvolvimento da Educação -FNDE), and resources are licensed under a CC-BY-NC-SA licence.

Curriculum + (Currículo+) - http://curriculomais.educacao.sp.gov.br/

Founded in 2014, Curriculum + is an initiative of the New Technologies Programme — New Possibilities of the Education developed by the Secretary of Education of the State of São Paulo. It provides a platform with suggestions of digital content (videos, animations, digital games, simulators, infographics and audio) as complementary pedagogical resources selected according to the Curriculum of the State of São Paulo through a continuous process of collective construction with educators of the basic education network. Funded by Secretary of Education of the state of São Paulo. While the platform carries a CC-BY licence, the contents each have their own usage licence. The initiative targets basic education teachers.

EduCAPES — https://educapes.capes.gov.br

EduCAPES is an OER portal that can be used by students and teachers of basic education, higher education and students enrolled in postgraduate studies. EduCAPES contains thousands of learning objects including texts, textbooks, research articles, thesis, dissertations, videotapes, audios, images and any other research and teaching materials that are openly licensed or published with express authorization of the author even if they are in the public

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[194]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258

domain. Although the focus of the repository is on resources from UAB's researchers and teachers, it also contains resources from partners.[195]

Based on findings from a comprehensive questionnaire aimed at exploring OER practices and perceptions at the UAB, EduCAPES commissioned the UNESCO Chair in Open Education in partnership with the Educadigital Institute to create the first training programme for higher education on OER.[196]

> *Approximately 300 people have already participated in this training during the first semester of 2018 including teachers, researchers and technicians associated to the Open University of Brazil (UAB). During the second semester of 2018, complementary training will be offered to a smaller audience aimed at promoting local 'ambassadors' from different institutions in Brazil.[197]*

Working Group (Grupo de Trabalho) — Ministry of Education (MEC) — http://portal.mec.gov.br/component/tags/tag/34821-grupo-de-trabalho

As a result of the Open Government Action Plan actions, the MEC established a Working Group focused on OER. Meetings are held approximately every three months geared towards developing public policies that promote open resources and open education taking into consideration experiences and challenges of different departments and departments within the scope of the MEC, as well as partners and supporters. This is a national initiative and is a joint effort of the Ministry of Education, Government, and UNESCO. The group is headed by the Secretary of Basic Education (SEB).[198]

OER Course (Curso REA) — http://curso.rea.ufg.br/

This was the first online, open and free course, offered in Portuguese on OER. The course was offered in 2013 and aimed to introduce the concepts of Open Education and OER as part of a global agenda for the sustainable provision of educational resources and promotion of education for all. The course was licensed under a CC-BY-SA licence, and was an initiative of Goiás Federal University and UNESCO-Brazil, and targeted school administrators and educators. The course was funded partially by UNESCO-Brazil.

Design Thinking for Educators (Design Thinking para Educadores) — http://www.dtparaeducadores.org.br/site/

The Design Thinking for Educators Kit was developed by the Educadigital Institute. It is resource for educators (in basic and higher education) to use this innovative approach in the classroom. The design thinking material consists of a basic booklet and an activity booklet, which are available for download. It is licensed under a CC-BY- NC-SA licence. The project was supported by the Natura Institute.

Educopédia — http://www.educopedia.com.br/

Educopédia is a collaborative online platform of digital classes where students and teachers can access self-explanatory activities in a playful and practical way, from anywhere and at any time. Classes include lesson plans and presentations for teachers who want to use classroom activities with students. The activities include videos, animations, images, texts, podcasts, mini-tests and games that follow a pre-defined script in line with theories of metacognition. The platform is licensed under a CC-BY licence. This initiative is funded by the City Hall of Rio de Janeiro and targets students and teachers in basic education.

Edukatu — https://edukatu.org.br/

Founded in 2001, Edukatu is a learning network that aims to encourage the exchange of knowledge and practices aimed at promoting sustainable practices. The initiative is funded by a consortium of private companies and banks such as HP, Itau, Santander, Braskem, Unilever, CocaCola Brasil, among others. Some of the available materials are licensed under CC-BY- NC-SA. This is an initiative of Akatu Institute, and targets teachers and students.

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[195]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), p. 252

[196]   Ibid. The offer had an expanded partnership, including UFABC as well as UnB, see: http://cursorea.net.br

[197]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), p. 252.

[198]   Ibid

Embrião Laboratory of Educational Technology — https://www.embriao.ib.unicamp.br/embriao2/index.php

This is an initiative of Educational Technology Laboratory, Department of Biochemistry, Institute of Biology, State University of Campinas — Unicamp, the Ministry of Science and Technology, the Ministry of Education, and Digital School. It focuses on producing digital educational media content that can be used in various platforms and that complement pedagogical practices in High School contributing to the improvement and modernization of teaching-learning processes in Brazilian public schools. The site contains online materials, audios, experiments, software, videos and animations in the area of science and biology. It is funded by the National Fund for Development in Education (Fundo Nacional de Desenvolvimento da Educação -FNDE) and is licensed under CC-BY-NC-SA licence.

Escola Digital (Digital School) — http://escoladigital.org.br/

The Digital School is a search platform that aggregates objects and digital resources aimed at supporting teaching and learning practices inside and outside the classroom. The website was created with the goal of facilitating the access of educators, schools and educational networks in order to enrich and streamline pedagogical practices. The platform also supports students who want to deepen their studies and addresses issues and concerns of parents who wish to be updated in the education of their children. It is funded by the LEMANN Foundation, Instituto Natura, Telefonica Foundation, and the Vanzolini Foundation. The Digital School is licensed under a CC-BY licence. It targets teachers, students, the general public, and basic education schools.

Escola Livre da Casa de Cultura Digital (Free School of the House of Digital Culture) — http://culturadigital.br/escolalivre/

The Escola Livre da Casa de Cultura Digital is a brick-and- mortar- space located in São Paulo aimed at knowledge sharing and promoting discussions on digital culture. It is an initiative of Ministry of Culture and the National Education and Research Network. The target audience is the general public. The content is licensed under a CC-BY- NC-SA licence. The initiative is funded by the government.

e-Unicamp (Universidade de Campinas — Unicamp) — http://www.ggte.unicamp.br/e-unicamp/public/

This initiative of Unicamp was created in 2013 with the focus of disseminating knowledge generated by the Institution via the provision of videos, animations, simulations, images and classes. All materials are created by the Unicamp professors and are freely accessible to the public. All content available on the e-Unicamp Portal will be under CC licences according to conditions established by Law 9.610 / 98 regarding copyright. The initiative is funded by the government.

Projeto Folhas — http://www.diadiaeducacao.pr.gov.br/portals/frm_login.php?origem=folhas; http://www.diaadiaeducacao.pr.gov.br/portals/folhas/frm_buscaFolhas.php

Initiated in 2003, Folhas is a project of the Secretary of Education of the State of Paraná that is geared towards the production of instructional material by the teachers of the public basic education network. The project has its own licence that allows the printing, use and creation of derivative works, for non-commercial purposes. It targets teachers of the basic education public school system and is funded by the state government.

Visual Geography (Geografia Visual) — https://geografiavisual.com.br

Founded in 2000, Visual Geography is a website created by educator Adriano Rangel that contains OER such as images and other types of interactive resources (infographics, maps, videos, simulators, games). While the site is licensed under CC-BY, most published references are not under open licences although they can be accessed by anyone. Visual Geography is aligned with the hacker culture, which takes anything (idea, object) and turn it into an open resource for all to use. The target audience is the general public, and teachers and students in basic education.

Digital Objects Laboratory (Laboratório de Objetos Digitais) — http://www.loa.sead.ufscar.br/

This is an initiative of Federal University of São Carlos (Universidade Federal de São Carlos-UFSCAR), which started in 2012. The Laboratory is an interdisciplinary space for studies and research on new technologies and methodologies for the development of OER. This initiative is associated with the General Secretary for Distance Education (SEaD) of UFSCAR. It is funded by SEaD[199] and the federal university. The Learning Objects are licensed under a Creative Commons Attribution-Share Alike Licence 4.0 (CC BY SA). It targets the general public, teachers, and students in Higher Education.

Portal TECA — https://canalcederj.cecierj.edu.br/

The TECA Portal is an initiative of the Centre of Distance Education of the State of Rio de Janeiro (Centro de Educação a Distância do Estado do Rio de Janeiro -CECIERJ) Foundation. It allows access to a variety of instructional materials such as images, animations, videos, audios and texts. All resources are available under CC Licences.

Porto OpenCourseWare — http://oec.portoseguro.org.br/

This initiative of Visconde de Porto Seguro Elementary and High School, São Paulo, targets teachers and students. All resources in this repository can be copied, modified, distributed and reused, provided that certain conditions (specific to each material) are met. The initiative is funded by the school.

Programaê — http://programae.org.br/

This initiative is aimed at teaching the basics of programming to young people from all over Brazil. It brings together the best and simplest tools to learn and teach programming. All tools are free and in Portuguese and do not require any previous programming knowledge. The initiative is funded by Fundação Lemann and Vivo and has established partnerships with other institutions such as Khan Academy, Codecademy, Scratch, codeclub.brasil.org, MIT App Inventor, among others. The site is licensed under a CC-BY-NC-SA licence.

REA Dante (OER Dante) — https://www2.colegiodante.com.br/rea/

This is an OER repository of the Dante Alighieri Elementary and High School located in São Paulo. The initiative is funded by the school and contains resources with a CC-BY and CC BY-NC licences.

Network for Exchange of Educational Production (Rede de Intercâmbio de Produção Educativa -RIPE) — https://blog.ufba.br/ripe/o-projeto/

The Network for Exchange of Educational Production promotes the exchange of images and audio for educational use, which are produced collaboratively. Its contents are licensed under CC-BY-NC-SA. The initiative is government funded and targets teachers and students in basic education.

Scientific Electronic Library Online — Scielo — http://books.scielo.org/

The Scielo initiative is focused on publishing online collections of books of scientific nature, mainly published by academic institutions with the objective of maximizing visibility, accessibility, use and impact of the research, essays and studies. The articles are readable on eBook readers, tablets, smartphones and computer screens. It is a joint initiative of FAPESP (São Paulo Research Foundation), CAPES, National Council for Research, Biblioteca Regional de Medicina (PAHO Organization) and Fundação de Apoio à Universidade Federal de São Paulo (FapUnifesp). It targets students and researchers in higher education. Except where otherwise noted, books in the collection are licensed under a CC BY-NC-SA licence. The initiative is funded by federal and state government agencies.

Wikimedia Brasil — https://br.wikimedia.org/wiki/Página_principal

The Wikimedia Brasil movement comprises a group of voluntary contributors who participate in diverse projects of the Wikimedia Movement. These projects are aimed at articulating,

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199   SEaD — Secretaria de Educação a Distância.

encouraging, implementing, promoting, developing and disseminating collaborative works and their production. The project is geared towards fostering inclusive dissemination of free knowledge in the Portuguese language. Resources are licensed under the CC BY-SA 3.0 licence and targets the general public.

Public Domain Portal (Portal Domínio Público) — http://www.dominiopublico.gov.br/pesquisa/PesquisaObraForm.jsp

The Public Domain Portal was founded in 2004 as a virtual library that enables the collection, integration, preservation and sharing of knowledge. Its main objective is to promote broad access to literary, artistic and scientific works (in the form of texts, sounds, images and videos) that are already in the public domain or that have an authorized disclosure. It is funded by the MEC.

Pioneiro Digital — https://www.pioneiro.com.br/pioneirodigital/

The Pioneiro Digital is an OER repository containing videos, images, audio, presentations, lesson plans, digital books, animations, and games. Except where otherwise noted, all content is licensed under a CC licence — Attribution (CC-BY) 3.0. The initiative is funded by the Pioneiro Educational Centre and targets students and teachers in basic education.

Caderno REA (OER Booklet) — http://educacaoaberta.org/cadernorea/

The Caderno REA is Portuguese OER booklet/guide geared towards teaching K-12 teachers where to find OER and how to use, create and license it. The booklet was created in 2013 by Educação Aberta Organization and was funded by the State University of Campinas and the UNESCO Chair of Open Education. The resource is funded under a CC-BY licence.

Ciênsação — https://www.ciensacao.org/index.html

Founded in 2015, this initiative promotes hands-on physics, chemistry, biology, geography and mathematics experiments in public schools in Brazil all licensed with a CC BY-SA licence. Since its launching, experiments have been developed, tested, photographed and repeatedly reviewed by a group of volunteers and subsequently translated into Portuguese so that teachers and students in Brazil can benefit from this work. Teachers and students may also submit, share and publish their experiments with other public schools in Latin America via the Ciênsação site. The initiative is funded by UNESCO Brazil, and targets teachers and students in basic education.

Portuguese is the main language in Brazil and OER are predominantly produced in Portuguese.

Even though Brazil has in recent years placed great emphasis on launching policies, initiatives and repositories that foster the production of local OER, Brazil is still in the early stages of mainstreaming OER and there is still some resistance from teachers and educators. Particularly in the basic education sector, there is great need for more awareness-raising actions and practical implementation actions in the form of professional development in order to mainstream OER in the country. For example, in higher education, findings from a study aimed at exploring teachers' use of OER in online teacher undergraduate courses (teaching certification programme) at the Open University of Brazil (UAB)[200] show that it is a common practice for teachers to resort to the Internet to search for resources to complement their lessons but very few teachers know what OER and CC licences are. Therefore, few teachers actually engage in reusing, remixing and redistributing OER and the majority of them do not know about or how to use CC licences.[201] In the K-12 educational sector the situation is very similar. Findings from a recent study aimed at exploring a set of evidence-based OER guidelines in the context of Teacher Professional Development (TPD) for Brazilian K-12 public school teachers also reveal that teachers regularly used the Internet to search for materials such as images,

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[200]   UAB — Universidade Aberta do Brasil.
[201]   Pereira, A.M.D.A. & Alves, T.P.O. (2015). Uso dos recursos educacionais abertos (REA) na educação superior/ UAB: sonho ou realidade? (Master's thesis, Universidade Federal de Pernambuco). Retrieved from https://repositorio.ufpe.br/handle/123456789/13845

videos and music.[202] Nevertheless, 'the fact that these teachers regularly search for, download and create using materials retrieved on the Internet is not to say that they are doing so in a way that complies with the 5Rs -the right to retain, reuse, revise, remix and redistribute[203] — of OER using open licences or Creative Common licences. On the contrary, it merely implies that these teachers are aware that the Internet is a good place to search for educational content'.[204] This notion is corroborated by data that indicates that the publishing and sharing of these resources on the Internet is still a relatively rare activity, practiced by only 30% of public school teachers.[205] Still in the basic education sector there are other factors that hinder OER uptake and make mainstreaming them more challenging. Such factors include: poor or limited Wi-Fi connectivity in the school and lack of equipment;[206] lack of knowledge or skills in locating OER, reusing, creating and sharing them;[207] lack of knowledge or skills with ICTs;[208] lack of time, personnel and low salaries;[209] linguistic barriers since most OER repositories are in English;[210] and absence of a culture of collaboration.[211] School administrators also need to be on board with OER use and adoption and would also greatly benefit from awareness-raising strategies and training. Ultimately, the use of OER needs to be a collective decision based on a shared vision and may entail changing cultural norms and modifying practices and behaviors of leadership and teachers.[212]

OER FINANCING AND SUSTAINABILITY

Not all the policies/strategies indicate how they will be funded, and it is suggested that all policy commitments to OER should clearly state or contain articles that describe from where and how (i.e., a business or financial model) much funding will be required, obtained and allocated so as to ensure that all laws or policies go into effect taking into consideration the yearly estimated national education budget. This is because a policy or law without any funding or resources is unlikely to be achieved.

Nevertheless, during the past decade, the growth of OER appears to be increasing in investment in design and development of educational resources. As the list on notable OER initiatives describes, there has been not only a significant increase in the development and

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[202] Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[203] The 5Rs of OER were coined by Wiley, D. (2010). *OER 101: Theory and practice* [Slides]. Retrieved from http://www.slideshare.net/opencontent/vss-2010-oer-101-theory-and-practice

[204] Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada. p. 151

[205] TIC Educação. (2015). Pesquisa sobre o uso das tecnologias de informação e comunicação nas escolas brasileiras. CGI.br. Retrieved from http://cetic.br/media/docs/publicacoes/2/TIC_Edu_2015_LIVRO_ELETRONICO.pdf

[206] Ibid Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada

[207] Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[208] Ibid

[209] TIC Educação. (2015). Pesquisa sobre o uso das tecnologias de informação e comunicação nas escolas brasileiras. CGI.br. Retrieved from http://cetic.br/media/docs/publicacoes/2/TIC_Edu_2015_LIVRO_ELETRONICO.pdf Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[210] Cobo, C. (2013). Exploration of open educational resources in non-English speaking communities. The International Review of Research in Open and Distributed Learning, 14(2), 106–128.Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1493
OER Regional Consultation (2017, April 3). OER for inclusive and equitable quality education: From commitment to action. Proceedings from the Latin America and Caribbean Regional Consultation on Open Educational Resources, São Paulo, Brazil, (pp. 3–32). Retrieved from http://rcoer.col.org/uploads/2/2/8/4/22841180/lac_rcoer_report_final.pdf
Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[211] Venturini, J. (2014). *Recursos educacionais abertos no Brasil: O campo, os recursos e sua apropriação em sala de aula*. São Paulo, BR: Ação Educativa.

[212] De Los Arcos, B., Farrow, R., Pitt, R., Weller, M. & McAndrew, P. (2016). Adapting the curriculum: How K-12 teachers perceive the role of open educational resources. *Journal of Online Learning Research, 2*(1), 23–40. Retrieved from https://www.researchgate.net/profile/Rebecca_Pitt/publication/301684854_Personalising_learning_through_adaptation_Evidence_from_a_global_survey_of_K-12_teachers'_perceptions_of_their_use_of_open_educational_resources/links/5721f7f908ae80636185e367.pdf

funding of OER projects, repositories and portals both by public, private and non-profit organizations but also clear policies for licensing are now available for these initiatives. In other words, more recent initiatives aimed at supporting the creation and sharing of digital resources many now be considered real OER initiatives since most of them are licensed under CC licences as opposed to earlier digital content initiatives (i.e., Teacher's Portal (*Portal do Professor*), International Database of Educational Resources (*Banco Internacional de Objetos Educacionais*), and Interactive Virtual Network of Education (RIVED). The latter, as previously mentioned, were not considered real OER initiatives as they did not fit into the category of OER since there were no licences attached to their resources.[213] In addition, there are currently a wider variety of initiatives (i.e., Virtual Campus of Public Health Brazil (*Campus Virtual da Saúde Pública — CVSP*), Free School of the House of Digital Culture (*Escola Livre da Casa de Cultura Digital*), e-Unicamp (Universidade de Campinas — Unicamp), and the Scientific Electronic Library Online (Scielo), which cater to diverse target audiences and the general public, and are all aimed at disseminating knowledge and promoting the sharing and creation of OER in other fields such as healthcare and national and indigenous culture and research, to name a few.

The use of OER in the design and development of educational resources are not only a cost-effective solution since they are free of the price of the content but are also free of costs associated with negotiating licences and clearing copyright by contacting publishers or authors. Naturally, there are other costs associated to designing and developing educational resources regardless whether these are OER or proprietary resources that require investment. These costs include: Internet bandwidth and Wi-Fi Connectivity, organizational infrastructure (equipment), training and production/adapting/assembling of content.

Teachers have used and adapted existing textbooks, photocopies, pictures, web sites and graphics for many years, even though most have little, if any, understanding of copyright laws. As part of their career plan, many of them have also been engaged in producing educational materials from scratch. The use, adaptation and production of OER requires different skillsets from teachers such as knowing where to search for materials in existing repositories, knowing how to use open source software to reuse, revise, remix and redistribute materials and knowing how to licence materials using CC licences or open licences. Therefore, considering that this is one of the main challenges faced by Brazilian teachers as well as other stakeholders,[214] the main focus should be on striking the right balance between what are already common practices, raising awareness and building the capacity of users to find, reuse, create, and share OER.[215] The balance will therefore be struck more appropriately through proper support and a clear action plan aimed at future OER training efforts throughout the country.

Initiatives focused specifically on insuring investment in OER that contribute to greater diversity of educational materials include: Ciênsação that is aimed at promoting practical experiments in public schools; Network for Exchange of Educational Production (Rede de Intercâmbio de Produção Educativa -RIPE) which is focused on promoting collaborative production and exchange of images and audio for educational use; e-Unicamp (Universidade de Campinas — Unicamp), which is geared towards disseminating knowledge generated by the higher education Institution via the provision of videos, animations, simulations, images and classes; Escola Digital (Digital School), which provides digital resources aimed at supporting teaching and learning practices inside and outside the classroom; and the Edukatu learning network, which is focused on promoting sustainable practices.

[213] Dos Santos, A.I. (2011). *Open educational resources in Brazil: State-of-the-art, challenges and prospects for development and innovation*. UNESCO Institute for Information Technologies in Education. Moscow, Russian Federation.

[214] Ljubljana OER Action Plan (2017). Proceedings from the Second World OER Congress. 1-8. Ljubljana, Slovenia. Retrieved from https://en.unesco.org/sites/default/files/ljubljana_oer_action_plan_2017.pdf; Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[215] Ljubljana OER Action Plan (2017). Proceedings from the Second World OER Congress. 1-8. Ljubljana, Slovenia. Retrieved from https://en.unesco.org/sites/default/files/ljubljana_oer_action_plan_2017.pdf; Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

In terms of initiatives that are focused specifically on ensuring that investment in OER contributes to the inclusion of marginalized voices in the resulting content, it is worth noting that access to computers and the Internet is still a major challenge for most Brazilian basic education public schools inasmuch as there is low availability of equipment and limited Internet connection.[216] Despite the fact that the use of OER has potential to broaden access to education and thereby promote social inclusion, Lane (2012) cautions that, in reality, access to open education or OER is still exclusive and can lead to disempowerment and enlarge the already existing educational digital divide.[217] The term 'educational digital divide' is used to describe the presence of marginalized voices or communities that cannot reap the benefits of OER use due to economic, social and cultural factors that limit their access to technologies afforded by the Internet. The use of OER thus may widen the educational divide between those who have access to ICTs and those who do not, rather than helping to narrow it.[218] A potential solution to this problem would be to offer teachers and students who do not have access to the Internet or who live in remote regions the possibility of using and creating OER as offline resources.[219] This would enable users to download OER as offline resources; however, users would still need to possess the knowledge and skills to find OER and to download them to their mobile phones or to their home computers provided they have one. Furthermore, the marginalized voices of the Brazilian society should be afforded opportunities to become literate with ICT skills so that they can make an informed decision about making use of OER. From this perspective, none of the OER initiatives included in this research speak to the inclusion of marginalized voices.

Existing initiatives mentioned above, which focus specifically on insuring investment in OER that contribute to greater diversity of educational materials, appear to be relatively sustainable. However, it is worth noting that three out of five initiatives are either privately funded or funded by UNESCO Brazil. These respectively include: *Edukatu*, *Escola Digital*, and *Ciênsação*. The other two initiatives, e-Unicamp (*Universidade de Campinas — Unicamp*) and Network for Exchange of Educational Production are government-funded, which means their sustainability could be negatively impacted if they government decides to discontinue their funding. The lack of clear policies and/or instructions on available OER initiatives and corresponding sites also compromise their sustainability. For example, initiatives such as the Teacher's Portal (*Portal do Professor*), which are aimed at providing closed resources (with free access) and OER and fostering collaborative practices lack clear policies with regard to how users can use, retain, reuse, revise, remix and redistribute these resources.

Still in terms of sustainability, 'while abroad there are specific funding lines and ongoing support for OER projects and actions, in Brazil organizations and funders have not yet turned to this area with due attention'.[220] Furthermore, OER initiatives that are funded by the federal government or other governmental organizations such as the MEC are subject to be discontinued if they lack financial and/or resource commitments. It is worth noting that Brazil has recently held general elections, including for presidency. Thus, at this time it is difficult to assess which or how many government-funded OER initiatives will continue to receive funding with the new government. As an example of this, on the website of the Curriculum + initiative, which is funded by Secretary of Education of the State of São Paulo, there was a disclaimer stating that 'in compliance with the law that governs elections (Law 9,504 / 1997), the remaining contents of this site will be unavailable from July 7, 2018 until the end of the state election in São Paulo'. Implications for this are that

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[216]   CIEB (2016). Adoção das tecnologias nas redes estaduais de ensino. Resultados do guia Edutec. Retrieved from http://www.cieb.net.br/wp-content/uploads/2017/04/Relatório-Guia-EduTec.pdf

[217]   Lane, A. (2012). A review of the role of national policy and institutional mission in European distance teaching universities with respect to widening participation in higher education study through open educational resources. *Distance Education, 33*(2), 135-150

[218]   Truong, A. (2015). Why connecting the billions of people who are offline requires more than just cables (or even drones) [Web log post]. Retrieved from http://qz.com/508155/why-connecting-the-billions-of-people-who-are-offline-requires-more-than-just-cables-or-even-drones/

[219]   OER Regional Consultation (2017, April 3). OER for inclusive and equitable quality education: from commitment to action. Proceedings from the Latin America and Caribbean Regional Consultation on Open Educational Resources, São Paulo, Brazil (pp. 3-32). Retrieved from http://rcoer.col.org/uploads/2/2/8/4/22841180/lac_rcoer_report_final.pdf

[220]   Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 248

it will basically be up to the future candidates elected to decide which initiatives will be continued and which will be discontinued. In general terms, privately funded initiatives such as REA Dante (OER Dante Alighieri Elementary and High School), *Programaê*, *Porto OpenCourseWare* (OpenCourseWare of the Visconde de Porto Seguro Elementary and High School), and Escola Digital (Digital School) appear to be more sustainable in the long term since they are not contingent on public funds. Finally, although the National Textbook Plan (*Plano Nacional do Livro Didático*) (2019 and 2020) initiative was recently approved, in Brazil textbook publishing companies still possess great economic, political and media power. Thus, these publishing companies are concerned with regard to the sustainability of OER practices and how such practices will affect their market power. There is therefore a need to provide publishers with new business models, which can provide sustainability for their business. To conclude, the sustainability of OER initiatives is a real issue of concern and further research is required to assess the sustainability of ongoing and future large-scale publicly funded OER initiatives.

RESEARCH AND EVALUATION

This section focuses on research and evaluation efforts around OER use and consideration of key issues that need to be researched. In Brazil, there is still a gap in literature on the topic of OER but this gap is gradually decreasing given the number of academic articles that have already been published.[221] In addition, there has been little empirical research on teachers' use of OER in K-12 public education in Brazil.[222] Zancanaro and Amiel (2017) conducted a bibliometric analysis of the Portuguese-language research on OER published until May 2015 gathered from multiple databases and journal. From data collected during two stages the scholars identified 107 selected scientific publications divided into the following categories: 33 articles published in journals, 29 works published in conference proceedings, 16 book chapters, two books, 17 dissertations, four theses and one postdoctoral report. In terms of main authors, institutions and countries, 'a total of 169 different authors were identified'.[223] It is worth noting that 'Brazil stands out with 77.5% of the authors, which one might expect given its size and population. Portugal has 14.2%, the UK has 5.9%, the US has 1.2%, and Germany and South Africa have 0.6%, completing the list of countries with authors publishing in Portuguese'.[224] The list that follows provides references or relevant links (URLs) to significant research (works that have been highly cited) publications in the Portuguese language in Brazil:

- *Recursos Educacionais Abertos: práticas colaborativas e políticas públicas* (The OER Book).[225]

- *Educação aberta: Configurando ambientes, práticas e recursos educacionais* (Open Education: Configuring Environments, practices and educational resources).[226]

- *Professores-autores em rede* (Networked teacher-authors) [227]

- *REA: O debate em política pública e as oportunidades para o mercado* (OER: The debate in public policy and market opportunities)[228]

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[221] Zancanaro, A. & Amiel, T. (2017). The academic production on open educational resources in Portuguese. *RIED: Revista Iberoamericana de Educación a Distancia, 20*(1), 81–104.

[222] Vladimirschi, V. (2018). Professional Development Guidelines for OER: A Case study of Brazilian Fundamental Education Public School Teachers [Unpublished doctoral thesis]. Athabasca University, Alberta, Canada.

[223] Zancanaro, A. & Amiel, T. (2017). The academic production on open educational resources in Portuguese. *RIED: Revista Iberoamericana de Educación a Distancia, 20*(1), p. 91.

[224] Ibid

[225] Santana, B., Rossini, C. and Pretto, N.D.L. (2011). Recursos Educacionais Abertos — Práticas Colaborativas e políticas Públicas. Retrieved from http://www.aberta.org.br/livrorea/livro/livroREA-1edicao-mai2012.pdf

[226] Amiel,T.(2012).Educaçãoaberta:configurandoambientes,práticaserecursoseducacionais.Retrievedfromhttp://aberta.org.br/livrorea/artigos/educacao-aberta-configurando-ambientes-praticas-e-recursos-educacionais/

[227] Pretto, N. (2011). Professores-autores em Rede. Retrieved from http://cev.org.br/biblioteca/professores-autores-em-rede/

[228] Rossini, C. & Gonzalez, C. (2012). REA: o debate em política pública e as oportunidades para o mercado. In B. Santana, C. Rossini & N.L. Pretto (eds). *Recursos educacionais abertos: práticas colaborativas e políticas públicas*, *1* (pp. 35–70).

- *Educação Aberta: Histórico, práticas e o contexto dos recursos educacionais abertos* (Open Education: History, practices and the context of OER.[229]

The OER Book is the most referenced Brazilian work, which provides evidence of the book as a milestone in creating awareness on the subject in Brazil (and perhaps abroad).[230]

Findings from Zancanaro's and Amiel's (2017) study also indicate that

> *Most of the analyzed works (46.7%) were written by a single author; 18.7% by two of them; 20.6% by three; 10.3% by four; 1.9% by five, and 1.9% by six authors. Data indicate that academic production is spread amongst a large number of authors and institutions. Despite the existence of institutions that have more salient production it cannot be concluded that there is a core group producing knowledge on OER. A small group of authors have a regular and significant production on the theme, which is not reflected in the representation of the institutions. This means that authors who produce more on the theme are not necessarily linked to the institutions with the largest number of affiliated authors. (p. 98)*

Finally, Brazil does not yet have any open access journals such as *IRRODL*[231] and *Open Praxis*[232.] However, it has participated in the *Workshop Open Educational Resources (WREA)* which held its second meeting during the Brazilian Congress of Computing in Education in 2015 and its latest one in 2017. Additionally, most of the major open education and OER conferences are held abroad in the English language. Implications for this are that authors or researchers who are not affiliated to any institution may prefer to publish their studies in international open access journals in English so as to obtain international visibility. However, as Zancanaro and Amiel (2017) quite rightly point out there is need for 'future studies to investigate the production networks around OER and OE starting with authors and their institutions, regardless of the language of the work itself'.[233]

Research on OER that has been conducted during the past couple of years in the Portuguese language, is quite rigorous. Most research reports provide a clear, evidence-based rationale for how the implementation of existing OER policies could greatly reduce costs of educational material. For example, Rossini's and Gonzalez's (2012) report entitled OER: The debate in public policy and market opportunities, which is included as a chapter in the 'OER Book' (Recursos Educacionais Abertos: práticas colaborativas e políticas públicas), provides a thorough description of the three programmes operated by the Brazilian federal government geared towards the textbook: the PNLD (National Textbook Programme), the PNLEM (National Textbook for Secondary Education), and the PNLEM (National Textbook Programme for Youth and Adult Literacy). It is important to stress that in Brazil the federal government is the main funder and purchaser of educational materials. The PNLD is aimed students enrolled in elementary education. The PNLEM is aimed at students enrolled in secondary education and the PNLEM is geared towards youth and adults that have already completed regular school phases but desire to continue their education to obtain formal diplomas. Data from 2010 reveals that the Brazilian government's public investment in teaching materials for the National Textbook Programme (PNLD) was of approximately USD216,158,859, including acquisition, distribution, and quality control expenses.[234] In the light of this tremendous expenditure and the overall structural weakness of this programme, the authors present not only evidence but also a compelling rationale, which takes into consideration existing OER policies and open textbook initiatives in the US. With basis on this analysis Rossini and Gonzalez (2012) provide sound recommendations and solutions for government authorities. These include:

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[229] Dos Santos, A.I. (2011). Educação aberta: histórico, práticas e o contexto dos recursos educacionais abertos. Retrieved from http://aberta.org.br/livrorea/artigos/educacao-aberta-historico-praticas-e-o-contexto-dos-recursos-educacionais-abertos/

[230] Zancanaro, A. & Amiel, T. (2017). The academic production on open educational resources in Portuguese. *RIED: Revista Iberoamericana de Educación a Distancia, 20*(1), p. 97.

[231] The International Review of Research in Open and Distributed Learning. (no date) Home Page. Retrieved from http://www.irrodl.org/index.php/irrodl

[232] *Open Praxis*. (no date). Home Page. Retrieved from https://openpraxis.org/index.php/OpenPraxis

[233] Ibid, p.99

[234] Rossini, C. & Gonzalez, C. (2012). REA: o debate em política pública e as oportunidades para o mercado. In B. Santana, C. Rossini & N.L. Pretto (eds). *Recursos educacionais abertos: práticas colaborativas e políticas públicas*, 1, 35–70.

- The separation in the PNLD of the acquisition phases of the contents and acquisition of the printed books, accompanied by a distinct policy of copyright;

- Instead of buying only the books printed directly from the publishers, the government should first acquire the authors' copyright, reward them with remuneration that values the creative work and, secondly, order the production of books by means of competition between companies capable of carrying out the editorial production of the works, according to the technical parameters required by the government;

- Taking advantage of the fact of owning the copyright, the government should make the books available on the Internet with a licence that allows the non-commercial use of the works. The provision of the content of all textbooks acquired annually by the PNLD on the Internet through a licence authorizing the non-commercial use of the works, including copying by reproduction or other means, would have many positive effects on the teaching and learning process across the country. The main ones would be the increase of the theoretical and pedagogical diversity, the promotion of the autonomy of the teacher within the classroom and a relative emancipation of the process of teaching and learning in relation to the school manual.[235]

These recommendations were extremely useful and have resulted in a new policy for the PNLD (see section on OER Policies).

Another excellent example of a clear, evidence-based rationale for how policy and OER can be aligned comes from Dos Santos (2011) in her report entitled *Open educational resources in Brazil: State-of-the-art, challenges and prospects for development and innovation*. In this report Dos Santos (2011) provides clear guidelines and/or directives that clearly demonstrate how OER can be used to achieve the strategies and goals of the PNE (National Education Plan).

However, there are some key research questions/issues that are currently not receiving the due attention regarding OER in Brazil even though the OER movement in Brazil is relatively new. First, what are the financial commitments of the federal government in terms of existing and new policies for OER adoption and use? How will new (or existing) policies be funded? How much money will be allocated for OER training? Second, how will sustainability be ensured? Third, what actions or plans will be undertaken by the federal government to ensure that all public basic education schools have proper and reliable infrastructure to use OER? What are the financial commitments for these actions to be achieved? Fourth, regarding one particular policy named *Política da Educação Conectada* (Policy of Connected Education) (Decree 9204/2017), which is an initiative 'that has among its four pillars, one dedicated exclusively to educational resources, associated with a project vision, technological infrastructure and teacher training'[236] how will teacher training be delivered? Practical implementation actions by the government and both public and private education sectors are paramount to disseminate OER adoption and use. Fifth, what strategies should or will be used to instill and promote a culture of collaboration among educators, which is currently one of the great barriers to OER use in the country? Finally, what actions or mechanisms should be in place, if any, to ensure the quality of locally produced OER? Quality control is usually more effective if it is undertaken by teachers than by policy makers. This is because teachers are the ones who are using the resources in their classes and can validate their effectiveness with their students.

Conclusion

To enable Brazil to realize the educational potential of OER more effectively, the following is recommended.[237]

1) To promote and ensure sustainability of OER initiatives and policies:

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[235] Ibid, p.67.

[236] Amiel, T., Gonsales, P. & Sebriam, D. (2018). Recursos Educacionais Abertos no Brasil: 10 anos de ativismo. *EmRede-Revista de Educação a Distância, 5*(2), 246–258, p.255

[237] The majority of the actions recommended are more focused on basic education than on higher education.

- All existing policies could contain clear financial or resource commitments (i.e., financial plan) so as to assess and ensure their sustainability.

2) To instill and promote a culture of collaboration:

- In both higher education and basic education sectors, encourage publicly-funded or privately-funded institutions that already use OER to open up their OER repositories to other schools or institutions. This may help foster collaborative practices and communities of practice focused on OER use.

3) To providing professional development on OER taking into consideration pedagogical, organizational, and infrastructure support factors:

- Identify champion teachers to obtain bottom-up buy-in adoption of OER. Teachers' bottom-up buy-in and adoption of OER is always more effective than any top-down government or institutional OER policy mandate.[238]

- Provide clear guidelines for OER professional development programmes and best practices on OER use and reuse in existing repositories or portals.

- Provide training to school administrators and pedagogical coordinators so that they can make informed decisions regarding how OER could be best implemented.

- Provide stakeholders with the pedagogical readiness that focuses on the fit between ICTs, OER and current teaching and learning practices to plan and support new practices.

- Provide incentives, bonus or competitions that stimulate the use of OER and that help teachers to feel more professionally valued so that they are more willing to embrace innovate practices.

- The professional development curriculum for pre-service and in-service teachers could include a detailed specification with clear objectives and learning outcomes for how OER can be integrated across disciplines.

- 'Policymakers could think of mechanisms and support for schools in purchasing equipment, providing technical support and help them in defining and creating local access policies'.[239] This could help mitigate some of the infrastructure problems of some basic education schools.

- Provide teachers with practical, hands-on professional development by giving clear examples of existing OER and by providing step-by-step instructions on how to locate, use, adapt, remix and license locally contextualized OER using open licences or CC licence. For teachers who have poor or limited Internet access, provide face-to-face professional development opportunities.

- Provide ongoing facilitator support (e.g., instruction for a significant duration of time, support teachers during the implementation phase and provide active and collaborative learning opportunities for teachers) for scaffolding engagement and learning in order to progressively empower teachers to gain the autonomy and confidence required for learning about OER.

- Develop teachers' digital capability and skills with the technology being used by demonstrating how this technology can be employed to improve instructional strategies and policies. Teachers need to possess certain ICT-related skills before OER can be considered.

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238   Cox, G. & Trotter, H. (2016). Institutional culture and OER policy: How structure, culture, and agency mediate OER policy potential in South African universities. *The International Review of Research in Open and Distributed Learning, 17*(5),1-18. doi:10.19173/irrodl.v17i5.2523

239   T. Amiel, personal communication, April 8, 2018

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Canada

Introduction

The focus of the Canadian case study is on the Higher Education Sector. There is very little OER activity at the school level in the Canadian provinces other than various efforts by individual teachers. Similarly, in the private training sector, OER use tends to be based on individual trainers' interests.

The open content movement began in Canada in the 1990s, as an outgrowth from several pan-Canadian research collaborations sponsored by the federal government's now defunct Office of Learning Technologies. These projects supported the development of learning objects and the online applications, standards, repositories etc. necessary for facilitating access to online educational content. At a very early stage, it became apparent to the participants that copyright restrictions were seriously impeding the sharing of learning objects among different institutions and individuals.

In the early 2000s, the federally funded CANARIE[240], which was charged with the advancement of Canada's knowledge and innovation infrastructure, provided a major grant to support an innovative research project called *eduSource*.[241]This was a focused pan-Canadian collaboration to address the problems related to accessing digital learning content using Canada's high bandwidth research network. This project included educational institutions across the country who developed basic principles for the design and construction of an open network of interoperable learning object repositories. As the research project developed, the participants had to address many learning, logistical, and legal problems. It became apparent that a most serious problem was not technological, but rather that of digital rights management. For applications under development, participants realized early on that if institutions uniquely owned and controlled their own work, that the system would become unworkable; legal agreements among institution in Canada would become too onerous and time consuming. Thus, the researchers decided to use open source licences for the entire repository infrastructure.

Once the first applications were tested, it became even more apparent to all that digital rights management was a most serious issue, so a blueprint was developed to address it. In addition, an open source application was built, led by Stephen Downes of the National Research Council, to enable the transfer of resources and their metadata for use by different eLearning systems or agents. Employing this application, a user searching for learning

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[240]   CANARIE@25. (no date). Home Page. Retrieved from https://www.canarie.ca
[241]   See McGreal, R., Anderson, T., Babin, G., Downes, S., Friesen, N., Harrigan, K., Hatala, M., MacLeod, D., Mattson, M., Paquette, G., Richards, G., Roberts, T. and Schafer, S. (no date). EduSource: Canada's Learning Object Repository Network. Retrieved from http://www.itdl.org/Journal/Mar_04/article01.htm

objects or other resources would be informed of the conditions and methods for accessing them. This process of ascertaining the different digital rights of content in the repositories became very complicated and began to seriously impede the ability of the different institutions to share their content. After much discussion, it was agreed that, like the software produced in the project, the content too must be open in order to facilitate the level of sharing needed to enable the repositories and search engines. At this time, the Creative Commons (CC) licences became available, which greatly facilitated this opening of content.

In 2003, an organization of higher education institutions was created in British Columbia, Canada's most western province. Called BCcampus, this network was financed by the provincial government and grants were provided to institutions to develop online content. After province-wide discussions, the participants became comfortable with sharing the content developed with this grant money, but only agreed to sharing among non-profit institutions within the province and not externally. To accommodate this, BCcampus created the BC Commons licence.[242]

BCcampus employees established close relations with OER supporters in the western United States, participating in Open Education conferences, which began in Utah. These US conferences became annual events, and some were held in Vancouver, sponsored by BCcampus. This brought more awareness of OER in western Canada. Later, in Alberta, Athabasca University (AU), Canada's Open University began experimenting with OER. In 2010, Access Copyright,[243] Canada's licensing agency for educational content decided to increase its pricing from CAD3.38 per students to CAD45. This led to AU and several other western universities foregoing licensing agreements with this agency and focusing more on accessing OER for their course content. This orientation lead to the establishment of a UNESCO/Commonwealth of Learning Chair in OER at AU.

However, the primary impetus for the OER initiatives in Alberta and in western Canada was the 2012 UNESCO Paris Declaration on OER[244] which, in 2013, led to the Council of Ministers of Education Canada (CMEC) supporting OER to enhance learning and accessibility. The CMEC is a body that represents the Ministries of Education (both higher education and schools) in all the provinces and territories. The ministers were also influenced by the US government's support for opening access to publicly funded publications. The Commonwealth of Learning (COL)[245]also played an important role. It is based in Vancouver, BC and has been a world leader in supporting OER. In Canada, COL personnel spoke at several key meetings with educational leaders in Western Canada. COL also supported the creation of the UNESCO/COL Chair in OER at Athabasca University.[246] The International Council for Open and Distance Education (ICDE) later supported this Chair. The international OERu consortium, has also been active in Canada, with members in BC, Alberta and Ontario. Creative Commons in the USA and the Open Education Consortium (OEC) also participated in discussions, promoting OER in the western provinces. OEC also held an international conference on OER in Alberta in 2015, where the Alberta OER initiative[247] was first announced.

At this time three western provinces, Alberta, British Columbia and Saskatchewan signed The Memorandum of Understanding on Open Educational Resources.[248] They declared a wish to collaborate on the development of common OER within their respective advanced education sectors; they also recognized the benefits of sharing existing OER with a focus on mutual areas of interest.

[242]   Shareable Online Learning Resources. (no date). Summary of BC Commons License (Version 2.0). Retrieved from https://solr.bccampus.ca/wp/summary-of-bc-commons-license-version-2-0/

[243]   Access Copyright. (no date). Home Page. Retrieved from https://www.accesscopyright.ca/

[244]   UNESCO. (2012). The Paris OER Declaration 2012. Retrieved from https://en.unesco.org/oer/paris-declaration

[245]   Commonwealth of Learning. (no date). Home Page. Retrieved from https://www.col.org/

[246]   Athabasca University. (no date). Athabasca University UNESCO/COL Chair in Open Educational Resources — Professor Rory McGreal. Retrieved from https://unescochair.athabascau.ca/team/chairholder

[247]   Alberta OER. (no date). Home Page. Retrieved from http://albertaoer.com/

[248]   Memorandum of Understanding — Open Educational Resources, between Alberta Ministry of Innovation and Advanced Education, British Columbia Ministry of Advanced Education, and Saskatchewan Ministry of Advanced Education. (2014). Retrieved from https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/NWP%20-%20MOU%20-%20March%202013.pdf

With awareness of OER growing at Athabasca University, the Graduate Students' Association wrote a report on OER,[249] which was used by student groups to lobby the Alberta Ministry of Advanced Education[250] for OER support. This lobbying, along with that supported by the UNESCO/COL Chair in OER convinced the ministry officials to support a symposium for higher education leaders on OER. Invited speakers included the UNESCO/COL Chair, student representatives, as well as Creative Commons and BCcampus personnel. This symposium was followed with the Department's support for the CAD3 million Alberta OER initiative, which was a three-year government funded programme designed to assist with reducing the costs of post-secondary education for students; and provide students and faculty members with the flexibility they need, offering updated, relevant content for learning.[251]

Contact North/Contact Nord[252] in Ontario led the support for OER there, sponsoring a series of webinars and on-campus workshops on OER. They hosted the 27th ICDE World Conference in Toronto in 2017, with an emphasis on open learning.[253] Prior to the conference, Maxim Jean-Louis, CEO of Contact North, was in contact with the Ontario Minister of Higher Education as they were initiating the founding of eCampus Ontario.[254] The Minister and Deputy Minister, along with the acting CEO of eCampus Ontario were invited to the 2015 ICDE Global Conference in Sun City, South Africa where they met with several Chairs in OER and participated in detailed discussions about OER. In a further development, they hired Dr David Porter, the founder of BCcampus as CEO of the eCampus, with a clear message of support for OER, since Dr Porter had been advising the Ministry and organizations in Ontario based on his BCcampus experiences. Since then, eCampus Ontario has proven to be a Canadian leader in OER initiatives.

There has been very little OER activity in Quebec, Canada's francophone province, although, an OER declaration was released by the Organisation internationale de la francophonie,[255] at a meeting in Moncton in 2013. This created some interest in Quebec, but with no specific government or institutional commitments, although some organizations like THOT — Cursus [256] and BRER-Licef[257] were adding Ressources éducatives libres (REL) to their repositories.

The main problem for OER growth in Canada is the lack of awareness. When faculty become aware of the existence of OER there is rarely any resistance, and the idea of OER has grown in acceptance and is supported when faculty and administrators become aware of it. However, this support for OER does not necessarily translate into concrete actions or OER implementation, as this depends heavily on the individual academic or administrator. Most faculty tend to not spend much of their time on creating or adapting lesson content, but are more research focused. They usually want a full package of content, for example a textbook, with online exercises and examination questions. Some OER do now consist of these full packages, but there are not many. Most OER consist of lessons or modules that must be adapted to fit into course curricula.

As an example, a Computer Science instructor at a university, was charged with developing a new course in Green Computing. He estimated that this course project would take about one year. He was advised to check out if any OER on this subject existed. He looked online and found a full OER course entitled 'Green Computing' and it was being delivered at an Australian university. He examined the course and found that it met nearly all his needs; it was even formatted for MOODLE, the Learning Management System in use at his university.

[249] Coffin, M. (2012). Canada's Contribution to the Commons: Creating a Culture of Open Education. Edmonton: Athabasca University Graduate Students' Association. Retrieved from https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/20120914%20-%20augsa%20-%20open%20education%20canada.pdf

[250] Government of Alberta. (no date). Ministry of Advanced Education. Retrieved from https://www.alberta.ca/ministry-advanced-education.aspx

[251] AlbertaOER. (no date). Home Page. Retrieved from http://albertaoer.com/

[252] Contact North/Contact Nord. (no date). Home Page. Retrieved from https://contactnorth.ca/

[253] World Conference on Online Learning — Teaching in a Digital Age — Re-thinking Teaching & Learning. (2017). Home Page. Retrieved from http://onlinelearning2017.ca/en/

[254] eCampus Ontario. (no date). Home Page. Retrieved from https://www.ecampusontario.ca/

[255] Organisation internationale de la francophonie. (no date). Vers Un Plan d' Action de l'oif Sur Les Ressources éducatives Libres Dans l'Espace Francophone. Retrieved from https://www.francophonie.org/Vers-un-plan-d-action-de-l-OIF-sur.html

[256] THOT — Cursus. (no date). Home Page. Retrieved from https://cursus.edu/

[257] Banques de ressources éducatives en reseau. (no date). Home Page. Retrieved from http://brer.licef.ca/

All he needed was to add Canadian examples, which he did and then shared them with his Australian colleague. Another business professor found that her very expensive textbook (+CAD200) came with explanations and applications that were difficult to comprehend and use. She also wanted to use another application that the students really liked. She found an OER textbook and combined it with the favoured application to deliver her course. She has now delivered the course using this OER text over three years to more than 2,000 students at a saving of more than CAD400,000.[258]

OER POLICIES

There are no policies on OER in any province/territory, or in any institution in Canada. Moreover, OER were not worthy of mention in a major report on post-secondary education in Canada released in August 2018.[259]

Although not a policy, reference should be made to the University of British Columbia's *Guide to Reappointment Promotion, and Tenure Procedures* [260]where evidence of inclusion of content in 'open repositories/resources' has become part of the criteria for promotion in the Education Leadership stream. Also, the Registry of Open Access Repositories[261] reports on 23 institutions and organizations in Canada that have open access policies, beginning with Athabasca University in 2006.

Educational materials produced by the provinces and the federal government are restrictively licensed using 'crown copyright'. This generally (but not always) allows for the free educational use of content, but the different provinces have their own versions, which although similar, are not the same. Several federal government departments have removed 'non-commercial' restrictions so there is a trend towards more openness allowing government documents to be freely used by both public and private sector organizations. The relevant federal legislation is the Copyright Act,[262] Section 12, which applies to all works 'prepared or published by or under the direction or control of Her Majesty or any government department.' This is called crown copyright and is perpetual.

The provinces have legal responsibility for education and have some control over educational content, restricting its use to public institutions within the province. In Ontario, Canada's largest province, The Queen's Printer[263] allows for open access to some content, including for education, and even for commercial purposes under its Open Government Licence.[264] Similar licences are available from the Queens Printer in the other anglophone/bilingual provinces and territories.[265] The exception to this is Les Publications du Québec[266] and other departments of the Quebec government that have restrictive copyright licences requiring permissions even for educational purposes.

While there are no policy commitments by any government in Canada, several provincial governments have provided funding for OER initiatives. For example, the British Columbia (BC) Government provides ongoing financial support to BCcampus to finance OER initiatives at higher education institutions within the province. The Ontario Ministry of Advanced Education and Skills Development created eCampus Ontario in 2016, which supports OER

[258]   Jensen, T. (2018). A Flexible OER Implementation Using a Commercial Application at Athabasca University, Alberta, Canada. Retrieved from https://teachonline.ca/tools-trends/flexible-oer-implementation-using-commercial-application-athabasca-university-alberta-canada

[259]   Usher, A. (2018). *The State of Post-Secondary Education in Canada, 2018*. Toronto: Higher Education Strategy Associates. Retrieved from http://higheredstrategy.com/wp-content/uploads/2018/08/HESA_SPEC_2018_final.pdf

[260]   The University of British Columbia. (2018). Guide to Reappointment, Promotion and Tenure Procedures at UBC. Retrieved from http://www.hr.ubc.ca/faculty-relations/files/SAC-Guide.pdf

[261]   See http://roar.eprints.org/view/geoname/

[262]   Justice Laws Website. (1985). Copyright Act. Retrieved from https://laws-lois.justice.gc.ca/eng/acts/c-42/

[263]   Service Ontario. (no date). Copyright Information: © Queen's Printer for Ontario. Retrieved from https://www.ontario.ca/page/copyright-information-c-queens-printer-ontario

[264]   Government of Ontario. (no date). Open Government Licence — Ontario. Retrieved from https://www.ontario.ca/page/open-government-licence-ontario

[265]   See Crown Copyright: Canada for further information — https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Crown_copyright.html

[266]   Publications Québec. (no date). Authorization to reproduce government material. Retrieved from http://www.droitauteur.gouv.qc.ca/en/autorisation.php

initiatives financially.[267] This support is ongoing. The Alberta (AB) Ministry of Advanced Education in 2014 supported a major OER initiative with a CAD3 million grant. This initiative led to more than 30 OER projects and reportedly brought savings to students and institutions amounting to millions of dollars. The province of Manitoba (MB) also opened a small open textbook initiative with Campus Manitoba, which entails reviewing and adapting BCcampus open texts for local use.

Funding for support of OER is available within present structures. To promote OER use and sustainability, finances can be diverted from programmes that presently consist of payments to large, mainly foreign, publishers, and used to support OER programmes. For example, the removal of a CAD200 textbook from a course represents a significant saving for students. A small student fee could then be applied that can be used for OER adoption and assembly. Another possibility to promote sustainability while supporting the local economy is to pay local publishers with the OER funds to print or digitally enhance the content, providing that they allow the government and institutions to retain the copyright using a Creative Commons licence. In addition, most institutions spend considerable time and money in chasing down and requesting copyright permissions from publishers and authors. As the use of OER increases, these costs are reduced and can be diverted to supporting the introduction of even more OER.

OER mandates are not a requirement in any jurisdiction in Canada. However, OER produced under grant-supported OER initiatives in BC, Alberta and Ontario must be licensed as Creative Commons Attribution enabling online sharing of OER that have been created. Furthermore, as noted above, 'crown copyright' generally allows for the free educational use of content, and the freedom of educational institutions to freely use government publications.

To date the principal mechanism for the sharing of OER, at least as textbooks or courses would be BCcampus Open Ed,[268] which is a repository for storing these OER. Both Alberta, Manitoba and eCampus Ontario have agreed to share their OER textbooks etc. and/or partner with BCcampus on improving and enhancing this repository. The Open Textbook Library of eCampus Ontario is also partnering with BCcampus and Manitoba on developing systems and processes for reviewing and adopting online textbooks.

A principal concern in Canada is that the responsibility for education is devolved to the provinces and so there can be no national/federal involvement in education. The federal government can and does sponsor training for the workplace and for research in the universities as part of their mandate but cannot legally take responsibility for education. The Council of Ministers of Education Canada (CMEC),[269] representing all the provinces and territories does meet every year and, as mentioned above, expressed support for the Paris declaration on OER. This declaration, along with the influence of the Commonwealth of Learning, based in Vancouver and the US government's support for open access of publicly funded content[270] all had a significant influence in convincing some provincial ministers to support OER as noted above.

The free sharing of OER can be regarded as essential for promoting the creation of content. Commercial publishers can technically control how, when, where, and with what specific brands of technological assistance that licensees are able to access content and applications. For example, some ebook publishers abridge the content and ensure that it is so difficult if not impossible to read that it becomes worthless as an educational tool. Moreover, publishers also deliberately cripple their devices to ensure that only their 'approved' uses are possible. This is often problematic for disabled users. The visually impaired, for example are denied use of a text to speech function and in many cases cannot even increase the text size. Moreover, many proprietary systems still disable highlighting, annotating,

267   ECampus Ontario. (no date). Tap into a World of Open Knowledge. Retrieved from https://www.ecampuson-tario.ca/open-education-resources/
268   BCCampus OpenEd. (no date) Find Open Textbooks. Retrieved from https://open.bccampus.ca/find-open-textbooks/
269   Council of Ministers of Education Canada. (no date). Home Page. Retrieved from https://www.cmec.ca/en/
270   Stebbins, M. (2013). Expanding Public Access to the Results of Federally Funded Research. Retrieved from https://obamawhitehouse.archives.gov/blog/2013/02/22/expanding-public-access-results-federally-funded-research

hyperlinking, and even dictionary access — and these features are important for educational uses. Frequent traveling students and teachers are also handicapped when 'Geo-Blocking' (restricting access to different types of data and contents based on the geographical location of the user) is included in the applications they use. For example, commercial content purchased in Canada will not work in the UK or France.

Different formats are nearly always problematic when mixing and mashing materials. OER can be changed and altered for use in different formats without permission unlike commercial content. Hyperlinking is a normal learning activity that is often disabled in commercial applications. The devices are often purposely crippled, or proprietary standards are used so that content and applications cannot be ported to other devices. Permissions of all kinds also need to be re-sought for tampering with the material for reuse, re-purposing or mixing, even when fair dealing allows for it. This can become an impractical burden putting a real damper on any attempts to provide learning for all, which relies on the existence of large collections of open and accessible resources.

Technological Protection Measures (TPM), otherwise known as Digital Rights Management (DRM) refers to digital locks that commercial publishers attach to their content. TPM restricts (or cripples) the user's device, while tracking their activities. It is used by publishers to control, limit and restrict how students and others can use their materials. These restrictions extend to both the hardware and the software. DRM can limit the devices that you are able to employ in accessing an application or content. It can restrict you to using the proprietor's website and purchasing the proprietor's materials under strict licensing conditions, determining how, when, where you can use the application or content and with what devices. Online learning is particularly affected by DRM. Learning environments need flexibility and cannot live with commercial restrictions that limit the capabilities of digital media. Learning is also based on trust among the participating students and instructors. As they share resources, the participants must have confidence that their personal information is not used for purposes other than those of learning and sharing with other students and the teacher.

DRM are further supported by End User Licence Agreements, prohibiting users from accessing content or changing parameters in the content even if they have a fair dealing right to do so. These digital licences wherein users must click on 'I Agree' in order to access the content or applications are also a major impediment to learning. Licensing restrictions can add needless complications to downloading the content, sometimes making it so difficult that users simply give up. Format shifting, as has been noted is made technically difficult, and this is reinforced with these restrictive licensing that prohibit the practice. Even if one wants to retain the same format, proprietary content is licensed to only one computer ('for use solely on this device'), so students who switch computers even with the same operating system are often restricted from doing so, or at a minimum they must contact the owners and request special permissions. Licences prohibit, not only copying and printing, but also modifying, removing, deleting, and augmenting (improving) or 'in any way exploiting any of the eBook's content'. Licences also prohibit the transfer of content to other students, for example when teachers wish to use a variety of devices with different groups of students in later semesters.

Application licences also exempt the publishers from ALL liability under consumer protection law. There is no 'product' to purchase. The 'purchaser' has no rights, and no requirements are placed on the publisher, nor is there any requirement that the application even works. And, the publishers have no liability if they decide to remove an application or any content for whatever reason, legitimate or otherwise. They can also change these and other clauses of the contract at any time. Whenever software is upgraded the contract can be changed and often is, but rarely for the benefit of the user.

Another issue of major importance in promoting OER is that of raising awareness among students and faculty in Canada. Even after more than 15 years of activity, OER are still not commonly known in institutions and governments. There is thus an obvious need for more campaigns to raise awareness that could include local, provincial and national conferences focusing on OER issues.

A side issue, but which seems to be having some effect on OER acceptance in Canada is the 'large and liberal' interpretation of fair dealing by the Supreme Court of Canada,[271] combined with the addition of 'education' as one of the uses for which fair dealing applies in the Copyright Modernization Act[272] 2012. Because of these changes, faculty and institutions at all levels of education are now able to make reasonable use of substantial portions of copyright-restricted content. There is a wide range of restrictively licensed educational content in various forms such as print, and online text, video, podcasts, games, etc. that are reasonably accessible to students without the need for special permissions. These users do not check for an open licence and simply make educational use of whatever content is accessible and so do not see the urgency of adopting openly licensed content.

OER Use and Adoption

Canada has several initiatives supporting OER use and adoption. These are described briefly below:

OpenEd — https://open.bccampus.ca/

An initiative of BCcampus, this BC Open Textbook project is a repository of more than 180 openly licensed textbooks. The initiative is funded by the BC government.

ABOER — http://albertaoer.com/

In the Alberta OER initiative involving higher education institutions in Alberta, the Ministry of Advanced Education provided CAD3 million for OER initiatives in post-secondary institutions. There were more than 30 OER textbooks created. This initiative was funded by the Alberta government.

Open Textbook Initiative — https://openedmb.ca/

This initiative at Campus Manitoba aims to adapt open textbooks from the BC OpenEd repository for use in Manitoba institutions. To date they have adapted more than ten texts. The initiative is funded by the Manitoba government.

Open Textbook Initiative — https://www.ecampusontario.ca/open-education-resources/

This initiative at eEcampus Ontario is for open textbook creation and for sharing them with the BC Campus repository. This project is beginning and has created, adopted and adapted several textbooks. The initiative is funded by the Ontario government.

Open Publishing Infrastructure — https://www.ecampusontario.ca/open-education-resources/

This is a joint eCampus Ontario/Ryerson University initiative to build an open source infrastructure supporting the creation of open textbooks. The project is still in progress and is funded by the Ontario government.

OERu (Canadian partners) — https://oeru.org/

Canadian partners at OERu are Athabasca U, Kwantlen PU, Thompson Rivers U. Chang School at Ryerson Unviersity, Contact North, and BCcampus. OERu is an international initiative with more than 30 partners on five continents. Its goal is to provide OER pathways as courses leading to official credentials free of charge. Students pay for the examination. The first year online initiative is now underway. More than 500 students in 60 countries have participated. The initiative is funded by the OER Foundation, the Hewlett Foundation, and participants.

Commonwealth Education Hub — https://www.thecommonwealth-educationhub.net/oer/

The Commonwealth of Learning, based in Vancouver, is an international association supporting distance education in the Commonwealth countries. It provides aid in open education

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[271]   Judgments of the Supreme Court of Canada. (2012). Alberta (Education) v. Canadian Copyright Licensing Agency (Access Copyright). Retrieved from https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/9997/index.do

[272]   Justice Laws Website. (2012). Copyright Modernization Act. Retrieved from https://laws-lois.justice.gc.ca/eng/annualstatutes/2012_20/page-1.html

policy creation by governments and institutions. It is funded by the Commonwealth of Nations.

UNESCO/COL/ICDE Chair in OER — https://unescochair.athabascau.ca/team/chairholder

This Chair is tasked with researching, supporting and promoting OER institutionally, nationally and internationally, particularly in developing countries. It is part of an international network of more than 13 Chairs responsible for open education research and promotion. Prof. R. McGreal at Athabasca University is the current Chairholder. In Canada, this position is funded by UNESCO, the Alberta government, Athabasca University, and the Hewlett Foundation.

OER Knowledge Cloud — http://oerknowledgecloud.org/

This is a repository of research articles and reports about OER. It is an ongoing initiative of the UNESCO/COL/ICDE Chair. There are now more than 2,200 items in the database. This initiative is funded by Athabasca University and UNESCO.

International Review of Research in Open and Distributed Learning (IRRODL) — http://irrodl.org/

This is a scholarly journal including articles about OER and Open learning issues that is co-edited by the UNESCO/COL/ICDE Chair. The key participating organizations are Athabasca University and AU press. This was the first open access journal in Canada, and it is listed in all the major indexes. Many articles on OER related issues have been published. The initiative is funded by Athabasca University, Social Science and Humanities Research Council, and UNESCO.

Blended and Online Learning and Teaching (BOLT) — http://cde.athabascau.ca/programs/pd/bolt/

This is a new initiative of Athabasca University aimed at promoting OER for teacher training and for use in elementary and secondary schools. One conference for teachers has been held. This initiative is funded by Athabasca University.

Inclusive Design Research Centre — https://idrc.ocadu.ca/

This initiative at Ontario College of Art and Design (OCAD) University supports Open research and development focusing on inclusiveness, addressing issues such as web site and document accessibility and using OER to offer content in alternative formats. It focuses on all levels of education and is funded by various funding agencies including the Hewlett Foundation.

Teaching Fellow in Open Studies — http://jhangiani.socialpsychology.org/

At Kwantlen University, Dr R. S. Jhangiani has been appointed to this position to support and promote OER in his institution and provincially. This initiative is funded by Kwantlen University.

Zed-Cred (Z degrees) — https://bccampus.ca/2018/03/06/zed-creds-are-zooming-ahead-in-b-c/

This Bccampus Zed-Cred initiative is the Canadian version of the US Zee Degree programme, where institutions offer a full degree with no textbook costs for students. One programme leading to a certificate is now available. It is funded by BCcampus.

Creative Commons — http://creativecommons.org

The CEO of this international organization is based in Toronto. It has created the most widely used open licences. It covers all levels of education and is funded by the Hewlett Foundation and private donations.

Open Education Consortium — https://www.oeconsortium.org/

The CEO of this international organization is based in Vancouver. It is the leading organization supporting OER. It grew out of the original MIT open courseware initiative and supports all levels of education. It is funded by the Hewlett Foundation and other sponsors.

It is difficult to determine whether OER is increasing or decreasing investment in the design and development of educational resources. This varies considerably among institutions and even among individual faculty within institutions. For example, in Athabasca University, there have been OER course development projects with provincial grants of more than CAD50K, so these can be classed as increased investment. On the other hand, some faculty have adopted OER courses or textbooks whole, at no cost, and thus have saved significant development time — so decreased investment.

In another example, and as noticed in several implementations, increasing investment in design and development, becomes integral to the introduction of OER, which can be, and usually is, cost-effective because not only are they free of the price of the content, but also free of costs associated with negotiating licences and clearing copyright by contacting publishers or authors. Of course, there are associated costs that exist whether one chooses OER or commercial content or not. These include ICT infrastructure, bandwidth, training, and authoring/adapting/assembling content.

In many cases, OER can also eliminate the duplication of efforts, taking full advantage of commonly available curricula, by incorporating content developed and paid for elsewhere. The ability to change OER is important for educators who wish to adapt or update the content. This can lead to significantly enhancing the quality of the curricula on an ongoing basis, ensuring the design of more effective learning environments. OER can be seen as an investment in higher quality more collaborative learning, because they can be used, reused, adapted etc. at will by teachers, learners, and course designers. OER can make it easy for learners to change, augment, or remove the content and this can form the basis for learners to construct knowledge through collaboration.

Overall, across the country, there is an imbalance between OER efforts using and adapting existing materials compared to producing new material. OER efforts tend to focus on creating new materials rather than adapting or adopting existing OER, and this needs to be addressed. However, as more faculty are becoming aware of the existence of OER in accessible repositories like that of BCcampus, adoption/adaption is beginning to become more common. There is a strong reluctance among many Canadian faculty to adopt US-based courses. In many humanities and social science courses, faculty in Canada have a different orientation than those in the USA. These faculty, in the absence of Canadian content, prefer to create their own resources. Thus, activities tend to focus more on local production rather than adoption/adaption, but this seems to be changing to a more balanced approach.

The main languages in Canada are English and French. The vast majority of OER are being produced in English, although there are some in French. Very few OER are produced in indigenous languages.

The Alberta initiative was open to Canadian First Nations (indigenous) organizations, and several of these organizations used funding provided to raise awareness of OER within their communities. One project was for OER course development at an indigenous college. This college adopted/adapted OER for use in a variety of courses and translated the Creative Commons licence names into the Cree language. In other example, BCcampus is implementing an OER initiative on indigenous education,[273] and Ecampus Ontario is sponsoring an OER project in indigenous story-telling[274] and in indigenous cooking.[275]

These OER initiatives have been supported by government grants. Traditional cultures, practices and processes for procuring textbooks and other content need to change as OER are not sustainable if it relies on special government grants. Sustainability is possible however if the current budgets for textbooks, which can be quite substantial, are diverted to support OER. Most savings at the higher education level have been for

[273] Ebeattie. (2016). Supporting the Indigenization of higher education in B.C. Retrieved from https://bccampus.ca/2016/04/19/supporting-the-indigenization-of-higher-education-in-b-c/

[274] ECampus Ontario. (no date). Digital Indigenous Storytelling. Retrieved from https://www.ecampusontario.ca/research_funding/digital-indigenous-storytelling/

[275] ECampus Ontario. (no date). Open Textbook Initiative. Retrieved from https://www.ecampusontario.ca/open-textbook-funding/

students and not the institutions. At AU, however, where the course fee has always been part of tuition, there have been substantial savings associated with OER adoption. Some of these savings should be allocated towards supporting more OER initiatives. At other universities, an OER development fee at a much lower cost than the average CAD500 — CAD1,000 per year that Canadian students pay for textbooks could be implemented to ensure OER sustainability.

Research

Canadian research on OER issues is very rigorous, as evidenced by the large number of published articles in internationally respected peer-reviewed scholarly journals, and the leading scholarly journal for OER issues: IRRODL. There have been several initiatives in western Canada on the evaluation of OER by faculty in various subject areas (for example, at BCcampus, ABOER, and Manitoba OTI). The preponderance of research points to a wide range of positive results related to OER implementation, particularly cost-savings for students but also more flexibility for instructors including the ability to adapt and update their course content. The evidence is there, but it has yet to be taken seriously by many educational policy makers (with some exceptions) at the institutional and/or provincial levels. Examples of research conducted are:

- Anderson, T. (2002). Telelearning Research and the TeleLearning-Network of Centres of Excellence. *Journal of Distance Education, 17*(3). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.575.3070&rep=rep1&type=pdf

- Annand, D. & Jensen, T. (2017, June). Incentivizing the Production and Use of Open Educational Resources in Higher Education Institutions. *International Review of Research in Open and Distance Learning, 18*(4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3009/4226

- Barker, J., Jeffery, K., Jangiani, R. S. & Veletsianos, G. (2018, July). Eight Patterns of Open Textbook Adoption in British Columbia. *International Review of Research in Open and Distance Learning, 19*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3723/4641

- Blomgren, C. (2018, April). OER Awareness and Use: The Affinity Between Higher Education and K-12. *International Review of Research in Open and Distance Learning, 19*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3431/4584

- Coffin, M. (2012). Canada's contribution to the commons: Creating a culture of Open Education. Retrieved from https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/20120914%20-%20augsa%20-%20open%20education%20canada.pdf

- Conrad, D., Mackintosh, W., McGreal, R., Murphy, A. & Witthaus, G. (2013). The Assessment and Accreditation of Learners using OER Retrieved from http://hdl.handle.net/2149/3384

- Conrad, D. & McGreal, R. (2012, December). Flexible paths to assessment for OER learners: A comparative study. *JIME: Journal of Interactive Multimedia in Education*. Retrieved from http://www-jime.open.ac.uk/article/2012-12/html

- Downes, S. (2007). Models for Sustainable Open Educational Resources. *Interdisciplinary Journal of E-Learning and Learning Objects, 3*(1), 29 — 44. Retrieved from https://www.learntechlib.org/p/44796/.

- Ives, C. & Pringle, M. M. (2013, June). Moving to Open Educational Resources at Athabasca University: A Case Study. *International Review of Research in Open and Distance Learning, 14*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1534/2486

- Jhangiani, R. S. & Jhangiani, S. (2017, June). Investigating the Perceptions, Use, and Impact of Open Textbooks: A survey of Post-Secondary Students in British Columbia.

International Review of Research in Open and Distance Learning, 18(4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3012/4214

- McGreal, R. (2006). Learning objects: A practical definition [reprint]. In G. Doctor (Ed.), *Knowledge sharing in academic institutions* (pp. 3 — 18). Hyderabad: Icfai University Press.

- McGreal, R. (2008). A typology of learning object repositories. In H. H. Adelsberger, J.M. Kinshuk, J. M. Pawlowski & D. Sampson (eds.). *Handbook on information technologies for education and training.* Heidelberg: Springer-Verlag.

- McGreal, R. (2013). Creating using and sharing Open Educational Resources. Retrieved from http://hdl.handle.net/11599/44

- McGreal, R. (2017). Special Report on the Role of Open Educational Resources in Supporting the Sustainable Development Goal 4: Quality Education Challenges and Opportunities. *International Review of Research in Open and Distance Learning*. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3541/4433

- McGreal, R. (2018). The impact of Open Education Resources. In M. Jean-Louis (Ed.), *Pockets of Innovation: Contact North/Contact Nord*. Retrieved from https://teachonline.ca/tools-trends/open-education-resources-oer-applications-around-world/taxonomy-term

- McGreal, R., Anderson, T., Babin, G., Downes, S., Friesen, N., Harrigan, K., Schafer, S. (2004). EduSource: Canada's learning object repository network. *International Journal of Instructional Technology and Distance Learning (IJITDL), 1*(3). Retrieved from http://www.itdl.org/Journal/Mar_04/article01.htm

- McGreal, R., Anderson, T. & Conrad, D. (2015). Open Educational Resources in Canada 2015. *IRRODL, 16*(5). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/2404

- McGreal, R., Anderson, T., Friesen, N., Sosteric, M., Hewitt, K., Ring, J., Downes, S. (2002). EduSource: A pan-Canadian learning object repository. *Punto y Como: Revista Interdisciplinaria Universidad del Sagrado Corazon, XI*, 160 — 174. Retrieved from https://www.learntechlib.org/primary/p/8914/

- McGreal, R., Chen, N.-S. & McNamara, T. (2012, June). A comparison of an open access university press with traditional presses: Two years later. *ELPUB2012: Social Shaping of Digital Publishing: Exploring the interplay between Culture and Technology, Proceedings of the 16th International Conference on Electronic Publishing, 14*(3), 231 — 239. Retrieved from http://elpub.scix.net/cgi-bin/works/Show?101_elpub2012

- McKerlich, R., Ives, C. & McGreal, R. (2013). Measuring use and creation of open educational resources in higher education. *IRRODL, 14*(4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1573

- McKerlich, R., Ives, C. & McGreal, R. (2013). *Ready, Set. Go! Researching Institutional Readiness to Adopt Open Educational Resources (OER)*. Paper presented at the Canadian Network for Innovation in Education, Ottawa.

- Porter, D. (2007). BCcampus: Creating a Sustainable Online Learning Consortium. Retrieved from https://www.researchgate.net/profile/David_Porter9/publication/228967943_BCcampus_creating_a_sustainable_online_learning_consortium/links/0c960527c84796b651000000.pdf

- Quirk, D., Anderson, T. & McGreal, R. (2013, April). OER Policies in Canada: A POERUP country report. Retrieved from http://conference.ocwconsortium.org/index.php/2013/2013/paper/view/371

- Stacey, P. (2010). *Foundation Funded OER vs. Tax Payer Funded OER — A Tale of Two Mandates.* Paper presented at the Open ED 2010, Barcelona.Retrieved from Website Foundation Funded OER vs. Tax Payer Funded OER — A Tale of Two Mandates. website: http://hdl.handle.net/10609/5241

- Stacey, P. (2013, June). Government Support for Open Educational Resources: Policy, Funding, and Strategies. *14*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1537/2481

A major function of the university is to assess and 'credentialise' learning by conferring qualifications and degrees. As organizations, universities are well equipped and experienced to assess the quality of learning for formal academic credit. OER are transforming the ways individuals create, share and learn from content that is freely available on the web. The problem is that learners, who access these OER and acquire knowledge and skills either formally or informally, cannot readily receive appropriate formal recognition for their efforts. This is a serious issue for Canada, with a growing number of educated and trained immigrants who cannot get their learning and skills recognized, as restrictive professional groups actively lobby to ensure that these skilled immigrants are provided no routes towards credentialization. There is very little, if any, research in this area. Thus, research is needed on mapping the existing situation, analysing scalable approaches to formal assessment and accreditation, documenting lessons learnt and proposing conceptual frameworks for the implementation of open assessment. This can include research into the efficacy and quality of Prior Learning and Recognition (PLAR)[276] and Challenge-for-Credit[277] approaches.

Most OER research is focused on textual content. There is a need for more OER research on more interactive and/or mobile technologies. These include videos, podcasts, games, etc. along with the impact when using smart phones and tablet computers, as well as recently introduced hearables.[278]

There is very little research being conducted on the cost/benefits and challenges, as well as the impact of transitioning to OER from commercial textbooks at the institutional level. At least some research[279] is pointing to significant positive effects on student retention and even on final grades at the community college level. Of course, because of the lack of OER activity at the school level, there is no Canadian research on school-level implementations.

Conclusion

A major, if not the most important, problem for OER implementation in Canada is still the lack of awareness. The majority of educators at all levels (students, teachers, faculty, administrators, superintendents, ministry cadre, etc.) simply do not know anything about OER and how they can benefit education while introducing substantial cost-savings. A national campaign (or even several provincial campaigns) to disseminate information about OER among the relevant stakeholders, including parents would go a long way in growing support for further OER implementations.

OER awareness can also focus on international initiatives in Canada such as that of the OERu,[280] which is offering pathways to learning along with credible accreditation from participating Canadian and international universities and colleges. The OERu First Year Online programme[281] offers learners the possibility of free access to first year Business courses based

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[276]   Canadian Association for Prior Learning Assessment. (no date). What is Prior Learning Assessment & Recognition (PLAR)/ Recognition of Prior Learning (RPL)? Retrieved from http://capla.ca/what-is-rpl/

[277]   (2014). Challenge for Credit. Retrieved from https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/General/ChallengeForCredit.pdf

[278]   Banks, L. (2019). The Complete Guide to Hearable Technology in 2019. Retrieved from https://www.everyday-hearing.com/hearing-technology/articles/hearables/

[279]   Contact North. (no date). Open Education Resources (OER) Applications from Around the World. Retrieved from https://teachonline.ca/tools-trends/open-education-resources-oer-applications-around-world/taxonomy-term

[280]   OERu. (no date). Home Page. Retrieved from https://oeru.org/

[281]   OERu. (no date). Certificate Higher Education Business (OERu). Retrieved from https://oeru.org/certhe-business/

on OER and leading to officially recognized certificates at public accredited institutions. Learners everywhere need to know that they can take full advantage of such opportunities.

One province must take the lead in implementing OER at the school level. OER initiatives are now underway in more than 26 states in the USA, but Canadian provincial ministries of education and superintendents of school boards have not reacted, either positively or negatively to this US development. If one of the provinces began implementation of OER as a pilot, the others would pay attention.

CHILE

INTRODUCTION

The focus of the Chilean case study is on OER in Higher Education (pertaining to institutional policies) and K-12 School Education (pertaining to national central government policies).

The first higher education institution to embrace OER was Instituto Nacional de Capacitación (INACAP)[282] after being appointed as the representative of MERLOT in Chile. MERLOT Chile has been operating since 2007 and has contributed or adapted OER to the central repository.[283] Between 2009-2010, within the framework of the Spanish-speaking higher education institution consortium Universia,[284] who joined the OpenCourseware Consortium (now called Open Education Consortium), the following Chilean partners shared openly licensed courses:

- Pontificia Universidad Católica (PUC).[285]

- Universidad of Chile.[286]

- Pontificia Universidad Católica of Valparaíso (PUCV).[287]

However, since then only PUCV has published open courses in a sustained manner, publishing more than 30 courses till 2014. In general, resources or materials related to the academic teaching-learning process, has not been an institutionalized strategy nor a trend to follow. Thus, openly licensed courses in Chile appear to be a result of being a partner in the OpenCourseWare Consortium.

This temporary interest can be confirmed with the recent hype around MOOCs, which has seen the same institutions launching new 'open' online courses since 2016. In this context, 'open' is understood as access without prerequisite, although neither institutions have an explicit open licensing framework:

- UAbierta (University of Chile)[288]

- Pontificia Universidad Católica de Valparaíso Abierta (PUCV)[289]

Thus, at the higher education level, OER or openness in general has been a concept that has depended on being part of foreign initiatives (MERLOT or Universia-OpenCourseware

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[282]   It was funded as INACAP Instituto Nacional de Capacitación, (National Training Institute). It was privatized in the earlier 90´s and it created in 2004 the Techological University of Chile — see https://www.inacap.cl
[283]   MERLOT Chile. (no date). Home Page. Retrieved from http://portales.inacap.cl/merlot-chile/index
[284]   Universia. (no date). Home Page. Retrieved from http://www.universia.net/
[285]   Pontificia Universidad Católica de Chile. (no date). OpenCourseWare. Retrieved from http://www7.uc.cl/ocw/
[286]   Universia Chile. (2009). Universidad de Chile publica diez nuevos cursos en OpenCourseWare Universia. Retrieved from http://noticias.universia.cl/vida-universitaria/noticia/2009/06/26/284499/universidad-chile-publica-diez-nuevos-cursos-opencourseware-universia.html
[287]   Pontificia Universidad Católica de Valparaíso. (no date). PUCV OpenCourseWare. Retrieved from http://ocw.pucv.cl/
[288]   Universidad de Chile. (no date). UAbierta. Retrieved from http://www.uabierta.uchile.cl/
[289]   Pontificia Universidad Católica de Valparaíso Abierta. (no date) Cursos. Retrieved from http://abierta.pucv.cl/wordpress/

Consortium). But the concept has not penetrated the stakeholder or decision-making sphere at the institutional level, let alone leading to some type of a policy. By extension, neither faculty nor middle managers have embraced the concept.

OER POLICIES

Open Data for CONICYT funded project grants

In 2015, the National Commission of Scientific and Technological Research/ Comisión Nacional de Investigación Científica y Tecnológica (CONICYT) launched an open data portal[290] that publishes databases related to the results of the projects of its grants aimed at higher education institutions. Their user guide for open data explains that to open scientific information, it is 'recommended to use Creative Commons Attribution licence with (CC-BY) for scientific literature. These licences allow the holder of the rights to authorize the use of his works by third parties without losing the attribution rights'. [291] For opening raw data, the explicit recommendation is to 'use the Creative Commons Zero licence (CC0). CC0 is a licensing model that dedicates and identifies a work as part of the public domain. It allows the owner of the rights to authorize the use of the works (the data, in this case) by third parties.' [292]

LaReferencia http://www.lareferencia.info/es/

The most pertinent and relevant Open Access initiative is LAReferencia: Network of Institutional Repositories of Scientific Publications of Latin America. This consortium brings together nine countries of the region and is based in Chile. It advocates for openly licensed scientific information, and the network has its own open access policy.[293]

Despite neighbouring countries such as Argentina and Uruguay adopting national policies that drive the development of OER, in Chile there is very little progress in the public licensing of educational resources as a national or institutional policy.

In Chile, copyright or licensing in general is not a pivotal concern for publicly-funded resources, and, by extension, there is even less interest or concern about open licensing. Although Ministry of Education websites declare in their footers that content is openly licensed (mainly a guideline for public agencies within the framework of the Open Government Partnership or OGP action plans), that is not extended to the content and resources for K-12 schools repositories: portal YoEstudio[294] and the *Centro de Recursos para el Aprendizaje* (CRA) School Libraries.[295] In both cases, the educational portals do not specify the rights to use the resources they host or distribute. Thus, while there may be in-principle support for OER, in practice, this may not be so.

More worrying is the situation of the educational resources portal EducarChile,[296] a semi-public entity, which is represented by the Ministry of Education and the Chile Foundation.[297] It even appears in registered as a public service that promotes OER in the OER World Map.[298] But analyzing the Terms and Conditions of Use of the resources hosted in EducarChile, 'the user undertakes to use the contents in a diligent, correct and lawful manner', that is:

- *Not reproduce, copy, distribute, transform or modify, make available, lease or communicate to the public the contents unless you have the express authorization of the owner of the corresponding rights.*

[290] Datoscientificos Abiertos. (no date). Home Page. Retrieved from http://datoscientificos.cl/
[291] Datos Científicos Abiertos. (2014). La Ciencia la hacemos entre todos. p.14 Retrieved from http://datoscientificos.cl/files/manual-2014.pdf
[292] Ibid, p.17
[293] LA Referencia. (2018). LA Referencia — Public goods for scientific data policies in Latin America (EN). Retrieved from http://www.lareferencia.info/es/recursos/ciencia-abierta-documentos-externos/80-la-referencia-public-goods-for-scientific-data-policies-in-latin-america-pdf-en
[294] YoEstudio. (no date). Home Page. Retrieved from http://www.yoestudio.cl/
[295] Bibliotecas Escolares CRA. (no date). Home Page. Retrieved from http://www.bibliotecas-cra.cl/
[296] EducarChile. (no date). Home Page. Retrieved from http://www.educarchile.cl/
[297] Fundación Chile. (no date). Home Page. Retrieved from https://fch.cl/
[298] OER World Map. (no date). Ministerio de Educación Chile (MINEDUC). Retrieved from https://oerworldmap.org/resource/urn:uuid:b3ace68a-e719-4d30-88ad-24d78ee834d8

- *Not to suppress, evade, or manipulate the 'copyright' and other identifying data of the rights of educarchile or its owners incorporated into the contents, as well as the technical protection devices, the digital identifiers or whatever the information mechanisms that may contain the contents or about the management of rights.*

- *Not to use the contents and, in particular, the information of any other kind obtained through educarchile or the services, to issue advertising of any kind and in any format, in Chile or abroad.[299]*

This wide range of use restrictions clashes with any OER definition. Even more, Educarchile includes resources that are OER, for example, videos from the Khan Academy portal, [300]but the rights of use over these resources are not described.

The indifference to openly-licensed educational resources, digital or not, from public policy is more explicit in the field of Higher Education. MINEDUC, through its Division of Higher Education (DIVESUP),[301] has various development grants open to bidding which is the most relevant way to fund higher education institutions. In the bidding conditions/terms of these grants it is made explicit that the 'ownership (physical and intellectual) of the goods and works created in the framework of the execution and implementation of this Performance Agreement will be included in the assets of the institutions.'[302] There is thus no incentive to generate publicly licensed resources from publicly funded higher education projects. Moreover, while copyright is a recognized licence for the protection of intellectual property in these grants, Creative Commons or other licences are not recognized as such.

The lack of incentives for developing publicly licensed educational resources can be framed in a broader context of the Chilean higher education system. Alongside DIVESUP grants, another relevant source of funding for higher education institutions comes from CONICYT.[303] These grants open to bidding oriented to research and investigation projects are disputed by higher education institutions in a scenario of hard competition. The struggle for public funds within the framework of a privatized education system 40-year process has made competition its matrix, at the expense of cooperation and mutual collaboration. In a 2012 study that analyzed the processes of collaboration between institutions and groups around the DIVESUP and CONICYT funded projects concluded that collaboration is:

> *…an uncommon and increasingly rare phenomenon in these programs. Within the poor collaboration detected, it was only a few regional institutions from the center-south of Chile that took a leading role in recent years, with collaborative networks composed of units responsible for their execution that are increasingly similar.[304]*

In this context, institutions conceive their educational and research resources and developments as competitive assets, therefore unwilling to share them openly, or co-develop their results. Within the context of competitiveness and exclusivity of rights, institutions do not have fertile ground for openness, or a culture of participatory learning emphasizing creation, sharing and collaboration between institutions and actors.

At the individual level, the outlook is not encouraging for OER either. Since the academic career is not centred on the field of teaching and student learning, but rather on research and indexed publication, this usually fosters competitiveness due to the struggle for the public funded grants already mentioned. Competitiveness is also explicitly reinforced in these grants for higher education, with clear incentives focused on the commercialization of results which are usually conceived as an exclusive asset. Furthermore, the logic of treasuring

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[299] EducarChile. (no date). Términos y Condiciones. Retrieved from http://www.educarchile.cl/ech/pro/app/somos?scc=terminos

[300] See http://www.educarchile.cl/ech/pro/app/search?sc=1009%3A&ml=10000&co=Khan+academy

[301] Ministerio de Educació. (no date). Educación Superior. Retrieved from https://divesup.mineduc.cl/

[302] There are different funding instruments for universities where this ownership clause is present, for example, for MECESUP3 () or FIAC () or FDI ()

[303] Comisión Nacional de Investigación Científica y Tecnológica. (no date). Home Page. Retrieved from https://www.conicyt.cl/

[304] Urbina, C., Cárdenas, J.P. Cárdenas, D. (2012). La colaboración interuniversitaria en Chile. El caso de proyectos mecesup desde la perspectiva de las ciencias de la complejidad. Retrieved from https://scielo.conicyt.cl/pdf/caledu/n37/art02.pdf

personal academic assets is fuelled by a scholar publishing ecosystem that is dominated by large monopolies and their commercial models.

In the schooling sector, the following is noted in a 'Copyright policy' for a publicly funded educational resource:

> The K-12 Textbook programme is one of the biggest investments of the Ministry of Education with a programme that delivers public textbooks every year to about 93% of the schools in Chile. The public funding climbs up to USD$ 51 Million for this years public budget (https://www.bcn.cl/presupuesto/periodo/2018/partida/09/capitulo/01/programa/11/subtitulo/24/item/03/asignacion/383), highly concentrated in two foreign (Spaniard) publishers. The public bidding conditions/terms to develop these public K-12 textbooks clearly declare that 'the author's rights of the awarded textbooks [of the public bid process] will belong entirely to the contracted one, for the effects of their free commercialization in the private market'.

Thus, the publicly funded textbooks are exclusive property of the publishers. In practice, publishers end up selling the same book in the private market at a price 12 or 15 times higher the cost of the public bid. The purchase of the publicly funded K-12 textbooks is carried out by a request for bid framework. A market study from the Economic Public Prosecutor has also shown that the differences are much bigger (in average 29 to 40 times) between the public and private textbook market.

In sum, the current context in Chilean higher education does not generate incentives for an ecosystem that supports the development of OER neither at a national, institutional or individual level. The indifference related to OER from national stakeholders can be confirmed with the 2012 Paris OER Declaration. Although the Chilean delegation attended the OER World Congress, as well having attended the preparatory regional consultation meeting in Rio de Janeiro in March 2012, Chile did not adopt the declaration.

OER Use and Adoption

OER for Digital Citizenship Education http://www.bcn.cl/formacioncivica/chile_mexico

There is a project of *Bibliloteca del Congreso Nacional* (BCN)/ the Library of National Congress of Chile; Belisario Domínguez Institute, and Senate of the Republic of México. The project titled *Strengthening Democracy through Digital Citizenship in Mexico and Chile* had as its main objective to develop a model of citizenship skills education, taking advantage of the opportunities offered by digital technologies through the development of a framework for assessing competencies of 'Digital Citizenship' and training plans for schools / high schools. It is funded by Chile-México Fund, Chilean Agency for International Cooperation for Development, and the Ministry of Foreign Affairs. These developments are a work trend integrated to the Civic Education Programme at BCN

Open Textbooks Web Platform http://openbooks.biblioteca.ucv.cl

The project titled 'Open Textbook Infrastructure Transference to foster Civic/Citizen and English language higher education' is an initiative of Aula Virtual, Pontificia Universidad Vatólica de Valparaíso. Its main objectives are to strengthen Civics/Citizenship and English learning through deploying an Open Textbook and OER development strategy at PUCV, increasing technological infrastructure, and focusing on methodologies for the development and management of resources. The initiative is funded by a public diplomacy small grant from the United States Embassy in Santiago, Chile.

There are limited initiatives that explicitly require resources to be released as OER with Creative Commons or similar licences. These initiatives tend to lack a medium or long-term strategy and tend to lack consideration for issues such as guaranteeing the quality of resources. Examples of such initiatives are:

The CREATIV initiative of the Faculty of Educational Sciences of the Catholic University of Maule — http://dehesa.unex.es/bitstream/handle/10662/1268/1695-288X_9_1_53.pdf?sequence=1&isAllowed=y

The CREATIV Project was developed in the Faculty of Education at the Universidad Católica del Maule in Chile. Its main objective is to produce and disseminate openly licensed digital

educational materials, from a collaborative network developed by entities related to teaching in different sectors of learning and teaching levels.

REA Uach — http://rea.uach.cl/

This is an OER repository from Universidad Austral and funded by a Higher Education Division grant from the Ministry of Education of Chile. The OER that meet technical and pedagogical standards can be freely downloaded with the declared objective of promoting equity in Chilean higher education. Each OER has ISBN indexation as well as a Creative Commons Attribution CC-BY licence, alongside an institutional licence that declares the permissions of the institution in relation to the faculty that authored the resource. These OER are related to biological science and are focused on nursing careers. This is the 'most open' existing OER initiative in Chile.

The main language in Chile is Spanish and OER are mainly in Spanish with a few English versions.

OER Financing and Sustainability

It is difficult to indicate whether there is a growth of OER, as there are only isolated initiatives that are not sustainable or do not respond to a specific strategy. The few and scattered initiatives mainly develop new materials, there's little awareness of the opportunities around reusing or remixing content and resources. Furthermore, there is decreasing investment in digital hardware resources — for example, the 2013's budget was USD8.6 million, but this fell to USD2.7 million in 2017 and was maintained in 2018.[305]

Research and Evaluation

As part of the framework of the ROER4D research project agenda for development, coordinated by the University of Cape Town, South Africa, the Providence Professional Institute/Instituto Profesional Providencia (IPP) has developed the project titled 'Effectiveness of OER use in first year higher education students' mathematical course performance: A case study'. Its aim was to understand the impact of OER on first-year mathematics students' academic performance at the IPP in Santiago, Chile, where more than half (52%) of first-year students typically drop out of their studies. Through the adoption (open web platforms) and creation (open texts built by teachers' own resources) of OER, within the framework of an impact assessment research on the uses of these resources, the project analyzed the effect in the academic performance of first-year students in engineering and education careers. Findings indicate that students in face-to-face classes who used Khan Academy resources obtained better examination grades than students who used the faculty-authored open textbook or relied on traditional proprietary textbooks. Moreover, it was also found that students who used both types of OER had significantly lower attendance levels than students who relied on traditional proprietary textbooks. Finally, it was observed that teachers and students had very positive opinions on the use of both the Khan Academy Collection and open textbook resources.[306]

In the same ROER4D initiative, Chile participated in the research titled 'Open Access and OER in Latin America: A survey of the policy landscape in Chile, Colombia and Uruguay', an overview of the mechanisms (funding, policy, legislative and procedural) adopted by Latin American governments with respect to Open Access and OER initiatives in the higher education sector. Findings indicate that while each country has its own approach to funding higher education, there are few or no specific national and/or institutional policies aimed at promoting Open Education in the higher education sectors. Low OER awareness and a commercialized model of higher education appear to account for the lack of any OER

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[305] Biblioteca del Congreso de la Nación. (no date). Buscar en todo el sitio... Retrieved from https://www.bcn.cl/presupuesto/comparacion/A-24432

[306] Westermann, W. (no date). Effectiveness of OER use in first year higher education students' mathematical course performance: A case study. Retrieved from http://roer4d.org/sp-9-oer-use-in-first-year-mathematics

policies in Chile.[307] Governmental officials today are being stressed to prove the impact of the programmes they deploy in order to be recognized as successful and justify the extension of public funding. Academia groups like the Open Education Group at US national level or ROER4D at an Global South/international level can bring diverse and robust evidence of OER's potential to feed stake holders decision-making and policy to solve the educational challenges and problems. Efficiency, particularly the Return on the Investment (ROI), is also a matter of interest of governmental officials as they are pressured to strategical well assign resources, especially for under-developed countries where there are very scarcity and heavy budget reduction.

CONCLUSION

OER, as a public strategy, can support the needs of an educational context with enriched possibilities: equitable access, quality enhancement of educational knowledge and resources, teacher professional development, institutional innovation, cost-effectiveness and public accountability. However, Chile has a long way to go in seeing OER as a main trend in educational discussion in the country. Although there is a lot more evidence today on how the 'free' aspect of digital resources has a measurable educational impact, Chile is still starting to assess how the 'open' aspect might contribute to accessible, high quality education.

CHINA

INTRODUCTION

The Chinese case study on OER focuses on OER in basic education and higher education. In 2000, the Ministry of Education (MoE) of China initiated 'the development project of online course in the new century', with the aim of promoting distance higher education in China. This initiative is regarded as the origin of OER in China. Its purpose was to build 200 online courses, and to promote sharing of quality learning resources among universities. The concept of OER is becoming more accepted as initiatives increased.

OER POLICIES

Ministry of Education — *The construction of quality courses and teaching reform in colleges and universities* (2003) — http://old.moe.gov.cn//publicfiles/business/htmlfiles/moe/s3843/201010/109658.html

This national policy from the Ministry of Education makes provision for financial support for 'National quality courses' which are online courses open to colleges and universities free of charge. The financial support includes costs related to construction fees and maintenance upgrades. The construction subsidy is paid within three months after the results of the review of the course are published, and the maintenance and upgrade fees are disbursed after the annual inspection.

Implementation opinions of the Ministry of Education on *The construction of National Quality Open Courses (NQOC)* (2011) — http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s3843/201111/xxgk_126346.html

This national policy focuses on promoting the sharing of quality educational resources, showcasing best practices in teaching, encouraging independent learning, and supporting open learning using an online platform including the building of 1,000 quality open video courses (QOVC) and 5,000 quality open resource courses (QORC). The MoE provides honorary title and funding subsidies for QOVC and QORC.

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[307] Amalia, T. (2017). Open Access and OER in Latin America: A survey of the policy landscape in Chile, Colombia and Uruguay (Advance online publication). Retrieved from https://zenodo.org/record/161280#.W5Z8TYB-FuR

Ministry of Education — *Implementation of full coverage of digital educational resources for One-teacher school project (2012)* **— http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s3342/201211/144800.html**

The aim of this national policy is to equip rural one-teacher schools with digital devices and digital education resources, assist these schools in accessing digital educational resources based on the national curriculum, improve the quality of education, promote the balanced development of compulsory education, and better serve the needs of children in rural areas to receive a good education near to where they live. Basic costs of hardware are covered by the central government, and the cost of project management, maintenance, and renewal are covered by local governments.

Ministry of Education — *Ten-Year Development Plan for ICT in Education (2011-2020)* **— http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s3342/201203/xxgk_133322.html**

One chapter in this national policy focuses on the development of digital educational resources, with the goal of building a national platform for digital educational resources, developing educational resources covering all education sectors, and building mechanisms for developing educational resources.

Ministry of Education — *The 13th Five-Year Plan of ICT in Education* **(2016) — http://www.moe.gov.cn/srcsite/A16/s3342/201606/t20160622_269367.html**

This national action plan makes mention of the need to achieve the following:

> *the realization of school broadband network full coverage and online learning environment full coverage, abundant high-quality digital education resources to meet the needs of information-based teaching and personalized learning needs, cyber learning space applications for each student, and education management information level significantly be improved.*

The implementation of this plan is funded by the Ministry of Education, the Ministry of Finance, the National Development and Reform Commission, the Ministry of Industry and Information Technology, and the People's Bank of China.

All the above policies are relevant to OER, as in China, 'digital educational resources' is often used as a synonym for OER. Financial commitments to OER policy are regarded as relatively adequate. Different sectors of the government take different responsibilities for the process of OER development: the Ministry of Education develops specific educational policies and plans for production and use of OER; the Ministry of Finance creates funding policies to provide OER grants; and provincial and municipal governments implement national policies and provide subsidies for the development of OER.

While most works in China follow Copyright Law (all rights reserved), in general, educational resources authorized by the government could be used freely with no cost. Some learning resources provided by companies (for example, NetEase) adopt a Creative Commons (CC) licence.

OER Use and Adoption

Full coverage of digital educational resources for One-teacher school (2012) http://jxd.eduyun.cn/cms/jxds/xmdt/

The aim of this initiative is to provide high-quality digital education resources to 63,600 One-teacher schools across the country through IP satellites, Internet and other means, helping rural remote areas to access the national curriculum to meet the basic requirements of a good education. Basic hardware and resources are provided by Ministry of Finance, and the cost of project management, maintenance and renewal is the responsibility of the local government's finance department.

National Quality Course

In 2003 the MoE initiated the National Quality Course (NQC) with the goal of reforming teaching content and enhancing courses. Approximately 750 universities participated in the development of NQCs and between 2003 to 2010, resulting in the development of

3,790 NQCs, of which 2,525 were general undergraduate courses, and 1,265 were vocational college and online education courses. While this initiative is noted as an OER, it is also noted that the NQCs adopted China's Copyright Law (all rights reserved).

Construction of National Quality Open Courses (NQOC) (2011) — http://www.icourses. cn/home/

This initiative focuses on sharing quality educational resources, showcasing best practices in teaching, encouraging independent learning, and supporting open learning using online platform. It also involves the building of 1,000 quality open video courses (QOVC) and 5,000 quality open resource course (QORC). The Ministry of Education provides subsidies for NQOCs, and local universities/colleges also provide funds for the development of quality open courses.

Five-Minute Course (2012) — http://www.5minutes.com.cn

The five-minute course, initiated by Open University of China, aims to build 30,000 five-minute courses involving 100 subjects (academic and non-academic) in several fields including arts, history, language, economics, management, education, technology, science, philosophy, politics, and farming. Thus far, more than 30,000 five-minute courses have been developed, and the China's Copyright Law (all rights reserved) is used to protect the copyright.

XuetangX (2013) — http://www.xuetangx.com

XuetangX is an initiative of Tsinghua and MOOC-CN Information Technology, which provides access to over 1,000 free courses from Tsinghua, Fudan, MITx, HarvardX and other universities. The platform also includes some paid courses.

NetEase open courses (2010) — https://open.163.com/cuvocw/; NetEase cloud classroom (2012) — https://study.163.com

NetEase, Inc. is a Chinese Internet technology company providing online services centered on content, community, communications and commerce. Founded in 1997 by Lebunto, the company was a key pioneer in the development of Internet services for China. Today, NetEase develops and operates some of China's online PC and mobile games, advertising services, email services and e-commerce platforms. It is one of the largest Internet and video game companies in the world. In November 2010, NetEase launched an 'Open Course project', with the first batch of 1,200 courses placed online, including more than 200 video with Chinese subtitles. Users are able to freely access open courses from world-class and domestic universities such as Harvard University.

NetEase Cloud Classroom is an online platform for practical skills learning created by NetEase company, which is officially launched at the end of December 2012, which provides a large quantity of courses for learners, and the users can arrange their own study progress according to their own learning level.

One creative lecture per teacher, and one elite teacher per lecture (2014) — http://1s1k. eduyun.cn/portal/html/1s1k/index/1.html

This initiative of the Ministry of Education and National Center for Educational Technology targets every teacher, particularly those in basic education. Starting in 2014, the initiative aims at fostering innovation in teaching and learning, promoting the integration of information technology and education teaching, and improving the quality of education through teachers' classroom use of OER. Currently there are more than 16,975,318 lecturers from elite teachers in different discipline from different provinces in China. The subjects covered include language, math, English, science, music, arts, history, and physical education. The MoE allocates funds to each province according to the quality and quantity of courses uploaded the platform, and the education department in each province will use the money for teachers who provide the materials accordingly.

National public service platform for educational resources (2012) — http://www.eduyun. cn

The 'National Public service platform for educational resources' is an innovation of the central government to provide basic public services for education. The platform, launched

in December 2012, fully utilizes cloud computing and other technologies to connect with regional educational resource platforms and enterprise resource service platforms. The platform brings together resources from famous schools and famous teachers. It also provides a personalized space for teachers and students throughout the country. By the end of December 2018, 12.52 million teacher spaces, 6.05 million student spaces, 5.56 million parents' spaces and 400,000 school spaces were opened in the platform. Furthermore, 19 provincial platforms, 28 municipal platforms, and 26 district-level platforms were connected with this national platform. The national and provincial platforms are regarded as important OER platforms which are funded with public funds.

The main language in China is Chinese and OER are predominantly produced in Chinese and English.

OER Financing and Sustainability

Based on the above, OER appear to be funded by both the government and by private companies. In China, it is believed that the growth of OER is decreasing investment in design and development of educational resources, as more schools and teachers start to use OER for their teaching instead of developing their own resources. For example, university teachers could use the NQOVCs and NQORCs, either as support materials or enrol students in the course, which could save costs by avoiding redundant construction. However, the premise is that these NQOC and NQVCs could meet the needs of these users.

There is a balance between OER efforts using and adapting existing materials compared to producing new materials, and an appropriate balance is being struck. The OER initiatives funded by government were mainly producing new materials to increase the coverage of learning resources — for example, *Construction of National Quality Open Courses* (http://www.icourses.cn/home/). OER initiatives by companies were mainly using or adapting existing materials, for example, 101 education PPT by NetDragon (https://ppt.101.com)

There are some initiatives focused on ensuring OER contributes to greater diversity of educational materials and inclusion of marginalized voices in the resulting content, for example the NQCs and NQOCs. Additionally, in basic education a wide dissemination of OER is made possible via the 'full coverage of digital educational resources for One-teacher school' project mentioned above, allowing the government to better serve the needs of children in rural areas to receive a good education near to where they live.

Some initiatives are more sustainable than others — for example, the NQC initiative in 2003 developed to the NQOC initiative in 2011 which is still running (and could possibly be attributed to related government OER policies). However, not all the initiatives were sustainable, as the sustainability is reliant on the policies and financial support from government and organizations.

Research and Evaluation

OER research in China focuses on technologies and repositories, the pedagogy, the outcome, open licence, and content. The following typical research studies have been undertaken on OER in China.

Pedagogy:

- Huang, R., Zeng, L., Zheng, L. (2010). On the trend of the reform of undergraduate teaching methods in China--sampling analysis based on national quality open courses. e-education Research, (05), 84-90. (⬜⬜⬜,曾⬜芳,⬜⬜琴.⬜于我⬜大⬜本科⬜⬜方法⬜革的⬜向⬜究——基于⬜家精品⬜程的抽⬜分析 [J].⬜化⬜育⬜究,2010(05):84-90.)

Outcome:

- Hou, S., Wang, L. (2012). National Quality Open Course Project: Using open education resources to improve undergraduate teaching quality. *Open education Research, 18* (1),

124-132.(侯爽,王□.□家精品□程□目:利用□放□育□源提升本科□□□量 [J].□放□育□究, 2012, 18(1):124-132.)

Technology and Repositories:

- Wang, Z. (2013). The co-building and sharing of National Public Service Platform for Education Resources and Digital Resource Center. China Education informatization, (01): 17. (王珠珠.□家□育□源公共服□平台及□字□源中心建□□□育□源共建共享 [J].中□□育信息化,2013(01):17.)

- Dong, Y., Du, G., Xu, C. (2017). The status and development of OER platform in China. *China e-education. 11,* 36-42. (董□, 杜□, 徐唱,等. □□□放□育□源平台建□的□□□□展 [J]. 中□□化□育, 2017(11):36-42.)

Open Licence:

- Yu, P. & Zhu, Z. (2009). Research on Copyright and Licence of Open Educational Resources. *Open Education Research, 6,* 011.

- Zhang, J., Xu, L., Zheng, Q. (2015). Further discussion on open education resources: the present situation and countermeasures of open standards and licences. *Modern distance Education*, (4), 15-21. (□□□, □玲, □勤□,等. 再□□放□育□源:□放□准□□□的□□及□策分析 [J]. □代□距□□育, 2015(4):15-21.)

Contents

- Hu, E., Li, Y., Li, J. & Huang, W.-H. (2015). Open educational resources (OER) usage and barriers: a study from Zhejiang University, China. *Educational Technology Research and Development, 63*(6), 957–974. https://doi.org/10.1007/s11423-015-9398-1

- Huang, R., Hu, Y., Liu, X. (2015). Research on the open Maturity Model of digital education resources--promoting the sharing of quality education resources through informatization (II.) [J].

- E-education Research, (3), 58-63. (□□□, 胡永斌, □□琳. □字□育□源的□放成熟度模型□究——信息化促□□□□育□源共享□究（二）[J]. □化□育□究, 2015(3):58-63.)

- Li, Y. (2015). A review of the current research status of MOOC in China: hotspots and trends--a common-word visual analysis based on the keywords in CNKI from 2009-2014.

- E-education Research, (7), 55-60. (李□□. □□慕□（MOOC）□究□□述□:□点□□□——基于2009—2014年CNKI所刊文□□□□的共□可□化分析 [J].□化□育□究, 2015(7):55-60.

There are some research and evaluation of OER in China that were based on empirical research, as well as discussions and literature reviews on the subject. For example, for the NQCs, research has investigated the status, applications, evaluations, and problems of NQCs based on data analysis or interview. The typical research included but not limited to the following papers:

- Lu, Q., Sun, H., Tian, Y., Xie, T., Wei, S. (2010). Investigation and analysis of the state-of-art of national quality course. *China Distance Education*, (04): 49-54, 79-80 (路秋□,□□,田雨,□怡,魏□平.□家精品□程建□□□的□□分析 [J].中□□程□育,2010(04):49-54+79-80.)

- Huang, B., Xiang, G. (2007). The present situation of national quality course construction and its consideration. *Chinese Higher Education Research,* (09),72-76.(□□玉,□□雄.□家精品□程建□□□分析及思考 [J].中□高□□究,2007(09):72-76.)

- Qin, W. (2013). A survey of the status of national fine curriculum development in the past decade. *China Distance Education*, (08): 53-57+96. (秦□□.□家精品□程□展十年□□□□[J].中□□程□育, 2013(08):53-57+96.)

The following research questions/issues could be explored regarding OER in China:

1) How to promote public awareness of OER.

2) How to promote teacher training to use OER.

3) Funding mechanisms to support OER development.

CONCLUSION

To enable China to realize the educational potential of OER more effectively, the following is recommended:

1) Formulate open licences for OER according to the local culture and education system. This may involve adopting a uniform open licence in China, such as CC, to promote the sharing of OER.

2) Involve enterprises to develop resources, and government could buy the resources or services for schools.

3) Develop assessment criteria related to effectiveness of OER practices.

4) Explore mechanisms to promote motivate teachers to develop and share quality educational resources.

5) Clarify how publishing houses could contribute to OER and their responsibilities and rights.

6) Break the barriers of different kinds of OER platforms to make OER flow freely.

GERMANY

INTRODUCTION

In Germany, many individual partners have discussed OER or have used OER since its inception when UNESCO coined the term. Germany was involved in the Open Courseware Initiative in the early 2000s,[308] and in the following ten years, several organizations were involved in European Open Education projects. However, there has been no common effort to harmonize and synergize Open Education activities within the country.

National-level activities started in Germany in 2012 with the German Federal Ministry of Education and Research (BMBF) consulting with German experts in OER. This was accompanied by various publications in different communities, for example OER for schools (updated 2014),[309] OER from a pedagogical perspective,[310] and OER in the business information systems community.[311]

The launch of the European Initiative "Open Education Europa" in 2013 also raised interest in the topic in Germany as the recommendations were communicated to the German Federal Council. The Free Education Alliance ("Bündnis Freie Bildung") founded in 2014 is the first national OER initiative and includes participation from several individuals and organizations

[308]   Orr, D., Neumann, J. & Muuss-Merholz, J. (2017). German OER Practices and Policy — from Bottom-up to Top-down Initiatives. Moscow: UNESCO Institute for Information Technologies in Education. Retrieved from https://iite.unesco.org/pics/publications/en/files/3214746.pdf

[309]   Bretschneider, M., Muuß-Merholz, J. & Schaumburg, F. (2014). Open Educational Resources (OER) für Schulen in Deutschland. Whitepaper zu Grundlagen, Akteuren und Entwicklungsstand. Retrieved from https://open-educational-resources.de/wp-content/uploads/OER-Whitepaper_OER-in-der-Schule-2014.pdf

[310]   Deimann, M. (2012). Open Education: Offene Bildung und offenes Lernen mehr als nur eine Alternative für E-Learning.Handbuch E-Learning, Köln. Retrieved from https://markusmind.wordpress.com/2012/06/25/beitrag-aus-dem-handbuch-e-learning-zu-open-education/

[311]   Pawlowski, J. & Bick, M. (2012). Open Educational Resources. *Business & Information Systems Engineering*, *4*(4), 209-212.

including the Open Knowledge Foundation, Wikimedia, and Creative Commons.[312] In 2015, the Federal Ministry for Education and Research (BMBF) and the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder (KMK) launched a discussion on OER. In 2016, the first specific funding programme was launched by BMBF ("OER Info") funding 25 projects in different domains.

OER has received some attention, especially in the schooling and Higher Education sector but also to some extent in vocational training and further education. In most cases, the activities have been isolated due to a lack of support at the policy/strategic level. The activities of the German Free Education Alliance, the OERInfo projects, and the Information Hub[313] are the main coordinated actions in Germany. To get a better impression on the situation, the main OER projects in Germany are listed on the OER World Map.[314]

POLICIES

There are no legal regulations or recommendations supporting OER to date. However, as education is a responsibility of each of the 16 German states, some states have started to move towards supporting OER. Furthermore, the new German government has expressed their intention to support OER at a national level.[315]

In general, for educational projects, there is currently no requirement to publish learning materials in publicly funded projects with an open license except for specific open education projects. However, one might see the "Open" movement in a broader sense as Open Access and Open Data are further developed than the concept of OER. The German ministry explicitly supports Open Access for scientific publication in publicly funded projects. The strategy was developed in 2016[316] and is continually discussed in the political and scientific community. However, while the ministry supports an Open Access culture, the final decision rests with stakeholders / researchers. The main national organization for basic research, Deutsche Forschungsgemeinschaft, also support Open Access. This was expressed by signing the agreement of the open access initiative OA2020 in 2016.[317]

OER USE AND ADOPTION

Information Hub OER (OERInfo) — https://open-educational-resources.de

OERInfo is responsible for knowledge exchange and dissemination of the funded projects of the BMBF funding programme. It provides support services such as training, and a portal (Content Buffet — https://oer-contentbuffet.info) for sharing OER. Content Buffet provides authoring and collaboration tools for different disciplines. Several organizations participate in OERInfo, including: Institut für Internationale Pädagogische Forschung, J&K Jöran & Konsorten, Hochschulbibliothekszentrum des Landes Nordrhein-Westfalen (hbz), FWU Medieninstitut der Länder, Universität Duisburg-Essen, Bundesinstitut für Berufsbildung, Deutsches Institut für Erwachsenenbildung (DIE).The project targets educators and researchers in all education sectors, and is funded by BMBF.

Eckpunkte Digital Education — http://www.cio.m-v.de/static/CIO/Inhalte/ Kooperatives%20E-Government/Digitale_Schule/Dokumente/170530_Ergebnis_ Eckpunkte_St-AG_230517.pdf

Eckpunkte Digital Education (Cornerstones Digital Education) is a national initiative that has developed a strategy paper and corresponding actions for improving digital education. The initiative is a combination of the German Ministry for Education and Research and the

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312   Alliance Free Education. (no date). Home Page. Retrieved from https://buendnis-freie-bildung.de/
313   OER Info. (no date). Home Page. Retrieved from https://open-educational-resources.de
314   OER Info. (no date). OER World Map — Germany. Retrieved from https://open-educational-resources.de/karte/
315   Koalitionsvertrag der Bundesregierung. (2018). Retrieved from https://www.bundesregierung.de/resource/blob/975224/847984/5b8bc23590d4cb2892b31c987ad672b7/2018-03-14-koalitionsvertrag-data.pdf?download=1
316   BMBF. (2016). Open Access in Deutschland. Retrieved from https://www.bmbf.de/pub/Open_Access_in_Deutschland.pdf
317   http://www.dfg.de/foerderung/programme/infrastruktur/lis/open_access/index.html

Commission of the federal states. The initiative also considers OER — for example it considers creating quality instruments for OER. The budget for this initiative is 5 billion Euros, and there is no specific budget allocation for OER.

Coalition agreements in different states — http://buendnis-freie-bildung.de/tag/koalitionsvertrag

These are regional initiatives by the governments of different German states such as North Rhine Westphalia and Schleswig Holstein. The focus is on open access for publicly financed research and promoting digital education.

Bündnis freie Bildung — https://buendnis-freie-bildung.de/

Bündnis freie Bildung is a political initiative consisting of different organizations (e.g. edu-sharing network, ELAN e.V., Wikimedia Germany, Open Knowledge Foundation) and individuals to promote open education on the policy level. They specifically promote free access to education and educational materials.

OER World Map (Germany) — https://open-educational-resources.de/karte/

The OER World Map is a web-based tool mapping OER projects, actors, and initiatives. Its target audience are educators and researchers in all sectors.

Serlo.org — https://de.serlo.org

Serlo.org provides and OER portal focused mainly on STEM topics at the primary school level. It provides simple explanations, courses, educational videos, tutorials, and tutorials that help students learn at their own pace and at their own pace. It is run by a non-profit organization, Serlo Education eV, and targets teachers, parents, and pupils.

Zentrale Für Unterrichtsmedien Im Internet E. V. — https://www.zum.de/portal

ZUM is a non-profit, grass-root initiative funded by membership fees. It aims at providing and sharing OER, Open Educational Practices (OEP), and tools for schools. It is a 100% "bottom up" movement that relies on the commitment of the teachers and other interested people. It organizes and finances itself largely without government or commercial contributions, and is mainly aimed at teachers.

Elixier — https://www.bildungsserver.de/elixier/

Elixier is a portal providing access to federal repositories containing pedagogical resources (including OER). The portal is run by Deutsches Institut für Pädagogische Forschung[318] (which is part of the Leibniz Association, a German association for basic research) and targets teachers and educators in all sectors (schools, vocational / adult education). Several federal states participate in the initiative.

OERHörnchen — https://oerhoernchen.de/

The privately run OER Hörnchen is an open-source OER search engine for German OER, and targets teachers in all education sectors.

The main language for OER (and learning materials in general) is German. Some universities targeting international students have developed some OER in English. Additionally, some OER were developed specific purposes and target groups; for example, some OER have been developed for schools and refugees in Turkish and Arabic. However, there are no broad initiatives focusing on multi-language support.

OER Financing and Sustainability

Thus far, the BMBF has only had one specific 18-month programme (OERInfo) supporting a national coordination hub and 24 other model projects. OERInfo is the only nationally funded OER programme in Germany. In comparison to the large programmes on digitalization of OER, this has received marginal funding.

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318 DIPF | Leibniz Institute for Research and Information in Education. (no date). Knowledge for Education. Retrieved from https://www.dipf.de/en/dipf-news

Other projects, particularly those in higher education, depend on internal institutional funding. There is limited experience with commercial business models. Thus, the sustainability of the existing initiatives is not clear.

Adoption of OER tends to be low outside the community of German OER experts in all sectors of education and training. For example, in Higher Education, there are no guidelines/recommendations or national portals for knowledge/OER exchange. OER is still considered as "not invented here" by most educators. In schools, the situation is different as there is a lot of informal exchange, but these do not use specific open licenses.[319] The willingness of teachers to participate in the schooling sector is higher than in other educational sectors, but there is a low level of OER expertise. There is thus an enormous potential for adopting OER in schools, but what is needed is a broad approach to educate on OER requirements, particularly licensing.

There is still some resistance to OER from individuals and organizations. Typical barriers experienced are:

- Lack of strategic/policy support: Very few organizations have adopted OER as part of their institutional strategy. Even though this support is a clear requirement for successful adoption, organizations are yet to change their policies. Educational institutions have not yet found way (or developed strategies) to incorporate OER on a broad base (e.g. incentives for OER creation/usage), and so for example, in Higher Education, there is no rewarding system for professors and lecturers sharing their learning materials.

- Insecurities on Copyright/IPR, Quality Issues: The issues of IPR and copyright have been discussed intensively in different educational sectors. The discussion for example in Higher Education show that expertise on IPR and licensing is rather low among educators. There is also resistance from publishers, focusing on the 'lack of quality mechanisms' when using OER.320

However, through the OERInfo initiative, fruitful discussions have started across sectors and political channels.

Research and Evaluation

Research on OER in Germany tends to focus on international issues and the European H2020 projects, and not specifically on Germany. Promisingly, within the OERInfo programme, several research topics are being explored.[321] However, within the OER Info programme, these were generally application/practice oriented.[322]

Nevertheless, some analyses of OER in Germany have been conducted, for example:

- OER in schools: König, C. (2017). OER und Schule — Aufbruch in ein neues Zeitalter des Lehrens und Lernens. Retrieved from https://open-educational-resources.de/dossierseite/?praxis=allgemein&bereich=schule

- OER in Higher Education: Eckhoff, D. (2017). OER in der Hochschulbildung. Retrieved from https://open-educational-resources.de/dossierseite/?praxis=allgemein&bereich=hochschule

- OER in Vocational Education and Training: Grimm, S. (2017). Offene Bildungsressourcen (OER) in der Erwachsenenbildung und Weiterbildung. Retrieved from https://open-educational-resources.de/dossierseite/?praxis=ueber-oer-forschen&bereich=berufsbildung

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[319]   For example, https://www.lehrer-online.de/ or https://www.4teachers.de/ are used.

[320]   Pirkkalainen, H., Jokinen, J. P., Pawlowski, J. M. & Richter, T. (2014, April). Removing the barriers to adoption of social OER environments. In International Conference on Computer Supported Education (pp. 19-34). Springer. Retrieved from https://link.springer.com/chapter/10.1007/978-3-319-25768-6_2

[321]   See OERInfo. (no date). OER-Forschung. Retrieved from https://open-educational-resources.de/oer-forschung/.

[322]   Mayrberger, K. (2018). Projekte der BMBF-Förderung OERinfo 2017/2018. Sonderband zum Fachmagazin Synergie. Universität Hamburg, 2018. Retrieved from https://www.synergie.uni-hamburg.de/media/sonderbaende/oer-info-2017-2018.pdf

- OER in Adult and Further Education: Koschorrek, J. (2017). Offene Bildungsressourcen (OER) in der Erwachsenenbildung und Weiterbildung. Retrieved from https://open-educational-resources.de/dossierseite/?praxis=allgemein&bereich=weiterbildung

There are several possible areas which can be further researched, for example:

- OER Quality mechanisms: How to design quality assessments and procedures to assure the quality of rapidly changing resources.

- OER Business Models: Which business models are promising and sustainable besides institutional funding?

- OER adoption/lifecycle: How are OER used, modified and changed along their lifecycle.

- OER Internationalization processes: Which processes and tools can support the internationalization / international adaptation of OER.

CONCLUSION

For Germany to realize the educational potential of OER more effectively, there is a need for a more systematic approach to OER at the political and organizational levels. Thus, the following recommendations are made:

- Policy support: Germany needs OER policies on a nationwide and state level (e.g. equivalent to Philippines). Policies for "open" approaches should not be independent but should be handled in a holistic way leading to a common approach for open education, open access, open data and open source.

- Harmonization of resources and platforms: Most OER are in organizational repositories. Existing national infrastructures (e.g. content buffet, Bildungsserver, zum wiki) should be utilized to reach the broadest user group possible.

- Research focus: Funding organizations should invest in both basic and applied interdisciplinary OER research. This research should systematically address pedagogical, business and technological dimensions for OER development, use, adoption, and quality.

- Organizational support: Organizations on all education levels and sectors should increase their support by incorporating OER in:
  ◦ Policies (e.g., a strategy on digital education should contain the organization's view on open education);
  ◦ Infrastructures (e.g. organizational repositories should facilitate OER by providing licensing and sharing support; and
  ◦ Operationally (e.g. through incentives in Higher Education, and support for individuals in the form of training and certification for OER experts).

MEXICO

INTRODUCTION

The Mexican case study focuses on 'Academic' OER at all education levels, and 'Scientific' OER in the higher education level. The distinction between 'academic' and 'scientific' resources is reported as follows:

- Academic OER are OER related to teaching and dissemination, which are published in an institutional repository. The evaluation of these resources is carried out by academic peers of the institution. Examples of this type of resources are photographs, presentations, infographics, videos, manuals, exams, learning objects, and cases.

- Scientific OER are OER related to science and research which are also published in the Institutional Repository. The evaluation of these resources is done through an evaluation process by peers from different institutions and they have been previously published in refereed journals and conferences. Examples of this type of resources are articles, books, book chapters, technical research reports, theses, and patent abstracts.

Following a request from UNESCO in 2002 to implement initiatives to open up knowledge, the concept of academic OER started with the promotion of OER production and open knowledge activities within the academic community of Tecnológico de Monterrey. Activities were carried out with the OpenCourseWare Consortium, and open learning courses and the use of a systems for indexing OER were developed.[323] In addition there was increasing activity around MOOC platforms such as Coursera, Edx, and MexicoX, as well as increased training and technological development activities with other Mexican universities.[324]

The concept of scientific OER started with the activities of the National Council of Science and Technology, where several activities were carried out with different governmental and academic sectors:

- In September 2011, the University Corporation for Internet Development promoted the Analysis and Reflection Roundtable on Internet as a citizen's right and the access to a national education and research network.

- In September 2013, the National System of Researchers shared the results discussed in the Senate: 'Phase of analysis, legislation on Open Access and Access to Scientific Information.'

- In May 2014, the decree of the Open Access Law in Mexico was announced, and in 2017 it was conceptualized as the Open Science Law.

Acceptance of the Open Education Movement and its practices was fostered thanks to strategies implemented at the governmental, institutional and organizational levels. A survey designed to understand the technological acceptance of the Institutional Repository and researchers' motivation to publish in open access platforms was disseminated to 47 students enrolled in Tecnológico de Monterrey's virtual course "Visibility of open knowledge through the Repository"[325] in December 2017 during a UNESCO visit. The study aimed to understand perceptions of usefulness and ease of use of the Repository to search and share OER. The results indicated that 17% had never used the Institutional Repository, 49% said they have been using the Institutional Repository for less than a year, and 34% said they had used it for over a year. Furthermore, 68% of those who participated used it to seek resources, 15% to used it to upload resources, 6% used it to search and upload, while 11% indicated that they did not use it to either search or upload resources. In addition, this survey assessed attitudes towards using the institutional repository, and the findings indicate that it is highly valued, as it makes participants feel like active participants in their institutions.

As a crucial part of the planning of the Open Access policy, the Scientific and Technological Advisory Forum and Consejo Nacional de Ciencia y Tecnología (Conacyt) (National Council for Science and Technology) coordinated a survey aimed to assess the familiarity of researchers from the National System of Researchers (SNI) with Open Access initiatives.[326] The

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[323] See http://temoa.tec.mx

[324] Burgos, J.V. & Ramírez, M.S. (2013). Academic Knowledge Mobilization to Promote Cultural Change Towards Openness in Education. In R. McGreal; W. Kinuthia & S. Marshall (eds). *Perspectives on Open and Distance Learning: Open Educational Resources: Innovation, Research and Practice,* 17-32. Vancouver, Canada: Commonwealth of Learning and Athabasca University. Available at: https://repositorio.itesm.mx/handle/11285/578153

[325] The topics covered in the Virtual Course are oriented toward the conceptualization of the Open Education Movement, the practices to create Open Educational Resources and issues related to copyright and global open access initiatives.

[326] CONACYT (2016). Informe general del estado de la ciencia, la tecnología y la innovación. Retrieved from: http://www.siicyt.gob.mx/index.php/transparencia/informes-conacyt/informe-general-del-estado-de-la-ciencia-tecnologia-e-innovacion/informe-general-2016/3835-informe-general-2016/file

study found a high level of 'agreement' (88%) the idea of OA, and 73% of researchers being aware of OA initiatives. Those 'against' OA initiatives provided these reasons:

- Copyright issues, as they felt they are not adequately regulated, and rights may be lost.

- Fear of plagiarism of their research by other researchers, and fear of researchers without professional ethics.

- Concerns around the quality of information shared in this way.

- Concerns around cost, time, and effort to participate in this type of initiative.

- The general public is not interested in this type of initiative or information, and in most cases, they do not understand it.

- The journals in which they publish are not Open Access, and it would not be possible to share this information.

OER Policies

National open access policy issued by the Official Journal of the Federation (2014) — http://www.dof.gob.mx/nota_detalle.php?codigo=5513515&fecha=16/02/2018

The policy's objective is to promote the development and dissemination of scientific research derived from basic and applied research activities, It focuses on quality technological development and innovation associated with improving the quality of education through the use of open access platforms. It aims to turn science, technology, and innovation into fundamental elements of society's general culture.

UNAM's open access policy (2016) — http://www.unamenlinea.unam.mx/ recurso/82924-lineamientos-generales-para-la-politica-de-acceso-abierto-de-la-unam

This university policy promotes open access and free digital content of academic, scientific, research and cultural activities carried out at UNAM.

Tecnológico de Monterrey's open access policy (2018) — https://tec.mx/es/noticias/nacional/investigacion/ tec-de-monterrey-anuncia-acceso-abierto-de-sus-contenidos-digitales

This private university's OA policy promoted initiatives and developments of open practices at the university and supports these efforts with greater funding. The focus is on creating new strategies, tools, and open practices to disseminate knowledge.

All the above-mentioned policies focus on Open Access (scientific OER) as opposed to OER (academic OER). All OER that have been financed with public funds need to be shared openly through institutional repositories. A fundamental part of the national OA Strategy are institutional repositories as they coordinate gathering information resources produced in the institutions and encourage self-uploading within their academic communities. CONACYT provides resources for financing these platforms. Challenges in implementing this OA policy relate to the training and experience required to develop OER and ensuring compliance with OA national regulations.

OER Use and Adoption

UNESCO/ICDE Chair — https://oerunesco.tec.mx/

The UNESCO-ICDE Chair has the following main objectives:

1) Transfer and mobilize the knowledge of the Open Educational Movement for its implementation.

2) Promote the integration of Latin American collaboration networks to use and produce open educational resources, reducing the educational gap.

3) Promote links with the UNESCO and ICDE Chairs working on OER issues (Canada, England, New Zealand, and the Netherlands)

4) Produce and disseminate studies on the open educational movement (OER, open educational practices, networks, copyrights) and promote digital publishing practices that reduce the ecological impact of printing materials.

In addition, an international visit is held every two years in Mexico, with the participation of Latin American researchers, which aims to train them in practices of the Open Educational Movement and create new initiatives using new methods in the workshops held in order to generate collaborative and multidisciplinary projects.

Tecnológico de Monterrey

Tecnológico de Monterrey is involved in several OER initiatives:

- The UNESCO/ICDE Chair "open Educational Movement for Latin America" was created in 2014 and aims to is to promote OA in Latin America with networks and working groups promoting the production visibility, dissemination, and mobilization of knowledge. The chair currently based at Tecnológico de Monterrey.

- Institutional Repository — https://repositorio.itesm.mx/. This institutional repository organizes and provides access to resources and learning objects generated by academics and students. It also allows access to special collections and artistic works.

- TEMOA — http://temoa.tec.mx/ is an OER portal hosted by Tecnológico de Monterrey. It contains selected educational resources, described and evaluated by an academic community. It aims to support the education community to find those resources and materials that meet their needs for teaching and learning through a specialized and collaborative search system and social tools.

National Repository — https://www.repositorionacionalcti.mx/

This national repository of the Federal Government of Mexico is a digital platform that provides open access to the full text of diverse academic, scientific and technological information resources. The repository contains resources such as: scientific journal articles, theses prepared at higher education institutions, research protocols, proceedings of conferences and patents, as well as other academic documents produced in Mexico using public funds. The initiative is funded by the government.

Knowledge Hub

As part of the Knowledge Hub initiative in 2009, an inter-institutional working group comprising six higher education institutions worked with basic education teachers to promote the use of OER. In 2010 another six higher education institution were included in this project, while in 2011 a further three were added. The objective of this initiative was to share OER through a metarepository as result of experience in the participation in the project. This initiative was financed the University Corporation for Internet Development — CUDI- and by the National Council of Science and Technology — CONACYT.

Universidad de Guadalajara

Universidad de Guadalajara is involved in two notable initiatives:

- UdG Agora — http://udg.theagoraonline.net/about/ — The UdG Agora is the site for the University of Guadalajara (UdG) Student-Centred and Mobile Learning Diploma. The goal of this faculty development programme is for UdG professors to integrate student centred and mobile learning strategies and activities in their courses. Through the use of practical examples, challenges, and experiential learning, the programme will provide learners with the tools they need to plan, design, implement and share student-centred and mobile learning in their courses. Learners will collaborate, share, and contribute openly to a community of practice that fosters the enrichment of student-centred learning experiences with the use of mobile learning technologies (iPads). The programme adopts the Agora as a metaphor for an open, collaborative,

community space where learning happens through interaction and engagement with others. The Agora for this programme is both face-to-face (f2f) and online spaces. The initiative is funded by the university.

- Mural UDG — https://muraludg.org/ — The goal of this advanced faculty development programme is for University of Guadalajara's professors to critically and confidently integrate open strategies and activities in their courses. Through the use of plenary sessions, collaborative teamwork and experiential learning, the programme will provide learners with the tools they need to plan, design, implement and share open education concepts in the classroom and/or at the University. The professors will be expected to collaborate, share, and contribute openly to a community of practice that fosters the culture of open access at UdG. The initiative is funded by the university.

ITSON repository of learning objects — http://biblioteca.itson.mx/oa/principal.htm

The 'Repositorio Objetos de Aprendizaje' is the site for the Instituto Tecnologico de Sonora (ITSON) with OER. The goal of this initiative shares open learning objects on different topics. These OER support training of students.

Universidad Nacional Autónoma de México (UNAM) Institutional Repository — http://www.rad.unam.mx/

UNAM's repository allows all users to search for and use its digital resources, provided that the source is acknowledged, and the resources are not changed.

OER Financing and Sustainability

Academic OER are produced by public funds when they have been financed with projects granted by public calls. However, in other occasions, they have been funded by the institutions responsible for that production, such as the case of TEMOA and the Observatory. Scientific OER are produced by public funds when they have been financed with projects granted by public calls, mainly from CONACYT.[327]

All OER published in the Tecnológico de Monterrey's institutional repository use creative commons open licensing. Approximately 30% of these resources were supported with public funds, while the rest have been developed with institutional support.

The OER requirement with open licensing comes from the national policy.[328],[329] The May 2014 decree that reformed the Law on Science and Technology, the General Law of Education and the Organic Law of the National Council of Science and Technology, contemplates the establishment of a National Repository to guarantee Open Access to information. For example, this decree establishes that CONACYT must create and operate the National Repository, which is defined as 'the centralized digital platform that, following international standards, stores, maintains and preserves scientific, technological and innovation information, derived from research, as well as from educational and academic products.' The National Repository was released on May 20, 2016. This is the great aggregator of information contained in the institutional repositories that wish to join this strategy. It is also the primary tool for sharing scientific production in Mexico. It is worth noting that all the information resources recovered by the National Repository are available in Open Access free of charge to anyone who wishes to consult and use them.

Several institutions have benefited by CONACYT to build repositories since 2015. In general, the policies of CONACYT's committees that promote the production of OER are accompanied by financing; however, they are not sufficient to fund their follow-up processes.

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[327] CONACYT (2017). Política de Ciencia abierta. Retrieved from https://www.repositorionacionalcti.mx/docs/seminario_RI_y_su_interoperabilidad_con_el_RN/01_Politica_de_Ciencia_Abierta.pdf

[328] Diario Oficial de Federacion. (2014). DECRETO por el que se reforman y adicionan diversas disposiciones de la Ley de Ciencia y Tecnología, de la Ley General de Educación y de la Ley Orgánica del Consejo Nacional de Ciencia y Tecnología. Retrieved from http://www.dof.gob.mx/nota_detalle.php?codigo=5345503&fecha=20/05/2014

[329] Diario Oficial de Federacion. (2018). DECRETO por el que se reforma la fracción II del artículo 6 de la Ley de los Institutos Nacionales de Salud. Retrieved from http://www.dof.gob.mx/nota_detalle.php?codigo=5513515&fecha=16/02/2018

For example, in 2015 CONACYT launched calls for public universities to develop their open repositories and, although the repositories were built, these initiatives have no medium and long-term mechanisms for their update and follow-up, nor strategies for their appropriation by the academic community. Thus, improved strategies are required in the following aspects: short, medium and long-term financing strategies, financing strategies and resources for creating open access culture for academic communities; financing strategies to promote communication and publicize best open access practices for the community; and financing strategies and resources to evaluate the quantitative and qualitative results of financing.

Nevertheless, OER is growing in Mexico. According to the weekly report on the creation of Institutional Repositories, carried out by the National Repository portal, 58 Institutional Repositories are currently interoperating, encompassing over 26,000 information resources and resulting in 980,230 queries since their implementation. With the publication of the Open Science policy in 2017,[330] significant programmes were established, such as:

1) Journal Programmes;

2) Scientific Information Resources Consortium;

3) Repository Programme;

4) Programme of Public Communication of Science;

5) Integrated information systems on scientific information, technological development, and innovation; and

6) Connectivity programme.

The programmes established by the strategy intend for citizens to benefit from the maximum dissemination of scientific, technological and innovation knowledge.[331]

However, there isn't a balance between the production of new materials and the reuse and adaptation of existing OER. There is a lack of training in legal and educational areas regarding appropriate reuse.[332]

Although the policy of Open Science in Mexico establishes guidelines to sustain various long-term initiatives, it is necessary that local and institutional guidelines be strengthened to preserve and give access to knowledge to all citizens through via Internet through interoperable networks based on open standards and practices. Also, the peer review of documents published online is a practice that should not be lost in order to guarantee their quality. Having qualitative and quantitative metrics to evaluate OER initiatives is a significant step that allows assessing the processes, technologies, and stakeholders involved, such as institutions, researchers, students and citizens who access OER.

The main language in Mexico is Spanish and most OER are in Spanish. There is a lack of initiatives in Mexico focusing on ensuring that investment in OER contributes to a greater diversity of educational materials and the inclusion of marginalized voices in the resulting content. For example, OER for the 68 indigenous languages in Mexico and their 364 linguistic variants; OER for the inclusion of differently-abled people, and general accessibility measures for OER.

Given the data presented above, OER initiatives are not sustainable with the mechanisms of the current funding sources for these initiatives. Once funding is given to implement new OER initiatives, a strategy should be created to ensure their long-term operation so that they are periodically evaluated and updated, and thus encourage their efforts.

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[330] CONACYT (2017). Política de Ciencia abierta. Retrieved from https://www.repositorionacionalcti.mx/docs/seminario_RI_y_su_interoperabilidad_con_el_RN/01_Politica_de_Ciencia_Abierta.pdf

[331] Repositorio Nacional (2018). Documentos de Consulta. Retrieved from https://www.repositorionacionalcti.mx/documentos

[332] Ramírez-Montoya, M.S. (2012). Academic networks and knowledge construction. *Revista Española de Pedagogía, LXX*(251), 27–44. Retrieved from http://catedra.ruv.itesm.mx/handle/987654321/747

Research and Evaluation

The Latin American Open Regional Community of Social and Educational Research (CLARISE), created in 2011, is a Community of Practice (COP) comprising researchers from higher education institutions and organizations related to the areas of educational innovation and technology. Its efforts focus on forming collaborative learning networks to promote and give visibility and free access to cultural, scientific, and academic authors and institutions in Latin America. Their main area of interest is OER [333] The network includes academics from more than 30 institutions and is coordinated by Tecnologico de Monterrey.

Within the framework of the CLARISE and Tec de Monterrey project, which was created with the purpose of creating MOOC to provide training courses to develop OER in universities in Mexico, the Mexican Network of Institutional Repositories (ReMeRI) was established, which has the support of the University Corporation for Internet Development (CUDI).[334] Among its objectives, ReMeRI intends to create a node that allows the interconnection of institutional repositories. In the first stage, it plans to connect the repositories that already have the necessary interoperability conditions, as well as to support and provide training to educational institutions that do not yet have repositories.

The following are references, relevant links to projects or research initiatives that have been carried out in Mexico, in relation to the use of OER in education.

- Agila-Palacios, M., Ramírez-Montoya, M.S., García-Valcárcel, A. y Samaniego, J. (2017). Uso de la tableta digital en entornos universitarios de aprendizaje a distancia. RIED. *Revista Iberoamericana de Educación a Distancia, 20*(2). 255-271. DOI: http://dx.doi.org/10.5944/ried.20.2.17712. Retrieved from http://hdl.handle.net/11285/622671

- Argueta-Velazquez, M.G. y Ramírez-Montoya, M.S. (2017). Innovación en el diseño instruccional de cursos masivos abiertos con gamificación y REA para formar en sustentabilidad energética. *Education in the Knowledge Society (EKS), 18*(4), 75-96. DOI: http://dx.doi.org/10.14201/eks20171847596. Retrieved from http://hdl.handle.net/11285/628002

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- Chiappe, A. & Adame, S. I. (2018). Open Educational Practices: a learning way beyond free access knowledge. *Ensaio: Avaliação e Políticas Públicas em Educação, 26*(98), 213-230. http://dx.doi.org/10.1590/s0104-40362018002601320

- García-López, R.I., Salazar, O.C., Ramírez-Montoya, M.S. & Tenorio-Sepúlveda, G.C. (2017). Competencies for production, search, diffusion and mobilization of open educational resources. *International Education Studies, 10*(4), 78. doi:10.5539/ies.v10n4p78. Retrieved from http://hdl.handle.net/11285/628004

- García-Peñalvo, F.J., Ramírez-Montoya, M.S. (2017). Aprendizaje, Innovación y Competitividad: La Sociedad del Aprendizaje. RED. *Revista de Educación a Distancia, 52*(1). DOI: http://dx.doi.org/10.6018/red/52/1. Retrieved from http://hdl.handle.net/11285/621239

- González-Pérez, L.I., Ramírez-Montoya, M.S. & García-Peñalvo, F.J. (2018). User experience in Institutional Repositories: A Systematic Literature Review. *International Journal of Human Capital and Information Technology Professionals (IJHCITP), 9*(1), 70–86. DOI:10.4018/IJHCITP.2018010105. Retrieved from http://hdl.handle.net/11285/627982

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[333]   CLARISE. (no date). About Us. Retrieved from https://sites.google.com/site/redclarise/
[334]   Repositorio Nacional (2018). Documentos de Consulta. Retrieved from https://www.repositorionacionalcti.mx/documentos

- González-Pérez, L.I., Glasserman, L.D., Ramírez-Montoya, M.S. & García-Peñalvo, F.J. (2017). Repositorios como soportes para diseminar experiencias de innovación educativa. En Ramírez-Montoya, M.S., Valenzuela-González, J.R (eds.). *Innovación Educativa. Investigación, formación, vinculación y visibilidad* (pp. 259-271). Madrid: Síntesis. Retrieved from http://hdl.handle.net/11285/628018

- Guerrero, M.Y., Glasserman, L.D. & Ramírez, M.S. (2017). Conexión de aprendizajes con recursos abiertos en un MOOC: percepciones y prácticas. *CPU-e, Revista de Investigación Educativa, 25*, 60-82. Retrieved from http://hdl.handle.net/11285/626621

- Mercado-Varela, M.A., Beltran, J., Perez, M.V., Vazquez, N.R. & Ramirez-Montoya, M.S. (2017). Connectivity of Learning in MOOCs: Facilitators' Experiences in Team Teaching. *Turkish Online Journal of Distance Education, 18*(1), 143–156.

- Mercado-Varela, M.A., Fernández Morales, K., Lavignec, G. & Ramírez-Montoya, M.S. (2018). Enseñanza y difusión sobre el uso de recursos educativos abiertos con MOOC: un estudio de caso. *CPU-e Revista de Investigación Educativa, 26*(2). Retrieved from http://hdl.handle.net/11285/628007

- Ramírez-Montoya, M.S. & Ceballos, H.G. (2017). Institutional Repositories. En Cantú, F. (Coord.), *Research Analytics. Boosting University Productivity and Competitiveness through Scientometrics*. CRC Press. Retrieved from https://repositorio.itesm.mx/handle/11285/628020

- Ramírez-Montoya, M.S., Mena, J. & Rodríguez-Arroyo, J.A. (2017). In-service teachers' self-perceptions of digital competence and OER use as determined by a xMOOC training course. *Computers in Human Behavior*, 77, 356–364.

- Ramírez-Montoya, M.S. & García-Peñalvo, F. (2018). Co-creation and open innovation: Systematic literature review. *Comunicar, 54,* 9-19 DOI: https://doi.org/10.3916/C54-2018-01. Retrieved from http://hdl.handle.net/11285/627964

- Rincón-Flores, E., Ramírez-Montoya, M.S., Serra-Barragán, L.A. (2017). Gamificación basada en retos en el curso MOOC la reforma energética en México y sus oportunidades. En Ramírez-Montoya, M.S. y Mendoza-Domínguez, A. (eds). *Innovación y sustentabilidad energética. Formación con MOOCs e investigación educativa* (pp. 57-83). Madrid: Narcea. Retrieved from http://hdl.handle.net/11285/628012

- Valderrabano, B. R., Landín, C. J., Reyes, M. M. & Ramírez, J. L. S. (2017). Modelo de propiedad intelectual para recursos educativos abiertos. *Campus Virtuales, 6*(2), 107-112.

- Valdivia Vázquez, J.A., Ramírez-Montoya, M.S. & Valenzuela-González, J. R. (in press). Motivation and knowledge: Pre and post assessment of MOOC participants from an energy and sustainability project. *International Review of Research in Open and Distance Learning*.

- Vallejo-Figueroa, S., Rodríguez-Artacho, M., Castro-Gil, M. & San Cristóbal, E. (2018). Using text mining and linked open data to assist the mashup of educational resources. In Global Engineering Education Conference (EDUCON), 2018 IEEE (pp. 1606-1611). IEEE.

Current research and evaluation of OER are being strengthened by the Open Science Law in Mexico, which defines State policy intended to increase the accessibility of scientific research (financed with public resources) for all citizens, through the maximum dissemination of scientific knowledge, technology, and innovation. It aims to establish the rules to be followed in order to respect Intellectual Property Rights in the field of Open Science, applicable to the different instruments, policies, programmes, tools, supports and other elements and components of Open Science.

However, there is no monitoring and evaluation policy to measure the impacts of each implementation and the progress of each application. Therefore, there is no policy allowing

the research reports resulting from each initiative to assess whether the justification for the project was clear and met the objectives set for its execution. Likewise, there is also a lack of assessment of the evidence of political and financial commitments with the OER that benefited from these policies to provide convincing arguments to those who evaluate and follow up on these projects.

The key research issues that should be explored regarding OER in Mexico, which are not currently receiving enough attention, are:

- Effectiveness of the training of researchers in intellectual property rights issues and the various open access routes for their publications.

- The peer evaluation of the academic OER published in institutional repositories must have institutional policies that guarantee their academic quality.

- The technological and connectivity infrastructure requires planning to connect the different zones giving access to citizens and research professors.

Conclusion

To enable Mexico to realize the educational potential of OER more effectively, the following is recommended:

1) Connect to universities and public research centres to generate strategies/guidelines/policies to create OER that are reusable and evaluated by peers.

2) Create a training plan based on a competency certification directed to researchers to publish in open access journals and repositories.

3) Develop new technologies to search and extract data and develop data mining models.

Mongolia

Introduction

The Mongolian case study focuses on OER in pre-school, primary, secondary and tertiary education and life-long learning.

From 2010 to 2014 Mongolia hosted a series of national forums, workshops, and pilot projects on OER. These activities included annual national events introducing the concept of Open Education and included educators and researchers across education sectors. The events were typically driven by international advocacy groups to help build a critical mass of support for open practice in the country and move toward the establishment of a Creative Commons Mongolia affiliate in 2013. Starting in 2010, the Development Research to Empower All Mongolians through Information and Communications Technologies (DREAM IT) project brought consulting expertise from Canada to Mongolia to introduce models of educational practice associated with OER. The consulting visits were also designed to stimulate local interest in OER research projects in Mongolia, with a focus on exploring and investigating potentially transformative education strategies for the country.

A national seminar on OER supported by DREAM IT and Canada's International Development Research Centre (IDRC) was held in Ulaanbaatar in October 2010. It introduced Mongolian educators and government officials to OER projects worldwide and provided opportunities for in-depth discussion about the merits and mechanics of Open Education principles and practices. In 2011, a follow-up workshop on Open Data, open government and OER was held, in which research projects funded by the IDRC through DREAM IT presented preliminary research results and demonstrated materials that each would share as OER using Creative Commons (CC) licences. Up until 2013 when it was completed, the DREAM IT project had

been active in capacity-building initiatives to introduce and demonstrate a range of open practices in the Mongolian education sectors.

Furthermore, a Seminar on Intellectual Property Rights was organized by the Ministry of Education, Culture and Science of Mongolia, Mongolian Intellectual Property Authority, UNESCO IITE and the Mongolian University of Science and Technology (MUST) in April 2012. The presentation by IITE Director was devoted to IPR with respect to OER, the importance of promotion of OER in national languages and the role of open licensing in development of OER. Also, the Asia-Pacific coordinator of CC delivered a paper on open licensing, in particular, CC licences and their impact on education, science, culture and government.

An international Conference on ICT in Education: Digital Pedagogy, Learning Technology, Teachers and OER was held in Ulaanbaatar in May 2014. The conference was organized by the MUST, UNESCO IITE, Mongolian University of Education, and Teacher Training Institute under the auspices of the Mongolian Ministry of Education and Science. The Conference outcome document included, but was not limited to, the following recommendations: to promote OER, open education and the penetration of ICT in education and to include them in the Government policy on education development in 2014-2024; and to promote and support initiatives in developing and implementing projects on new pedagogical practices, development of mobile learning, OER, MOOCs and other areas.

However, wider acceptance of OER has not yet emerged. OER is still a new concept in Mongolia. Although it may have certain benefits in situations where costs are a concern for both educators and students, the lack of awareness means that it is typically only isolated individual educators who are adopting OER. Changing culture that is slowly taking place will influence institutional policy, pedagogical practice, and funding methods of OER.

OER POLICIES

National OER Programme 2014-2024 — http://www.legalinfo.mn/annex/details/6349?lawid=10147

This national document covers all sectors of education. The Programme was drafted by the Ministry of Education with participation from education sector specialists and OER advocates. It was approved by the Parliament and serves as the country's OER policy. The main objective of the Programme is to promote OER through implementing pilot projects in 2014-2024. The components include: Open Network for Education (ONE) Academy to support open collaborative work, the development of an open university, the development of policies that allow educators to release their materials openly, to create an online dictionary of the Mongolian language, and an open repository of dissertations and research works. The policies that are included in the Programme to enable OER are:

> *4.1 to create favourable legal environment and financing mechanisms for national lifelong-learning system 4.2 Mongolia to join international intellectual property systems, to create conditions for it in the country, especially in online environment 4.3 to determine Internet topology and data centre capacity of education sector, to establish information management system of education sector by 2016.*

The programme is meant to be financed from the state and local budget, grants from international donor organizations, and development loans. Allocations from the state budget are proposed each year to the budget plan as part of Mongolia's socio-economic agenda. The National OER Programme was financed in 2014-2016. The Government invested around USD500,000 to implement pilot projects. However, due to the global slump of commodities prices, from which Mongolia is heavily dependent, the Government became unable to continue its financial commitment. Also, there is a lack of political will and interest in this Programme from two recent governments which were established as a result of the Parliamentary election in 2016. In addition, there were constant changes in top-tier management of the Ministry of Education. Therefore, financing from the state budget stopped after 2016. Improvements that are required are that the Ministry of Education needs to secure funds from the state budget in following years, and international donor organizations are requested to invest in OER development in Mongolia.

The very first government document that mentioned OER was the ICT in Education policy 2012-2016. Article 4.2.6. stated the following:

> *To create OER, and to join international intellectual property rights licensing movements and to create legal environment to license e-learning materials.[335]*

This policy did not have a tangible impact in terms of OER development. While the policy was approved by the Ministry of Education, it expired in 2016. Under the government structure, the Ministry does not have financing power, but it can plan and propose activities to the state budget.

There is currently no legal requirement for educational materials produced with public funds to be openly licensed. As a standard practice, educational materials produced with public funds are not openly licensed.

OER Use and Adoption

Pre-school education — http://davalgaa.mn/

This pre-school educational website is an initiative of Education Wave, an NGO. Since 2012, Education Wave NGO conducted a research project to investigate how parents and teachers of preschool children can become engaged in using and adapting OER. The project involves designing, localizing and implementing OER for the purpose of improving parents' and teachers' knowledge and abilities to work with early-age children. The aim of this iterative multi-phased research project is to study the practice impacts on parents and preschool and primary school teachers when they used, adapted, and localized early childhood OER learning materials for the Mongolian context. The outcome was capacity- building in an appropriate design approach for developing and localizing OER materials for free use by schools, teachers and parents. Materials are released under a CC-BY-NC-SA licence. The IDRC supported this initiative in 2012-2014. Currently, the NGO and its website is continuously supported by the private sector (a publishing company Admon), and this funding source is regarded as sustainable.

Open Network for Education — http://one.mn/ , https://mn.khanacademy.org

The Open Network for Education (ONE) is the main coordinating organization for the National OER programme. In 2014. Khan Academy and ONE signed an agreement on this initiative, whereby video lessons in math, science, information technology, and arts are localised to the Mongolian context. Teachers, who localize and use these video lessons, collaborate and share their experiences on an online community platform (http://k12.mn/). ONE was involved in developing the National OER Programme and conducted awareness-raising activities among decision-makers, educators and other stakeholders. The materials from this initiative were released under a CC-BY-NC-SA. Funding was from the state budget, but the initiative is currently not sustainable since the funding stopped.

Mongolian alphabet lessons — http://mongolbichig.mn/

The Mongolian alphabet lessons are an initiative of ONE and the Ministry of Education, Culture, Science and Sports (MECSS). The old Mongolian alphabet used Mongolian letters, but this was replaced in 1940 with the Cyrillic alphabet. However, the old Mongolian alphabet continues to be used in Inner Mongolia in China. These 40 video lessons of the old Mongolian alphabet were created for anyone who wants to read and understand the Mongolian literature and writing heritage before 1940 and writing from Inner Mongolia in China. In creating these video lessons, the Khan Academy didactics and methodology were used. Video lessons carry a CC-BY-NC-SA. The initiative was funded from the state budget and can be considered complete and thus further funding is not necessary.

Online dictionary of the Mongolian language — https://mn.wiktionary.org, http://www.wikitoli.mn/

This initiative of ONE, MECSS and the National University of Mongolia started in 2015 and involved creating an online dictionary of 50,000 Mongolian words and descriptions. The

[335]   https://mecss.gov.mn/media/uploads/97a09ce9-44eb-467f-a362-16312b72a61c.pdf (in Mongolian)

dictionary was initially developed by ONE, and since December 2016, the National University of Mongolia and its School of Mongolian Studies are coordinating this initiative. The dictionary is released under a CC-BY-SA licence. Initial funding was from the state budget, but currently the National University of Mongolia funds the initiative. However, as the funding amount is insufficient, it is a moderately sustainable initiative.

OER Financing and Sustainability

National level OER development was financed by the Government between 2014-2016. After that, the financing almost stopped. There is almost no investment at the institutional level. Although there are still few OER initiatives, these are both adapted materials like Khan Academy video lessons, and new resources like the Mongolian language dictionary and video lessons, and thus there appears to be a balance between OER efforts using and adapting existing materials compared to producing new materials.

The main language in the country is Mongolian, and OER are predominantly produced in Mongolian. Since Mongolia is a sparsely populated country with adequate Internet coverage, OER materials are beneficial for students who are residing in rural settlements. It has also widened learning opportunities for people with limited mobility. Khan Academy video lessons also help parents assist their children to understand materials from formal textbooks. Initiatives promoting the Mongolian language helps Mongolian children who permanently live and study in foreign countries, becoming less proficient in their native language, better learn their mother-tongue language. As highlighted above, due to the country's recent financial hardships, OER funding from the state budget has ceased. OER is not yet mainstreamed; there is limited awareness; and government decision makers do not prioritize it in policies or funding.

Research and Evaluation

Recent research on OER adoption and use in Mongolia's higher education sector, which was part of the ROER4D project, coordinated by the University of Cape Town, South Africa, investigated the strategies and practices of educators from six public and private higher education institutions in Mongolia in order to understand the role of OER in their work. The study employed a sequential exploratory model in which qualitative interviews comprised the first stage of data collection, followed by quantitative surveys.

Findings indicate that despite recent efforts to promote OER by funding agencies and the government, OER awareness remains modest among higher education instructors and administrators, and therefore OER adoption rates in Mongolia are low. As a result, a culture around OER engagement has not yet emerged, with only isolated individual educators adopting OER. In contrast with many academics who often worry about the quality of OER, Mongolian educators appear to be more concerned about a particular sub-component of quality, which is relevance. This research has value and application for researchers and advocates pursuing an OER agenda, for policymakers seeking to understand how policy interventions might influence OER adoption in the national and institutional context, and for funding agencies aiming to boost educators' OER engagement more broadly.[336]

The following research papers have been prepared:

- OER adoption and use in Mongolia's higher education sector. Subproject-8 as part of the Research on OER for development (ROER4D) project, supported by IDRC and coordinated by University of Cape Town, South Africa (2014-2017). http://roer4d.org/sp-8-oer-adoption-and-use-in-mongolia

- Zagdragchaa, B. & Trotter, H. (2017). Cultural-historical factors influencing OER adoption in Mongolia's higher education sector. In C. Hodgkinson-Williams & P.B. Arinto (eds*.).*

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[336]   Zagdragchaa, B. & Trotter, H. (2017). Cultural-historical factors influencing OER adoption in Mongolia's higher education sector. In C. Hodgkinson-Williams & P.B. Arinto (eds). *Adoption and Impact of OER in the Global South,* 389–424. Retrieved from https://doi.org/10.5281/zenodo.599609

Adoption and Impact of OER in the Global South, 389–424. Retrieved from https://doi.org/10.5281/zenodo.599609

- Norjkhorloo, N. & Porter, D. (2013). Exploring the use of open educational resources with teachers and parents of early-age children in Mongolia. In H. Grunfeld & M. N. L. Hoon (eds.). *Dream I.T.: Development research to empower all Mongolians through information technology,* 25–46). Ulaanbaatar: International Development Research Centre & Datacom. Retrieved from http://www.academia.edu/8335079/Mongolia_s_educational_resources_go_into_the_great_wide_open

Key research questions that could potentially be explored regarding OER in Mongolia are:

- What hinders educators to create OER?

- What pre-conditions and factors needed to adopt OER policy at institutional level?

- What steps can be taken by domestic and international OER advocates to convince the government to prioritize sustainable OER funding?

Conclusion

To enable Mongolia to realize the potential of OER more effectively, the following is recommended:

- Re-start the implementation of the National OER Programme 2014-2024;

- Secure sustainable funding from state budget for at least until the end of remaining period of the Programme;

- Request international organizations operating in Mongolia to require outcomes of their research projects, conducted by local organizations to be openly licensed;

- Raise awareness about OER especially among education sector stakeholders; and

- Increase participation from international donor organizations in funding OER initiatives.

New Zealand

Introduction

The New Zealand case study focuses primarily on post-secondary education with references to open licensing in secondary education in relation to the New Zealand Government Open Licensing Framework.

The WikiEducator website was established on 13 February 2006 in New Zealand as a community portal to share openly licensed web-materials authored using the eLearning XHTML editor — eXe — a free software project funded by the Tertiary Education Commission's eLearning Collaborative Development Fund.[337] This was the first public OER initiative to publish open education materials in New Zealand. Subsequently funding to support the WikiEducator website was provided until 2009 by the Commonwealth of Learning. Since 2009, the WikiEducator project has been supported by the OER Foundation. The aim of the initiative was to develop and share openly licensed teaching materials using open standards and free and open source software.

In 2007, Otago Polytechnic adopted a Creative Commons Licensing policy whereby educational materials produced by academics' default to a Creative Commons Attribution

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[337] See https://exelearning.org/

license.[338] Otago Polytechnic is one of the world's first tertiary education institutions to adopt an open licensing policy.

In 2009, the OER Foundation was established as a non-profit organization to provide leadership, support and networking to education institutions to implement open education approaches in achieving their strategic objectives. In the same year, the Ministry of Education provided limited funding support for the *Reusable and portable content for New Zealand schools project* aiming to foster the development of a sustainable OER ecosystem for New Zealand teachers to create, share, re-purpose and reuse digital content.[339] The project did not succeed in mainstreaming the adoption of OER in New Zealand schools largely due to complexities in copyright ownership of teacher-produced resources which vest with the individual Boards of Trustees, and competing time demands on teachers who teach full-time.

In 2010, Parliament approved the *New Zealand Government Open Access Licensing Framework* (NZGOAL) which recommends government departments to apply the Creative Commons Attribution license to Crown copyright works. Under the NZGOAL framework, School Boards of Trustees are 'strongly encouraged' to adopt Creative Commons license policies. An estimated 180 of New Zealand's 2,500 schools have adopted Creative Commons policies. It should be noted that post-secondary institutions do not fall under the provisions of NZGOAL.

In 2011, the OER Foundation convened an international meeting to establish the OERu (OER universitas).[340] Headquartered in New Zealand, the OERu is a collaboration of 30 universities, colleges and polytechnics who assemble open online courses based on OER and provide pathways for learners to achieve formal academic credit. In 2018, the OERu has commenced offering a first year of study leading to two university-level exit qualifications.

There has been some progress with the adoption of open access at New Zealand Universities. In 2010, The Council of New Zealand University Librarians (CONZUL) published a statement on Open Scholarship.[341] Five New Zealand universities have published guidelines (and one policy) on open access.

In 2013, a group of academics and librarians from New Zealand and Australia convened at the University of Otago to collaboratively write an open textbook for the field of media studies. This was the first (an only) "open textbook hack" initiative.

There is growing knowledge of open access in New Zealand as evidenced by a small number of Universities adopting open access "guidelines", but the implementation of OER in New Zealand is a far cry from reaching mainstream adoption. The only notable OER initiative in post-secondary education is the OERu. There is no published evidence of intentional resistance, just that the status quo of "closed" practice dominates post-secondary education in New Zealand.

OER Policies

Lincoln University Open Access Policy — https://ltl.lincoln.ac.nz/advice/copyright/open-access/

This organizational policy encourages staff to release content outputs under Creative Commons license. Materials where Lincoln University hold copyright are generally released under an appropriate Creative Commons license. The university provides support for maintaining the repository hosting open access outputs.

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[338]   Wikieducator. (no date). Featured Institution: Otago Polytechnic. Retrieved from http://wikieducator.org/Otago_Polytechnic:_An_IP_policy_for_the_times

[339]   Wikieducator. (no date). Reusable and portable content for New Zealand schoolshttp://wikieducator.org/Funding_proposals/Reusable_and_portable_content_for_New_Zealand_schools

[340]   Wikieducator. (2011). Meeting Summary — 23 Feb 2011. Retrieved from http://wikieducator.org/OER_for_Assessment_and_Credit_for_Students/Meeting_Summary_-_23_Feb_2011

[341]   CONZUL. (2010). Statement on Open Scholarship. Retrieved from https://www.universitiesnz.ac.nz/sites/default/files/uni-nz/documents/CONZUL%20Open%20Scholarship%202010%20Final.pdf

University of Auckland Open Access Guidelines — https://www.auckland.ac.nz/en/about/the-university/how-university-works/policy-and-administration/research/output-system-and-reports/open-access-guidelines.html

These university guidelines clarify expectations for researchers to share research outputs freely. The policy requires research outputs to be deposited in the University Research Repository. There is institutional support for maintaining the University research repository.

University of Canterbury Policy for Mandatory deposit into the Research Repository — http://canterbury.libguides.com/scholarly/OA

This university policy requires research outputs to be deposited in the University's research repository. There is institutional support for maintaining the University research repository, and funding support for paying article processing fees for approved open access journals.

University of Otago: Open Access Policy — https://www.otago.ac.nz/administration/policies/otago664881.html and Open Access Guidelines — https://www.otago.ac.nz/administration/policies/otago664883.html

The university's policies and guidelines encourage open access principles. Its open access policy encourages academic staff to promote the release of research outputs under their copyright as open access. The open access guidelines are an intervention to encourage open access principles. The university provides the following financial support with regards to open access:

- Hosting of the Otago University Research Repository (OUR repository); and

- Paying article processing fees for open access journals at the discretion of the individual cost centre.

University of Waikato: Open Access Mandate Guidelines — https://www.waikato.ac.nz/__data/assets/pdf_file/0007/186586/open-access-guidlines.pdf

These university guidelines encourage the deposit of research outputs in the "Research Commons". The university provides financial support for the deposit and maintenance of the "Research Commons" repository.

Otago Polytechnic Intellectual Property Policy — https://www.op.ac.nz/assets/policies/MP1100.03-Intellectual-Property.pdf

This institutional policy encourages release of intellectual property under the Creative Commons Attribution license. Where copyright is co-owned with the institution, release under another license must be justified and approved by the organization. There is no specified financial commitment other than supporting advances to knowledge and scholarship through open licensing.

New Zealand Government Open Access and Licensing Framework — https://www.ict.govt.nz/guidance-and-resources/open-government/new-zealand-government-open-access-and-licensing-nzgoal-framework/

The government requires that State Services agencies should make their copyright works which are of interest or use for citizens available online under the most open of licensing terms within NZGOAL — the Creative Commons Attribution license. School Boards of Trustees are 'strongly encouraged' to adopt open licensing. It is difficult to estimate the financial commitment of government to open licensing initiatives.

In general, educational materials produced with public funds in New Zealand are not openly licensed as a rule. There are two exceptions: First, under the provisions of the NZGOAL framework, materials produced by government departments under Crown Copyright should apply Creative Commons licenses unless there are restrictions to do this. Under this framework, School Boards of Trustees are 'strongly encouraged' to adopt Creative Commons licensing policies. Second, copyright holders including OER advocates and institutions can voluntarily release research and educational materials under open licenses.

Open licensing incentives outside of Crown Copyright under the NZGOAL framework are not currently supported by financial or resource incentives. While additional government investment in OER could potentially be beneficial in promoting mainstream adoption of OER, a possible first step would be to introduce a policy mandate requiring open licensing of all educational content produced from taxpayer dollars. Government already subsidises the provision of tertiary education through government grant and an open licensing framework for education materials produced by academics working in publicly funded post-secondary institutions, would provide an important catalyst for institutions to realign their course development approaches to promote OER adoption.

There are no government supported mechanisms to enable sharing of OER resources. However, this might not be a necessary requirement given that the open web, combined with open standards would be sufficient to provide the technical infrastructure for sharing. Producers of proprietary content already have a state subsidised monopoly by virtue of the "all rights reserved" copyright ensured by the national Copyright Act. A legislative requirement to license all educational content produced with public funds under a permissive open license would be adequate to foster mainstream adoption of OER in higher education.

Successful OER adoption in the mainstream is not necessarily a technical or policy challenge. It is more of a cultural challenge relating to the disposition of individuals to work transparently, collaboratively and cooperatively in building an ecosystem for more sustainable higher education futures. Assuming a national requirement for open licensing of content from public funds, the next step is to build capacity in the digital skills required for collaborative development and sharing to support ongoing cultural change towards open practices.

OER Use and Adoption

OER universitas (OERu)

There are several stakeholders in this initiative: BCcampus, AKO Aotearoa, Hamdan Bin Mohammed Smart University, Otago Polytechnic, Contact North|Contact Nord, Saylor Academy, North-West University, University of Tasmania, Athabasca University, COL, Ryerson University, National Open University of Nigeria, Charles Sturt University, University of the Highlands and Islands, University of Southern Queensland, Curtin University, Kwantlen Polytechnic University, Thomas Edison State University, Thompson Rivers University, Open University, University of South Wales, ecampusOntario, University of the South Pacific, Penn State University, and Humber College. The target audience are post-secondary learners who are unable to afford tuition costs at conventional institutions or unable to study at traditional institutions due to work or personal commitments.

The OERu international partnership was established in 2011. The OERu is implementing a 1st year of university-level study based on OER online courses with pathways to achieve two qualifications: Certificate of Higher Education Business (OERu) conferred by the University of the Highlands and Islands and the Certificate of General Studies conferred by Thompson Rivers University.

OERu courses are assembled from existing OER and developed collaboratively using open source technologies. The OERu uses free cultural works approved licenses (i.e. CC-BY, CC-BY-SA or works dedicated to the public domain.) Assessment services for academic credit are provided on a cost-recovery basis by OERu partner institutions. A key innovation of the OERu is the implementation of OER-enabled micro-credentials which will articulate into formal academic credit.

Central infrastructure costs are funded by membership fee contributions from OERu partner institutions. The OERu also receives a general operating support grant which constitutes approximately 30% of the total costs of operation. Recruiting an additional 25 contributing partners will achieve a sustainable operation without reliance on third party donor funding.

The recurrent costs for partners to provide assessment services are recouped using a fee-for-service model. The OERu partners have published two documents describing the OERu open business model:

- Business model brochure.[342]

- Open business model canvas.[343]

There are no other significant OER initiatives in New Zealand

Official languages in New Zealand are English, Te Reo Māori and New Zealand Sign Language. However, OER are predominantly produced in English.

OER Financing and Sustainability

There are no notable OER initiatives in post-secondary education in New Zealand other than the OERu collaboration based in Dunedin, Otago. The information in this section is thus derived from experience gained from the implementation of the OERu initiative.

Financing of OERu has been described above. Growth in OERu open online courses has not decreased the investment in design and development of educational resources at our partner institutions. Courses designed and assembled for OERu are typically used in parallel on campus as part of normal design and development at the institution who contributed the course for OERu. There are a few examples where OERu courses will be offered as credit bearing opportunities for local students of the respective partner institution demonstrating potential savings in design and development costs because these courses can be reused without investing in course development. The OERu's "Learning in a Digital Age" course is available for credit at four institutions in four countries. (i.e. Thompson Rivers University in Canada, Thomas Edison State University in the USA, University of the Highlands and Islands in UK and Otago Polytechnic in New Zealand.)

OERu is achieving an appropriate balance between using and adapting existing materials compared to producing new materials. It is estimated that 70% of the OERu courses are assembled from existing OERs with the remaining 30% produced as new materials, and/or existing closed materials being released under an open license for use within the OERu network.

While accessibility, inclusion and diversity are important strategic objectives underpinned by the values of widening equitable access to post-secondary education at the OERu, due to a cash strapped budget, the collaboration is constrained in what can realistically be achieved. However, there are a few examples of how OERu is promoting diversity.

1) As an international collaboration, OERu encourages the contribution of courses promoting indigenous knowledge for example the four micro-courses on Indigenous Australia: Indigenous Australians: The dreaming and relationships to country,[344] Indigenous Australian histories,[345] Human rights and indigenous Australian peoples,[346] and Contemporary realities for indigenous Australians[347].

2) All OERu online course materials are published openly without the need to register an account in order to gain access to the resources. This enables marginalised populations, for example first in family indigenous learners, to succeed "anonymously".

The OERu model was designed for sustainability from inception. It represents a disaggregated service provision model using a networked approach to fund shared technical infrastructure

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[342] OERu. (no date). Business Model Canvas. Retrieved from http://wikieducator.org/images/5/58/OERu_Business_Model_Brochure.pdf

[343] OERu. (no date). OERu Business Model Canvas. Retrieved from http://wikieducator.org/images/8/86/1248_OERu_BusinessModel_Canvas_PRESS.pdf

[344] OERu. (no date). Indigenous Australians: The dreaming and relationships to country. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/indigenous-australians-the-dreaming-and-relationships-to-country/

[345] OERu. (no date). Indigenous Australian histories. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/indigenous-australian-histories/

[346] OERu. (no date). Human rights and indigenous Australian peoples. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/human-rights-and-indigenous-australian-peoples/

[347] OERu. (no date). Contemporary realities for indigenous Australians. Retrieved from https://oeru.org/oeru-partners/charles-sturt-university/contemporary-realities-for-indigenous-australians/

from nominal membership fee contributions for providing free access to OER online courses and funding recurrent assessment costs on a fee-for-service basis. Currently 70% of the OERu operations are funded from sustainable sources with only 30% reliant on third party donor funding. It is conceivable that the OERu will achieve a financially sustainable model to offer OER open online courses at no cost to students with pathways to achieve formal academic credit.

Research and Evaluation

Creative Commons Aotearoa New Zealand, formerly hosted by the OER Foundation and now operating independently as Tohatoha Aotearoa, published the following book documenting the growth of the commons in New Zealand. Whilst it is not a research publication, it is regarded nevertheless, as a useful resource:

- Creative Commons Aotearoa New Zealand. (2015). A Quiet Revolution: Growing Creative Commons in Aotearoa New Zealand. Retrieved from https://archive.org/details/AQuietRevolution1.1

Other research publications relating to the OERu initiative are:

- Conrad D., Mackintosh W., McGreal R., Murphy A. and Whitthaus G. (2013). Report on the Assessment and Accreditation of Learners using OER. Vancouver: Commonwealth of Learning. Retrieved from http://oasis.col.org/handle/11599/232

- Davis, N., and Mackintosh, W. (2013). A mOOC prepared to make a difference. DEANZ Magazine, November 2013. Retrieved from https://ir.canterbury.ac.nz/bitstream/handle/10092/8767/12647056_DEANZ%20Magazine%20nov13%202.pdf?sequence=1&isAllowed=y

- Mackintosh, W. (2016). OERu: Realising sustainable education futures. In Miao, F., Mishra, S., and McGreal, R. (Eds.) *Open Educational Resources: Policy, Costs and Transformation. Vancouver*: Commonwealth of Learning. Retrieved from http://oasis.col.org/bitstream/handle/11599/2306/2016_Perspectives-OER-Policy-Transformation-Costs.pdf?sequence=1&isAllowed=y

- Mackintosh, W. (2017). Open course development at the OERu. In Jhangiani, R., and Biswas-Diener, R. (Eds.) Open. *The philosophy and practices that are revolutionizing education and science.* London: Ubiquity Press. Retrieved from http://www.ubiquity-press.com/site/chapters/10.5334/bbc.h/

- McGreal, R., Mackintosh, W. and Taylor, J. (2013). Open Educational Resources University. In McGreal R., Kinuthia, W., and Marshall S. (Eds.) *Open Educational Resources: Innovation, Research and Practice*. Vancouver: Commonwealth of Learning. Retrieved from http://oasis.col.org/bitstream/handle/11599/486/pub_PS_OER-IRP_web.pdf?sequence=1&isAllowed=y

- McGreal R., Conrad D., Murphy A., Witthaus, G. and Mackintosh, W. (2014). Formalising informal learning: Assessment and accreditation challenges within disaggregated systems. *Open Praxis.* 6(2): 125 — 133. Retrieved from http://openpraxis.org/index.php/OpenPraxis/article/view/114

- Murphy, A. (2012). Benchmarking OER Use and Assessment in Higher Education. Towoomba: University of Southern Queensland. Retrieved from https://wikieducator.org/images/8/8e/OER_use_and_assessment_Total_Results.pdf

- Ren, X. (2015). Input Evaluation Report of the Open Education Resources universitas (OERu). Towoomba: University of Southern Queensland. Retrieved from https://wikieducator.org/images/b/b4/OERuInputEvaluationFinalreport.pdf

The research conducted has focused primarily on the implementation of the OERu rather than providing an evidence-based rationale for policy makers to consider policy change or financial commitments to OER. As the OERu proceeds with implementation, more authentic

data from student engagement and more detailed cost analysis will be gathered. This could conceivably provide an evidence-based rationale for policy and financial commitments. However, this research focus is not a priority, as the OERu's limited capacity focuses on implementation as opposed to research. Further, the OERu does not receive government funding nor is it likely to receive government funding in the short term.

Nevertheless, the following two priority research issues are worth exploring:

- Investigating the challenge of developing effective and affordable marketing approaches to communicate the opportunities of these OER-based learning opportunities for formal credit to the populations of students who are most likely to benefit from our efforts.

- Implementing transnational micro-credentialing and articulation with formal qualification pathways.

Conclusion

To realize the educational potential of OER in New Zealand more effectively, the following is recommended:

- Adopting policy requiring the open licensing of government funded education materials at post-secondary level.

- Adapting the funding model for tertiary education to accommodate disaggregated service provision, for example applying government grant for an assessment-only service rather than bulk funding for a full-service model.

Nigeria

Introduction

The focus of the Nigerian case study is on higher education, further education, adult learning, and lifelong education.[348]

The origins of OER in Nigeria date to 2005 when the National Teachers' Institute (NTI), Kaduna[349] participated in the Teacher Education in Sub-Saharan Africa (TESSA)[350] project by authoring and versioning teacher education modules and user-testing the TESSA website. The modules, which involved collaboration with the Nigerian Commission of Colleges for Teacher Education, were aligned with the Nigerian school curriculum.

An interview with Dr Dele Yaya, former staff member and former coordinator of OER at NTI provided background on TESSA and NTI involvement with the initiative. The Open University of the UK initiated TESSA with a consortium of eight countries in Africa. The programme was geared towards developing material for teacher training that could be shared and reused by others; NTI was the node for Nigeria. Teachers from NTI were trained between 2005 and 2009, and OER materials in five subject areas were created, which other countries/institutions were encouraged to use, reuse, and adapt. The TESSA-NTI collaboration resulted in the development of a teaching practice supervisors' toolkit, an OER that can be edited or adapted by users. The toolkit can be used to address certain challenges which occur in the process of teaching practice supervision[351]. Nigeria's National Commission for Colleges of Education partnered with TESSA on both creation of

[348] Although this report concentrates on OER, mention is made of Nigeria's Research and Education Network because of its relevance to OER.

[349] National Teachers Institute. (no date). Home Page. Retrieved from http://www.nti.edu.ng/

[350] TESSA. (no date). Home Page. Retrieved from http://www.tessaafrica.net

[351] TESSA. (no date). CCE / NTI Teaching Practice Supervisors' Toolkit. Retrieved from http://www.tessaafrica.net/NTI-Toolkit

the initial teacher education modules and also on the toolkit. There is a TESSA page on the Commission's website.[352]

With the resuscitation of open and distance learning (ODL) programmes and the development of the National Open University of Nigeria (NOUN)[353] in 2002, the notion of OER grew. As part of the staff development process for the newly established NOUN, OER became one of the areas where critical capacity building activities were undertaken. The Regional Training and Research Institute for Distance and Open Learning (RETRIDOL), a COL-sponsored institute located at NOUN organizes Open Distance Learning (ODL) and OER training in West Africa.[354] In 2013, NOUN also participated in sub-regional training on OER in Abuja Nigeria, organized by COL, UNESCO and the Economic Communities of West African States (ECOWAS). This training was timed to coincide with COL's Pan-African Forum Seven. Hosting RETRIDOL and the 2013 training further propelled OER awareness at NOUN, with the establishment of an OER unit in September 2014—the first in West Africa.[355] Since NOUN focuses on the higher education and lifelong learning sectors, most of the information sharing and professional development have been in the areas of further education, higher education, and lifelong learning. Scant attention has been given to OER for basic and secondary education.

When the concept was initially introduced, NOUN encouraged academic staff to develop their materials into accessible OER resources for their students and other interested clients, but there was very little uptake of this idea. There was much resistance from academics who felt that developing their content as OER would lead to a loss of authorial autonomy. However, with training, and as greater information became available, the benefits of OER as a democratising force in the educational process became clearer and many more NOUN academics have embraced the idea of OER and mounted their resources on the NOUN OER Repository.[356]

In September 2017, the National Universities Commission of Nigeria in collaboration with COL, drafted an OER policy for higher education in Nigeria. This was subsequently approved on 2nd August 2018 by the Minister of Education, Nigeria.[357]

OER POLICIES

Nigerian National Policy on OERs in Higher Education — https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/2017_Agbu-Mishra_Open-Educational-Resources-Policy-for-Higher-Education-Nigeria.pdf

The policy is referenced in a COL report about higher education and OER in Nigeria and was approved in August 2018. The policy is a national policy which provides guidelines for the creation and use of OER to increase access to and support quality teaching, learning and research in the Nigerian higher education system.[358] It seeks to strengthen commitment to OER by higher education institutions and all concerned stakeholders. It applies to all publicly-funded higher education teaching and learning materials, developed by higher education institutions in Nigeria, as well as to various ministries, departments, and agencies (MDAs), educational/research institutions, and autonomous bodies developing teaching and learning materials using public funds. Any university, institution or organization which develops

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[352] National Commission for Colleges of Education and TESSA. (no date). New NCE Minimum Standards, Micro-Teaching & Teaching Practice Materials Digitization for all NCE Schools and Programmes. Retrieved from http://www.ncceonline.edu.ng/NCCE-Digitization/Welcome.html

[353] National Open University of Nigeria. (no date). Home Page. Retrieved from http://www.nouedu.net

[354] This Day. (2018). COL is Enhancing Education in Nigeria, Africa through ODL. Retrieved from https://www.thisdaylive.com/index.php/2018/02/15/col-is-enhancing-education-in-nigeria-africa-through-odl/

[355] UNESCO Communication and Information. (2015). National Open University of Nigeria launches the 1st West African University OER Portal. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/all-news/news/national_open_university_of_nigeria_launches_the_1st_west_af/

[356] National Open University of Nigeria OER Repository. (no date). Home Page. Retrieved from https://www.nouonline.net/oerportal/oer.php

[357] Communique not yet available online.

[358] National Universities Commission. (no date). Nigeria's Draft OER Policy gets World Acclaim. Retrieved from https://nuc.edu.ng/nigerias-draft-oer-policy-gets-world-acclaim/

any educational resource using public funds, donor-provided funds or its own funds, shall apply the policy. However, in all cases, the release of works under an open licence will follow the Nigerian copyright act, cap c28, laws of the federation of Nigeria, 2004.

National Open University of Nigeria policy on OER (not available online)

The overall aim of NOUN's OER policy is to reposition NOUN as a major production and distribution hub of OER in Africa by providing guidelines on the use, creation, and review of OER. The specific objectives of this policy are:

- To guide the use, creation and review of OER materials prior to sharing them globally; and

- To clarify licensing issues and publication rights for OER.

As highlighted above, the national OER policy encourages institutions with publicly-funded materials to openly license them as OER. Institutions in Nigeria are gradually understanding the benefits of OER and will hopefully adhere to this. NOUN has also been able to openly licence some of its course materials (which were public funded).

At NOUN, there are some provisions made for OER within the university's course materials development budget, rather than as a separate budget item. This funding arrangement means that insufficient funds are available for implementing OER optimally. A separate budget will aid OER content development, as converting existing government-funded course materials into OER requires dedicated time and resources. With the newly developed national OER policy, it is likely that the issue of financial commitment to OER will be afforded greater attention.

At NOUN, the mechanism used by the university to share the materials is via a microsite within the university's portal. The materials are made available for sharing and reuse by students of NOUN, students of other institutions as well as academics from other institutions.

OER USE AND ADOPTION

With the NUC's firm backing of OER, more Nigerian universities have begun to use OER.

University of Ibadan — https://dlc.ui.edu.ng/oer.dlc.ui.edu.ng/app/

The University of Ibadan, which is a dual mode University, coordinates its distance learning activities through its Distance Learning Centre (DLC). University of Ibadan in its stride to key into OER has been able to list 202 course materials as OER.

University of Lagos — http://oer.unilag.edu.ng/

The University of Lagos has a website dedicated to OER at the university. The site contains links to various OER including publications, theses, and courseware.

The University of Nigeria Nsukka (UNN) — https://oer.unn.edu.ng/?rdr=1

The University of Nigeria at Nsukka also has several resources listed in its newly created OER portal. These include books, journal articles, theses, lecture notes, courseware, and videos.

NOUN OER are being released in three different formats of epub, odt and pdf; the University of Nigeria at Nsukka uses the format in which the resource was submitted; the University of Ibadan uses Google Docs and requires permission to download resources; and the University of Lagos runs a password-protected Moodle site. Although more Nigerian universities are adopting OER, there is no uniformity in how they are made availability.

OER FINANCING AND SUSTAINABILITY

OER financing and sustainability is still at its early stage as there is no clear procedure for funding currently. In line with UNESCO-OER recommendation, institutions in Nigeria keying into OER are encouraged to open up government funded teaching and learning materials as OER. It is hoped that the OER policy for higher education in Nigeria will provide more insight in this area and more specifically on possible funding avenues for OER.

The growth of OER is actively increasing investment both in the design and establishment of tertiary educational resources in Nigeria. For instance, OER developed by NOUN has been reused, tweaked, and remixed by other tertiary institutions in Nigeria. For example, Modibbo Adamawa University has requested permission from NOUN's management to re-use NOUN-OER. NTI continues to use OER in teachers' education for its national network.

Other developments

The National Universities Commission (NUC) in partnership with the Committee of Vice Chancellors of Nigerian Universities (CVC), established the Nigerian Research and Education Network (NGREN)[359] to ensure that Nigerian universities can communicate, collaborate, access and share resources across national and international boundaries, primarily for the purpose of research and learning but also for added capabilities to offer the efficiencies of unified communications and consolidation of digital content.

The Nigerian Institute of Advanced Legal Studies (NIALS),[360] is the public lead for Creative Commons (CC) Nigeria and has, in partnership with the CC Nigeria affiliate, organized several roundtables to address the relevance of CC in the digital environment. This was to raise awareness of the benefits of CC, not only in the education sector but also in the creative sector. NIALS has provided a platform for CC Nigeria to engage with and provide adequate knowledge of CC to key policy makers and other stakeholders in the industry, academia and beyond.

With the national OER policy in Nigeria and with the National Universities Commission as its champion, it is hopeful that interest in OER in higher education will be sustained.

RESEARCH AND EVALUATION

Research in OER appears to be in a nascent stage, with the following publications noted:

- Agbu, J. O. & Mishra, J. (2017). Open Educational Resources Policy for Higher Education in Nigeria. Vancouver, Canada; COL. Retrieved from http://oasis.col.org/handle/11599/2798

- Nwankwo, W. (2017). Assessment of Open Educational Resources in Tertiary Institutions: The Computerized Information Model. *Communications, 5*(6): 58-72. Retrieved from http://article.sciencepublishinggroup.com/pdf/10.11648.j.com.20170506.11.pdf

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Additional key research issues that require further exploration are:

- Research on copyright and intellectual property rights.

- Evaluation of cost analysis of developing content from scratch ad adapting existing OER.

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[359]   Nigerian Research and Education Network. (no date). Home Page. Retrieved from http://ngren.edu.ng/
[360]   Nigerian Institute of Advanced Legal Studies. (no date). Home Page. Retrieved from http://nials.edu.ng/

- Research on inclusiveness in design and development of OER.

- Research on language barriers.

- Fear and resistance in OER.

- Benefits of OER.

CONCLUSION

To enable Nigeria to realise the educational potential of OER more effectively, the following is recommended:

- Government commitment;

- Capacity development in OER and OER-related areas; and

- Enforcement of policy on OER and establishment and enforcement of national OER policy to cover all levels of education.

SLOVENIA

INTRODUCTION

The focus of the Slovenia case study is on basic education, secondary and higher education, and lifelong learning.

In 2006, the Ministry of Education and Sport issued its first public tender to develop educational interactive e-materials under Creative Commons (CC) licences.[361] In January 2014, the Slovenian government decided to examine in detail the possibilities that Open Education (OE) and OER could potentially deliver to its educational system. The goal was to understand on a systemic level whether such an approach was feasible and create a long-term objective to involve stakeholders in discussing, researching, developing, implementing, testing, validating and sharing good practices in open education and 'openness beyond education'. This was called the OpeningupSlovenia Initiative.

By August 2017, the government had delivered a range of world-changing actions, addressing hundreds of experts, teachers, researchers, technologists, and entrepreneurs in Slovenia and abroad in pushing the open education agenda nationally, regionally and internationally. Sixty projects were undertaken, many of them are still in development and deployment, and five exemplar areas of transformation were defined. These are the building blocks for a sustainable and scalable OER environment in Slovenia.

The Slovenian government has translated its practice in implementing OER into a Roadmap.[362] This policy document intends to present to international stakeholders (e.g. other governments) how Slovenia has addressed and continues to address the idea of 'opening up' education.[363] The government has identified five major areas/'exemplars' across all fields of education, and work on these 'exemplars' (showcases) has just begun and is being further developed:

Exemplar 1: Policy Actions- defining a vision and implementing it with efficient strategies;

Exemplar 2: Capacity Building — improving skills, competences and collaborative leadership;

Exemplar 3: Services and Content — creating education materials and enhancing e-services;

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361 See http://eucbeniki.sio.si/
362 Republic of Slovenia, Ministry of Education, Science and Sport. (2017). Open Education and OER Slovenian case: From Commitment to Action. Retrieved from https://www.oercongress.org/wp-content/uploads/2017/10/OER_Roadmap.pdf
363 Opening up Slovenia. (no date). Exemplar ideas. Retrieved from https://www.ouslovenia.net/exemplars/

Exemplar 4: Research and Development — exploring new pedagogy and technologies for content creation and collaboration; and

Exemplar 5: Supportive Environments — efficient mechanisms of scalability and sustainability.

The government has led three major development phases in adopting and implementing open education and OER, starting with the Pre-phase (1993 — 2005), Phase I (2006 — 2013) and the current Phase II (2014 — 2022). Major milestones towards introducing Open Education and OER in Slovenia:

- Pre-phase (1993 — 2006): In 1993 The Slovenian Parliament secured funding and adopted guidelines to introduce ICT in education (at first as a Computer literacy programme), which initiated a set of activities that had to be implemented in parallel: teacher training, Web-based interactive materials, qualitative portals (Videolectures. net, Slovenian Educational network), collaboration of education with business and other sectors, ICT-infrastructure and safe Internet.

- Phase I (2006 — 2013): By combining national and EU visions, goals and financial resources, Slovenia has supported the implementation of some major national education projects, involving various stakeholders (e-education, e-competent teacher framework, e-textbooks, e-school bag, virtual classrooms, teachers' e-communities, e-services). Openness (with Creative Commons) has become a value and a need in all three pillars of society: state, economy, and civil society. With such steps taken at national level, it was almost by default that an active role of Slovenia in the international arena had to be pursued. The facilitation and creation of stable and sustainable international partnerships in individual fields of expertise and disciplines was one of the main tasks that had to be accomplished.

- Phase II (2014 — 2022): Slovenia pursues a holistic approach to the development of an open and innovative educational environment in formal education and to all forms of non-formal education with all stakeholders (companies, NGOs, civil initiatives). Partnerships of different stakeholders (all sectors) are becoming more powerful and sustainable, which assure innovation in various disciplines and involves local, regional, national, EU, and global stakeholders such as UNESCO. Importantly, stakeholders are aware that the Ministry of Education and Government in general can and should act only as one of the partners and does not necessarily take the leading role in developing approaches towards open and innovative educational environments.

The country's biggest initiative in open education, *OpeningUpSlovenia* was conceptualized in 2013 and officially launched in 2015. The government hopes the initiative will enable Slovenia to become the first green reference country on digital transformation and the first open reference country, serving as a case study for others to follow. *OpeningUpSlovenia* is a framework and a think tank with many stakeholders from different sectors, all treated as equal players, with the aim to discuss challenges (e.g. related to digital education) and come up with appropriate solutions. It is a framework in the sense that it is a support mechanism for various projects. It brings projects together, showcases them, and helps establish partnerships and collaboration among the stakeholders. The goal is to design, implement, test, validate and share good practices, thus naturally creating a set of practical standards in the field.

There has been wide acceptance of the concept of OER in the government particularly within the Ministry of Education as well as within the Research and Academic communities. However there has been some resistance in adoption from publishers. Additionally, the Ministry of Education is one of the few EU ministries of Education to promote open licences in the *Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market (DSM) — COM(2016)593*.[364] However, the newly proposed EU

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[364] European Commission. (2016). Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market. Retrieved from https://ec.europa.eu/digital-single-market/en/news/proposal-directive-european-parliament-and-council-copyright-digital-single-market

legal framework of copyright and the exceptions and limitations for materials available for teaching, is extremely complex and fragmented.

The vote of the European Parliament on 12 September 2018 on amendments to the draft EU Digital Single Market Copyright Directive (the 'Copyright Directive') gave rise to fierce debate among Slovenian stakeholders[365] draft's supporters and detractors who were, on certain issues, aligned in opposing factions. The most hotly discussed matters were Article 11 on the new neighbouring right of publishers to receive payment from online platforms for digital use of their works, save for simple links and individual words, and Article 13 whereby providers of online sharing services (for example YouTube, in the Slovenian case the OER video site VideoLectures.Net) carry out acts of communication to the public which are the preserve of copyright holders, resulting in the need for a system of licences for exploitation of the related content.

With the ongoing copyright reform, the European Commission promised — in its DSM strategy — to reduce differences between copyright regimes and to provide greater legal certainty for cross-border use through harmonised exceptions, Slovenia is proposing that (open) educational materials are an exception to copyright fees.

OER POLICIES

OpeningUpSlovenia — http://www.ouslovenia.net/

OpeningUpSlovenia focuses on a digital transformation of society. In this broad sense it encompasses various open practices (OER, open pedagogies, open technologies, collaboration, etc.). It is also concerned with digital competences (of citizens, teachers, learners) as a route to digital transformation.   At a national level, Slovenia has developed partnerships between ministries and other stakeholders to support the adoption of open education practices on a large scale with 30+ partners. Partnerships between stakeholders are essential in order to foster open education. OE is not seen as the responsibility of a single institution or actor, but instead as calling for joint action in the form of a multi-stakeholder approach. In order to be able to partner with each another, stakeholders have a clear strategy for open education and to set goals. The transparency of activities and communication between stakeholders is therefore essential in order to enable them to identify collaboration opportunities. It is a framework with the long-term objective of involving stakeholders in discussing, researching, developing, implementing, testing, validating and sharing good practice on open education and 'openness beyond education'.

In Slovenia, the open education system is more 'distributed' and has no legal identity of its own. Instead it involves a combination of partners and a project framework developed by all of them. *OpeningUpSlovenia* initiative serves as an example, where openness is thought of also beyond the educational domain to embrace businesses, industries, and the government. *OpeningUpSlovenia* is a bottom-up approach supported by many different stakeholders, including the Ministry of Education and Sports, and this improves its sustainability and wide dissemination across the country. The framework is a conduit for promoting the open education agenda nationally, regionally, and internationally. Members influence the creation of new policies on institutional, local, regional and national levels with the help of international collaborations. OpeningupSlovenia is independently funded by its members through a variety of mechanisms, and therefore independent and not under the control of Government, thus making the relationship with Government on equal grounds with Government being one of the partners in OpeningupSlovenia

Strategic guidelines for further implementation of ICT in the Slovenian education until 2020 — http://www.mizs.gov.si/fileadmin/mizs.gov.si/pageuploads/URI/Slovenian_ Strategic_Guidelines_ICT_in_education.pdf

Although not a policy, these guidelines produced by the national government, mentions the creation of an open platform for cooperation on information technology, e-content, (e-)

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[365]   Opening Up Slovenia. (no date). Evropa potrebuje dobro reformo avtorskega prava. Retrieved from https://www.ouslovenia.si/event/autorsko-pravo/

services, pedagogical concepts and approaches, added-value models, as well as motivational mechanisms (e.g. positive legislation) in open education.

There is not a specific document regulating open education in Slovenia, instead there are overarching goals which help framing the *OpeningUpSlovenia* initiative. These goals were based on the computer literacy action project, which was designed in 1993 with the aim of introducing ICT in education in Slovenia. This literacy action project is a type of national action plan for education and is updated every seven years; the most recent update was in 2016. It was in this last revision that open education was first mentioned specifically in the document, as a support mechanism for digital transformation in different education sectors.

In 2015 the Slovenian Government issued the 'National strategy of open access to scientific publications and research data in Slovenia 2015–2020' which determines that each beneficiary must ensure open access to all peer-reviewed scientific publications that refer to the results from the nationally funded research in the period from 2015 until 2020. The strategy also determines that journals published by the publishers based in Slovenia, containing peer-reviewed articles and receiving national public funding for their activities in the period from 2015 until 2020, should be openly accessible. Publishers of scientific monographs, which receive national public funding in the period from 2015 until 2020, are encouraged to publish the monographs through business models that will enable open access to their full text immediately upon publication and their licensing with open access licenses. Additionally, the Ministry of Education is making open licencing a requirement in call for project proposals since 2006.

The Ministry of Education has also published a series of open textbooks[366] and courses for teacher training[367] as OER. It has also introduced open education and OER in the strategic guidelines mentioned above, where OER is specifically mentioned in the introduction and action cross-section. Since 2016, all OER and open education activities have been governed by these guidelines. Building on these guidelines, the Ministry of Education is also implementing the Ljubljana 2017 Action Plan[368] to implement open education and OER into its educational system. It is still defining a blueprint for 'how a country should go about opening up education'.

Currently, the policy commitments are accompanied by adequate funding. While the government seldomly directly funds the creation of OER, they do require each recipient of national public funding (between 2015 and 2020) to publish the works with open licenses.

While there is no national OER repository, there are several institutional repositories, and they operate based on their own set of guidelines. One way to address the sharing of these resources is being explored X5GON project (described in more detail below). The plan is that by late 2019, all Slovenian OER repositories will be connected via the X5GON solution. It is intended to help users learn effectively and enjoyably by providing a personalized route through appropriately prioritized OER.

Slovenian publications repositories, research data repositories, archives, and software for scientific journal publishing are required to be compatible with OpenAIRE guidelines. All published open access scientific monographs are required to be included in the Directory of Open Access Books (DOAB).

OER Use and Adoption

Bralna pismenost in razvoj slovenščine Ozaveščanje, Branje, Jezik, Evalvacija, Modeli — https://www.zrss.si/objava/projekt-objem

This initiative of National Education Institute Slovenia, Educational Research Institute (ERI) and a selection of experts, develops and tests pedagogical approaches and strategies that will contribute to a holistic and continuous vertical development of language and reading

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[366] See Teacher training portal for all Slovenian teachers https://sio.si/ and Open textbooks in Slovenian language http://eucbeniki.sio.si/
[367] See E-learning educational resources for teachers http://www.nauk.si/
[368] Opening Up Slovenia. (no date). Exemplar areas. Retrieved from http://www.ouslovenia.net/exemplars/

literacy for children and students, specifically for the Slovenian language curriculum. All the outputs are OER. The target audience are teachers and teacher trainers. The project was co-financed by the European Social Fund, Republic of Slovenia's Budget.

NA-MA POTI (NAravoslovno MAtematična Pismenost, Opolnomočenje, Tehnologija in Interaktivnost) — https://www.zrss.si/objava/projekt-na-ma-poti

Participants in this initiative are National Education Institute Slovenia, University of Ljubljana (UL), University of Maribor (UM), University of Primorska (UP), primary schools, secondary schools and kindergartens. In the project, the planned activities will follow the main goal: to develop and test pedagogical approaches and strategies, flexible forms of learning, which will also contribute to the integrated and continuous vertical development of natural, mathematical and other literacy (financial, digital, media) of students from kindergartens to secondary schools through the integration of new technologies. All outputs are OER. The target audience are policymakers, teachers and students at all educational levels. The project was co-financed by the European Social Fund, Republic of Slovenia's Budget.

INOVATIVNA PEDAGOGIKA 1:1 — http://www.inovativna-sola.si/

The project Innovative 1: 1 pedagogy is a methodology that can be implemented into the framework of the so called Innovative Learning Environments in which teaching scenarios emphasize how mobile devices can be used to support many different learning strategies; introducing elements of formal monitoring and taking into account the development of new competences that are developed in technology learning, and learning in time and space are spread outside the classroom. Innovative learning environments represent the context within which learning takes place in the widest sense and connects learners, content, teachers, resources, organization and pedagogy. All outputs are OER. The target audience are policymakers, teachers and students at all educational levels. The project was co-financed by the European Social Fund, Republic of Slovenia's Budget

Za Kakovost slovenskih učbenikov — http://kauc.si/predstavitve/

This initiative focuses on an assessment of the Slovene textbook system and developing quality measurement tools for textbooks Participating organizations are Universities of Ljubljana, Maribor and Primorska University, Josef Stefan Institute, The National Examinations Centre, The Educational Research Institute, eight primary and three secondary schools. The education stakeholders are policymakers, teachers, and text books authors. The findings from studies in this initiative will be openly accessible. The project was co-financed by the European Social Fund, Republic of Slovenia's Budget.

MENTEP — Mentoring Technology Enhanced Pedagogy — http://mentep.eun.org/

The MENTEP project addresses the need in Europe and Slovenia for teachers able to innovate using ICT in their classroom and for improved data on teachers' digital competence. Based on this premise, MENTEP investigates the potential of an online self-assessment tool to empower teachers to progress in their Technology-Enhanced Teaching (TET) competence at their own pace. This initiative is coordinated by European Schoolnet, a network of 30 Ministries of Education from across Europe with 16 partners in 13 countries. All course material are openly available, but users are required to register to join the course. The project is a European Policy Experimentation funded by the European Commission via the Erasmus+ programme. The project was co-financed by the European Social Fund, Republic of Slovenia's Budget

Ustvarjalni razred (Creative Classroom Lab) — http://creative.eun.org/, http://www.zrss.si/ustvarjalni-razred/, http://el.fri.uni-lj.si/ludo/

The Creative Classrooms Lab project (CCL) brought together teachers and policy makers in eight countries to design, implement and evaluate 1:1 teaching approaches and scenarios via a tablet in 45 schools. The project produced learning scenarios and activities, guidelines and recommendations to help policy makers and schools to take informed decisions on optimal strategies for implementing 1:1 initiatives in schools and for the effective integration of tablets into teaching and learning. This initiative was coordinated by European Schoolnet,

a network of 30 Ministries of Education from across Europe with ten partners, including the Slovenian MIZŠ, ZRSŠ, Microsoft, '*Einsten, ne jezi se*' a game developed by the Faculty of Computer and Information Science of the University of Ljubljana, and five high schools. Content is licensed under a Creative Commons Attribution-ShareAlike 3.0 License The project is funded by the European Commission's Lifelong Learning Programme.

Scientix — http://www.scientix.eu/

Scientix is a project run by European Schoolnet, a Brussels-based consortium of thirty ministries of education. Scientix[369] promotes and supports a Europe-wide collaboration among STEM (science, technology, engineering and maths) teachers, education researchers, policymakers and other STEM education professionals. The outputs mainly teaching resources such as lesson plans, videos, assessments, guides, resources are all released as OER. The target group is teachers at all levels, researchers, policy makers, parents and everyone else interested in STEM education. The funding for this initiative is via the Horizon 2020 programme of the European Union for research and innovation.

SiiT — http://www.siit.eu/

This project mainly targets teachers, students and citizens of an area encompassing north-eastern Italy and Western Slovenia, who mainly communicate in their national languages (this is officially a bilingual area where Italian and Slovenian are spoken). The project involves ten partners from Italy and Slovenia, including universities, educational institutions, museums of natural science, parks and agencies of local development and environmental monitoring. SiiT is a three-year project aimed at enhancing the knowledge of biodiversity in an area extending from the eastern Adriatic coasts (Italy) to Western Slovenia by providing schools (from primary schools to universities) amateurs and citizens with innovative interactive tools for the identification of plants, animals and fungi. The identification tools developed by SiiT[370] are available in different versions: Web applications, CD-Rom, mobile devices and printable versions are available as well. The results are OER in the form of e-learning modules with videos and resources for teaching and learning (e.x. module for leaf characters). The initiative is funded under the Interreg programme Italy-Slovenia 2007-2013, the European Regional Development Fund and national funds.

OER are also being produced at research institutions via European funding and for-profit activities; a good example is the website Videolectures.Net,[371] twice winner of the World Summit Award (WSA). The policies governing these educational materials produced with European public funds are openly licensed under the EU research requirements for research grants, including the OpenAIRE mechanism.

The main language in Slovenia is Slovenian, and OER are mainly in Slovenian and English, depending on the type of OER (there are in general more English videos for example). However, Slovenia has produced cutting-edge learning software, to automatically translate OER at a high level of accuracy. The country is involved in translating OER from English into eleven European and BRIC languages (German (DE), Italian (IT), Portuguese (PT), Greek (EL), Dutch (DU), Czech (CS), Bulgarian (BG), Croatian (CR), Polish (PL), Russian (RU), Chinese (ZH)) and designing language models for Slovenian language combinations, including text-to-speech (TTS) and automatic-speech-recognition (ASR) based on novel neural networks algorithms.

OER FINANCING AND SUSTAINABILITY

Establishing a financially sustainable environment for the design and development of OER has been a three-phase process in Slovenia. The basis for design and use of OER is a well operating system of ICT infrastructure for educational purposes (e.g. broadband connection for the entire network of schools), which by its nature calls for larger financial investments. For the period of 2014–2020 approximately 17 Million EUR is being invested into the finalization of the infrastructure and ICT equipment.

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369   See Scientix resource example http://www.scientix.eu/resources/details?resourceId=22377
370   See SiiT project resources http://www.siit.eu/index.php/tools-for-identification
371   Videolectures.net. (no date). Home Page. Retrieved from http://videolectures.net/

Additionally, funds need to be secured to facilitate the development and deployment of OER content through this infrastructure. One of the key principles of OER is reusability, which, among other things, decreases the level of necessary and continuous investment into traditional resources by publishers and allows reuse .

Deployment of OER in the formal education system teacher training and continuous professional development. In the period 2017-2022 approximately 12,5 M EUR are being invested into different activities, relating to teacher training and development. The growth of OER thus does not entail in overall increase or decrease of financial investment in the area, but rather a refocus of financial investments from infrastructure and content into people and staff.

However, OER development and use has not replaced existing teaching and learning materials as nation-wide ICT infrastructure in education still needs to be put in place. OER are however, being developed and used as a supplementary educational content for teachers and pupils. Once OER policies are developed and adopted and more useful technology developed, an understanding of the appropriate balance between creation, adaptation, and reuse will become clearer. Thus far, there is no evidence of initiatives that would specifically focus on diversity and inclusion of marginalized voices.

Slovenia makes great use of available EU funding mechanisms (e.g. European Structural and Investment Funds, Erasmus+ programme, Horizon 2020) to undertake different OER initiatives. The funding is secured within the framework of Multiannual Financial Framework (7-year periods) and the national priorities are set in advance through negotiations with other fields and the responsible EU institutions. With a wide variety of funding resources available at EU level, sustainability of OER initiatives does not represent a major challenge, although funding priorities are politically set. Within the current global and EU context (e.g. smart, sustainable economies, with great emphasis in the role of education and lifelong learning), there is strong belief that understanding of the needs for further development in the field of OER will be recognized and sufficiently financially supported. On the other hand, the overreliance on the available EU funding resources represents a certain level of vulnerability for ensuring sustainability. With this potential threat identified, there is hope that national funding will also be secured for several activities in the field of OER in the future (e.g. teacher training and education).

RESEARCH AND EVALUATION

Slovenia has conducted mainly computationally based artificial intelligence (AI) research projects with the purpose to explore and support technological and policy innovation for OER with the end goal of introducing elements for an ICT supported wider open education system, including OER. The country is developing tools, services and applications as training data for algorithms and tailored in order to be further used for OER on a massive scale. Most of these efforts were developed via governmental and European funded research projects. These include the following projects:

- Strategic projects 2014-2018: transLectures[372], MediaMixer[373], Xlike[374], Xlime[375], TraMOOC[376], MOVING[377]

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[372]   transLectures. (no date). Home Page. Retrieved from http://translectures.eu/

[373]   MediaMixer. (no date). Home Page. Retrieved from http://mediamixer.eu/

[374]   Xlike- Cross Lingual Knowledge Extraction (no date). Retrieved from http://www.xlike.org/

[375]   xLiME — CrossLingual CrossMedia Knowledge Extraction. (no date). Home Page. Retrieved from http://xlime.eu/

[376]   TraMOOC — Translation for Massive Open Online Courses (no date). Home Page. Retrieved from http://tra-mooc.eu/

[377]   MOVING — Training towards a society of data-savvy information professionals to enable open leadership innovation. (no date). Home Page. Retrieved from http://moving-project.eu

- Strategic projects 2018-2022 funded by the Government of Slovenia and European Commission: X5GON[378], CLEOPATRA[379], CogLo[380], DataBench[381], TheyBuyForYou[382], MicroHE[383], and EDSA.[384]

- VideoLectures.Net, a WSA 2009 and 2013 award winning video library currently including content from 1,105 events, 15,617 authors, 21,269 lectures (some 24658 videos in total).

As part of the X5GON initiative, several reports have been prepared, which will be publicly available soon. These include:

- Poster: 'Towards Assessing Quality of Educational Content at Scale' presented at Microsoft AI Summer School in Cambridge, UK on July 5, 2018. About 100 Postgraduate level researchers participated from all over the world.

- Handout: 'Towards Assessing Quality of Educational Content at Scale' distributed at 5-day (July 2-6, 2018) course on Open Education Design organized by The University of Nova Gorica and UNESCO Chair on Open Technologies for OER in Vipava, Slovenia. Lecturers and participants came from 17 countries (Slovenia, Brazil, Fiji, France, Greece, India, Italy, South Africa, Canada, Kenya, Macedonia, Malaysia, Malta, Germany, Uzbekistan, United Kingdom, USA).

- Novak, E., Urbančič, J., Jenko, M. (2018). Preparing multi-modal data for natural language processing. 2018. Proceedings of the Slovenian Conference on Data Mining and Data Warehouses (SiKDD 2018), Ljubljana, Slovenia, 11 October 2018

- Bashford, D. (2018). GitHub — dbashford/textract: node.js module for extracting text from html, pdf, doc, docx, xls, xlsx, csv, pptx, png, jpg, gif, rtf and more! https://github.com/dbashford/textract. Accessed: 2018-09-03

- del Agua, M.A., Martínez-Villaronga, A., Piqueras, S., Giménez, A., Sanchis, A., Civera, J., and Juan, A. (2015). The MLLP ASR Systems for IWSLT 2015. In Proc. of 12th Intl. Workshop on Spoken Language Translation (IWSLT 2015). Da Nang (Vietnam), 39–44. http://workshop2015.iwslt.org/64.php

- Brank, J., Leban, G., Grobelnik, M. (2017). Annotating Documents with Relevant Wikipedia Concepts. 2017. Proceedings of the Slovenian Conference on Data Mining and Data Warehouses (SiKDD 2017), Ljubljana, Slovenia, 9 October 2017

Key research worth exploring regarding OER in Slovenia are to:

- Conduct a mapping exercise of existing OER initiatives in higher education;

- Understand the distribution of OER learners per region;

- Explore drivers behind OER/reasons to get involved;

- Explore incentive models for OER per educational level and target audience;

- Explore issues for OER based recognition/certification/accreditation; and

- Map existing and potential OER business models.

- Explore new and existing OER quality models

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378 X5GON — Cross Modal, Cross Cultural, Cross Lingual, Cross Domain, and Cross Site Global OER Network, Artificial Intelligence, and OER. (no date). Home Page. Retrieved from http://x5gon.org/

379 CLEOPATRA — Cross-lingual Event-centric Open Analytics Research Academy. (no date). Home Page. Retrieved from http://cleopatra-project.eu/

380 CogLo — Future COGnitive Logistics Operations through Social Internet of Things

381 DataBench — Evidence Based Big Data Benchmarking to Improve Business Performance

382 TheyBuyForYou — Enabling procurement data value chains for economic development, demand management, competitive markets and vendor intelligence

383 MicroHE — Support Future Learning Excellence through Micro-Credentialing in Higher Education, Erasmus+, EACEA/41/2016 — Forward-Looking Cooperation Projects

384 EDSA — European Data Science Academy, ICT-15-2014 — Big data and Open Data Innovation and take-up (2015-2018), http://edsa-project.eu/resources/dashboard/

To realize the educational potential of OER more effectively, Slovenia would need to focus more on the following actions:

- Consider incentive models to promote OER;

- Create a targeted approach to capacity building and public relations around OER and Open Education; and

- Introduce user centric technologies for enabling the 5Rs of OER.

SOUTH AFRICA

INTRODUCTION

The South African case study focuses on Higher education (universities and universities of technology).

The origins of OER in South Africa stem from open source software and open content ideas and subsequent implementation by Derek Keats from the University of the Western Cape (UWC). Open initiatives at UWC were promoted as a means of addressing 'benefits of freedom that include social justice, rather than solely on the utility benefits.'[385]

There has been modest uptake of OER in South Africa.[386] For example, the Centre for Innovation in Learning and Teaching (CILT) at University of Cape Town has attracted both external and institutional funding for OER-type initiatives since 2007. The first initiative was the Opening Scholarship project (2007-2009) which was funded by the Shuttleworth Foundation, followed by the OER UCT project (2009-2010), the UCT Vice-chancellor's OER Adaption Project (2012-2014), the Canadian International Development Research Centre (IDRC)-funded Research on OER for Development (ROER4D) project (2013-2017). The current Digital Online Textbooks for Development (DOT4D) project (2018-2020) is also funded by the IDRC. In addition, UCT has funded the development of twelve Massive Open Online Courses (MOOCs), and several of the materials in these courses are released under Creative Commons (CC) licences. In other examples, the Faculty of Veterinary Science of the University of Pretoria has created an OER Portal, the African Veterinary Information Portal (AfriVIP). The University of the Western Cape released some of their materials for their Master of Public Health and Postgraduate Diploma in Public Health as OER. These are elaborated in more detail below. The challenge, it would seem, is keeping these OER updated over time.

OER POLICIES[387]

Open Learning Policy Framework for Post-School Education and Training (2017) — https://www.greengazette.co.za/notices/higher-education-act-101-97-education-and-training-act-16-2006-skills-development-act-97-1998-call-for-comments-on-the-open-learning-policy-framework-for-post-school-education_20170407-GGN-40772-00335.pdf

This is a national policy framework. Comments were called for the Open Learning Policy Framework for Post-School Education and Training on 24 March 2017 by the then Minister of Higher Education and Training, Dr B.E. Nzimande. Although there is evidence that

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385   Keats, D. (2009). The road to Free and Open Educational Resources at the University of the Western Cape: A personal and institutional journey. Open Learning, 24(1), 47-55. p.47. Retrieved from: https://www.tandfonline.com/doi/full/10.1080/02680510802627829

386   Lesko, I. (2013). The use and production of OER & OCW in teaching in South African higher education institutions: Case study. Open Praxis, 5(2), 102–121. Retrieved from http://openpraxis.org/index.php/OpenPraxis/article/view/52

387   In order to determine the OER policies at higher education institutions, the contributors reviewed data from a list of institutions from: https://www.4icu.org/za/south-african-universities.htm and added the University of South Africa (UNISA) which is a Distance Education University.

comments have been submitted (for example, from Universities South Africa,[388] a review of the Parliamentary Monitory Group [389] suggests that this policy is still to be finalized by the Department of Higher Education and Training (DHET).

The framework notes the following with regard to funding:

Some of the DHET's strategic funding priorities will be to:

1. *modify the relevant budgetary frameworks and funding norms to recognise the importance and status of open learning, including the development of quality OER;*

2. *review the funding formula which assumes a neat and obvious division between contact and distance education;*

3. *fund continued technical infrastructure development in order to allow for increased and enhanced access to programmes;*

4. *support the sustainable development and sharing of quality learning materials as OER; and*

5. *review National Student Financial Aid Scheme (NSFAS) funding in order to facilitate the appropriate support of learners availing themselves of open and distance learning opportunities.[390]*

White Paper for Post-school Education and Training (2013) — http://www.dhet.gov.za/ SiteAssets/Latest%20News/White%20paper%20for%20post-school%20education%20 and%20training.pdf#search=white%20paper

This National White Paper includes OER as one of the ways to build an expanded, effective and integrated post-school system. With regard to funding and sustainability, the paper indirectly suggests partnerships between public and private entities.

Cape Peninsula University of Technology (CPUT) Open Access policy which includes Open data and OER — https://www.cput.ac.za/storage/library/policies/CPUT_Open_Access_ Policy_-_Final.pdf

This is a university-level policy. According to Associate Professor Eunice Ivala, CPUT has 'an open access policy, which covers both open data and OERs'.[391] The policy does not make direct funding provision but refers to the role of the CPUT Library in managing this policy.

North-West University (NWU)

The North West University's Senate approved the university's OER Declaration in March 2018,[392] signalling its support and promotion of OER. The university is due to create an OER policy soon.[393] The NWU draft policy reportedly makes provision for OER in the same way as the UCT Open Access policy does.[394] The draft policy does not make mention of sustainability, and there is no direct funding, but it refers to capacity building which indirectly indicates institutional funding.

University of Cape Town (UCT) — OER embedded in an Open Access Policy: http://www. uct.ac.za/downloads/uct.ac.za/about/policies/OpenUCT_Policy.pdf

UCT's Council approved an Open Access Policy in March 2014. The Policy seeks to:

…increase discoverability and visibility of scholarly output at UCT; preserve, present and facilitate access to the institution's research and knowledge production; ensure the full participation of the

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[388]   Universities South Africa. (2017). Comment on the Draft Policy Framework on Open Learning and Distance Education: Universities of South Africa. Retrieved from http://www.usaf.ac.za/wp-content/uploads/2017/08/2017_USAF-Commentary_ODL-Policy-Framework_12-May-2017.pdf

[389]   Parliamentary Monitoring Group. (no date). Home Page. Retrieved from https://pmg.org.za/

[390]   South Africa Government Gazette. (2017, April 7). Open Learning Policy Framework. No 40772. (pp. 358-412). Retrieved from https://www.gov.za/sites/www.gov.za/files/40772_gon335.pdf

[391]   Email correspondence with Associate Professor Eunice Ivala. Received September 26, 2018.

[392]   North West University Open Educational Resources Declaration. Retrieved from http://news.nwu.ac.za/sites/news.nwu.ac.za/files/files/Robert.Balfour/2018.OE-Declaration.14March.pdf

[393]   Email correspondence from Professor Jako Olivier. Received September 25, 2018.

[394]   Email correspondence from UCT Post-Doc Researcher, Dr Patricia Chikuni. Received October 3, 2018.

UCT academy in global knowledge communities; contribute their academic resources to social and economic development; develop research capacity within the institution and region by sharing research knowledge and practices.

Within this policy 'open education resources', 'open content', 'open courses' and 'open education' are included as part of Open Access:

UCT recognizes the additional pressure exerted by the policy environment in the global north which increasingly requires academics to make their work available through open access; this Open Access Policy as adopted by Council, June 2014 creates additional urgency for ensuring the online visibility of academic work from the global south. At the same time the widespread availability of open education resources, open content, open courses etc. from the global north is both an opportunity and a concern as there is an equally urgent need for local teaching and learning resources to be made freely available online. By joining peer institutions regionally, nationally and internationally as well as a growing number of governments and significant funding agencies globally in adopting an open access policy and building digital repository services, UCT becomes part of an important and rapidly growing movement taking forward open scholarship and open education as part of its commitment to scholarly communication, e-research and digital content stewardship.

There are no financial commitments contained in this policy, but funding has been channelled by UCT for a limited number of OER projects, viz:

- Andrew Mellon Teaching Grants that specifically supported OER development by academics[395]

- The Vice-Chancellor's OER Adaptation Project that specifically supported post-graduate students to assist academics to adapt existing teaching materials as OER (King, 2017).[396]

University of South Africa (UNISA)

UNISA does not yet have an OER policy, but it does have an OER strategy, which has shaped several activities to date. The OER strategy reveals a high level of institutional volition regarding OER use and creation, based on moral and practical grounds. According to the strategy:

OER cannot be considered as marginal, socially acceptable, nice-to-have activities. They must be integrated into mainstream institutional processes if we wish to harness the true potential of OER in our transformation process and if the shift to this paradigm is to be economically and practically sustainable.[397]

With this perspective in mind, management has developed a comprehensive strategic approach to incorporate external OER into UNISA courses, and share UNISA courses and course components as OER. In addition to the OER strategy, the university has committed financial, intellectual and technical resources to this ambition. It established the position of OER coordinator in the Office of the Pro Vice-Chancellor, initiated a series of workshops and training sessions to increase academics' OER literacy, signed the Paris OER Declaration and the Berlin Open Access Declaration, and formalised a collaboration with the OER Universitas as a founding anchor partner.[398]

University of the Western Cape (UWC) (2005) — https://www.oerafrica.org/sites/default/files/UWC_FreeContentPolicy-0.4.pdf

UWC was the first university to have an 'OER strategy' in South Africa. The strategy provides guidelines on the facilities, training and incentives to academic staff to ensure that 'Free Content and Free and Open Courseware' are easy to publish and use. The strategy explains the cost involved for the university to implement what we now refer to as OER.

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[395] Personal communication with Associate Professor Cheryl Hodgkinson-Williams, Dr Glenda Cox, Ms Sukaina Walji, and Mr Thomas King

[396] King, T. (2016). A case study of student adaptation of Open Educational Resources at the University of Cape Town: A Diffusion of Innovations approach. Masters dissertation. Cape Town: University of Cape Town.

King, T. (2017). Postgraduate students as OER capacitators. Open Praxis, 9(2), Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/566/316

[397] University of South Africa (UNISA). (2014). UNISA Open Educational Resources (OER) strategy 2014-2016. Pretoria: UNISA, p.4. Retrieved from http://www.unisa.ac.za/contents/unisaopen/docs/OER%20Strategy%20(final)%20March%202014.pdf

[398] Cox, G. & Trotter, H. (2017b). Factors shaping lecturers' adoption of OER at three South African universities. In C. Hodgkinson-Williams & P.B. Arinto (eds). *Adoption and impact of OER in the Global South*, 287–347. Retrieved from https://doi.org/10.5281/zenodo.601935

An enabling strategy for Free and Open Educational Resources at the University of Witwatersrand (2011) — http://libguides.wits.ac.za/ld.php?content_id=5267236

The University of Witwatersrand's Free and Open Educational Resources strategy was approved by Senate in 2011. The purpose of the strategy was to 'create an enabling environment for Wits academics, students and other staff to participate in the use, adaptation, creation, and sharing of educational and research resources as free and open educational resources (FOER)'.[399] Moreover, the strategy 'grants explicit permission for Wits staff to participation in the creation of FOER, including courseware, and the deposit of research articles in an IR' (Keats et al., 2011, p4.). The university is reportedly in the process of reviewing all its policies related to Teaching and Learning, including the OER policy.[400]

An Open Access Policy was approved by the University's Council in June 2018.[401] The policy is 'designed to ensure that Wits peer-reviewed research, where appropriate, be made accessible openly, globally, and as soon as possible by depositing (self-archiving) it in the Wits IR (Green OA), and/or publishing it in an open access journal (Gold OA)'.[402]

There is no national or institutional policy which mandates that educational materials produced with public funds should be openly licensed. Some policies might encourage academics and/or senior students to publish their work as OER, but there is not the same expectation to publish learning and teaching materials as there is to publish research — which is an income generating activity for the universities and often for the academics themselves.

Section 12 of the South African Copyright Act allows reproduction of copyrightable materials for educational purposes. The implication of this inclusion is that higher education instructors who teach primarily in face-to-face modes and do not employ blended learning strategies are not really required to engage with OER, as they are empowered to reuse any materials for the purposes of their teaching mode. Furthermore, the proposed Amendment Bill provides, in Clause 13B, for the following:

> The author of a scientific or other contribution, which is the result of a research activity publicly-funded by at least 50 per cent and which has appeared in a collection, has the right, even after granting the publisher or editor an exclusive right of use, to make the contribution available to the public under a public licence or by means of an open access institutional repository in the final accepted manuscript version peer-reviewed post print[403].

If the Amendment Bill is approved, this will mandate the open sharing of publicly funded research.

OER USE AND ADOPTION
National Open Learning System (NOLS) — website still in development

The National Open Learning System for Post-School Education and Training (NOLS) is an initiative of the Department of Higher Education and Training (DHET). The project was approved in April 2016 but has not been implemented as yet. The intention it to focuses on:

- piloting an open learning system and the development of open learning materials for one skills programme; four subjects for the National Senior Certificate for Adults; two NC(V) subjects; and a Career Development Practitioners' programme;

- developing case studies on the application of open learning; and

- promoting Open Educational Resources.[404]

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[399] Keats, D. Ballim, Y., Bozzoli, B., Taylor, D., Klipp, V., Nicholson, D., Roberts, C., Currie, I. and Dagada, R. (2011). An enabling strategy for Free and Open Educational Resources at the University of the Witwatersrand, Johannesburg. Retrieved from https://libguides.wits.ac.za/ld.php?content_id=17311115

[400] Email correspondence with Rita Kitso. Received October 4, 2018

[401] Email correspondence with Ms Denise Nicolson. Received October 2, 2018

[402] University of the Witwatersrand (n.d.). Open Access (OA) Policy, p.2. Retrieved from https://libguides.wits.ac.za/openaccess_a2k_scholarly_communication/Wits_OA_Policy

[403] Republic of South Africa. (2016). Copyright Amendment Bill. Retrieved from http://infojustice.org/wp-content/uploads/2017/05/South-Africa-Copyright-Amendment-Bill-2017.pdf

[404] Department of Higher Education and Training. Annual Report 2016/17. Retrieved from http://pmg-assets.s3-website-eu-west-1.amazonaws.com/DHET_Annual_Report_2016_17_web6237.pdf

The budget for this initiative is R51.860 million.[405]

Cape Peninsula University of Technology (CPUT) — OER Grants — http://www.cput.ac.za/blogs/oer/

CPUT is involved in an OER project. During the first year of this project (2016) eight pilot initiatives were launched and received funding (ZAR10,000 per project) for OER development through a DHET-sponsored University Capacity Development Grant (UCDG). In 2018, a further eight lecturers were identified to continue the project. The OER produced are shared via the institutional OER repository and lecturers' own channels.[406] The details of the production of OER at CPUT are as follows:

> The materials developed could thus cover a whole new course, or some elements to support existing courses. You could also create content that helps student transition from high school to university, or content that could help accommodate non-traditional students into university. It could be content that students need when joining your course (revision) or content that complements your current teaching. Examples could be the creation of content to help articulate students from vocational institutions into university or to support students from articulating from a lower to higher degree. Any materials supporting more flexible ways of learning are welcome. You can create either new materials or modify existing Open Educational Resources for teaching and Learning in your course. The use of open software to create these materials is encouraged. These OERs will be published on CPUTs OER repository.[407]

The CPUT OER repository includes third-party content from open book publishers such as BookBoon. The target audience for these resources are higher education students and students transitioning from school to higher education. It is not clear how sustainable this initiative is.

Universiteit van die Vrystaat /University of the Free State

According to a report on the 2016 OER Africa Convening, 'discussions focused on the current UFS Student Success Portal and its envisaged transformation into an open platform that can be accessed by students from all universities …[to] ensure that it can be openly licensed'.[408] Libraries at UFS have a specific section on OER, but this acts as a portal to third party OER and not to OER developed at the institution. No sustainability plan was evident.

University of Cape Town (UCT)

The University of Cape Town (UCT) is involved in several OER initiatives:

- It is the only South African member of the Open Education Consortium (OEC),[409] and Associate Professor Laura Czerniewicz is an OEC Board Member (2017-2019).

- UNESCO has informed the University of Cape that it will be awarding a Chair in OER and Social Justice to Associate Prof Cheryl Hodgkinson-Williams.

- UCT's Vice-Chancellor's OER Student Adaptation project provided funds for senior students for each Faculty to work with lecturers to make existing learning and teaching materials available as OER. Funding of ZAR 150,000 was provided by the university.

- UCT-sponsored Massive Open Online Courses (MOOCs) whereby UCT provided funding and technical support to academics to create MOOCs, some of which were released as OER.[410]

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[405] Department of Higher Education and Training. Annual Report 2016/17. Retrieved from http://pmg-assets.s3-website-eu-west-1.amazonaws.com/DHET_Annual_Report_2016_17_web6237.pdf

[406] Email correspondence with Dr Daniela Gachago. Received September 25, 2018

[407] Cape Peninsula University of Technology. Open Educational Resources (OER). Retrieved from http://digitalknowledge.cput.ac.za/handle/11189/3679

[408] Saide. (2016). The 2016 OER Africa Convening: Report of Proceedings, p.6. Retrieved from https://www.saide.org.za/resources/newsletters/Vol_22_no.3_2016/Content/2016%2006%2030%20OER%20Africa%20Convening%20Workshop%20Report%20(final).docx

[409] Open Education Consortium. (no date). Members in South Africa. Retrieved from https://www.oeconsortium.org/members/country/South%20Africa/

[410] See Centre for Innovation in Learning and Teaching. (no date). UCT MOOCs Sign Up. Retrieved from http://www.cilt.uct.ac.za/cilt/moocs-uct

- UCT has an institutional repository, OpenUCT,[411] into which OER can be deposited.

- In 2018, an institutional instance of Figshare was launched at UCT, Zivahub,[412] which is specifically intended as an open data repository, but has the functionality to curate OER and open access materials.

- OER Term Bank[413] — this is a partnership between UCT and UP, whereby Prof Mbulungeni Madiba from the UCT Multilingualism Education Project worked with colleagues from UP on this multilingual glossary. The target audience is students and this initiative was funded by DHET.

- Several individual academics from the Medical School (for example, Dr Juan Klopper, Dr Charles Slater, Prof Johan Fagan) have made OER available on the UCT Repository and other sites.[414] The target audience for these resources are university medical students and some resources are self-funded while others are donor-funded.

- The London School of Hygiene and Tropical Medicine (LSHTM)'s Managing Eye Care MOOC and is currently a module in the Postgraduate Diploma and Masters' programme run by the Ophthalmology unit. This is targeted at university medical students at UCT and is funded by the Seeing is Believing Innovation Fund and The Queen Elizabeth Diamond Jubilee Trust.

- UCT participated in the Health OER Inter-Institutional Project, a collaboration between OER Africa, the University of Michigan, and medical schools in Ghana and South Africa to develop OER and tools for facilitating the integration of these into the existing curricula.[415] The target audience is university students and the project was funded by the Hewlett Foundation

University of Johannesburg (UJ)

The University of Johannesburg's (UJ) Library has a website that links to international OER portals and or repositories.[416] There are individual cases of use of OER — for example, Prof Duan van der Westhuizen developed the Faculty of Education Computer Skills Development Programme (CSDP) which includes OER.[417] There is also some anecdotal evidence of interest in OER.[418]

University of Pretoria (UP)

- UP's Faculty of Veterinary Science created several OER in the African Veterinary Information Portal (Afrivip) Initiative.[419] The target audience is veterinarians and veterinary students in Africa.

- The OER Term Bank — as noted above, this is a free and reusable resource to allow students and lecturers to check meanings and definitions of words in other South African languages. This is a joint initiative by UP, Professor Adelia Carstens, and UCT and is funded by a collaboration grant from the DHET.

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[411] Open UCT. (no date). Home Page. Retrieved from https://open.uct.ac.za
[412] Zivahub-Open Data UCT. (no date). Home Page. Retrieved from https://zivahub.uct.ac.za/
[413] OERTB Term Bank. (no date). Home Page. Retrieved from http://oertb.tlterm.com/
[414] See for example: http://open.uct.ac.za/handle/11427/29116
      https://www.youtube.com/user/Jhklopper/about
      https://www.coursera.org/learn/clinical-research
      http://www.entdev.uct.ac.za/
[415] UCT Health Education Development Unit. (no date). Health OER (Open Educational Resources). Retrieved from http://www.healthedu.uct.ac.za/health-oer-open-educational-resources
[416] University of Johannesburg. (no date). Open Course Content. Retrieved from https://www.uj.ac.za/studyatUJ/Pages/Open-Course-Content.aspx
[417] University of Johannesburg, Faculty of Education. (2016). Annual report 2016. Retrieved from https://www.uj.ac.za/faculties/facultyofeducation/Documents/Fac_Edu_AnnualR_2016_final.pdf
[418] See for example, University of Johannesburg Faculty of Education. (2017). EduBrief. Retrieved from https://www.uj.ac.za/faculties/facultyofeducation/Documents/Edubrief_Dec2017.pdf
[419] AFRIVIP. (no date). Home Page. Retrieved from http://www.afrivip.org/education

- The Centre for Visual Impairment Studies is developing and implementing a postgraduate teacher qualification during the period from 2016 to 2020. OER will be developed as part of this initiative. This initiative is also funded by DHET.

- There are also individual initiatives to use OER in teaching — for example, Professor Linda van Ryneveld reports that she made extensive use of OER in modules that she taught over the past two years (using and producing OER).[420]

University of South Africa (UNISA)

UNISA has quite a well-developed OER information site, with links to OER created at Unisa.[421]

OERs form an integral part of the Unisa tuition environment. They take the form of OER integration into Unisa (tuition content already internationally available) and the internal production of OERs that offer a Unisa contribution (contextualized knowledge). In noting the above, Unisa is treading very cautious[ly] not to be hegemonized by Western knowledge through OER integration. This is in line with its ideological underpinning of Africanization and Decolonization. Hence, the emphasis on being an OER producer that speaks to the African context.[422]

The OER information site mentions the various funders for their OER, and these appear to be mainly donor funders.[423]

- Capacity building in OER is conducted by the Centre for Professional Development (CPD), which builds academics' awareness of OER and the appropriate licensing (through an online course and workshop facilitations). CPD also works on developing OER strategies with colleges and the different regional centres to fulfil the broader Unisa OER strategy vision (2017-2021). It is within this context that each academic college in Unisa has their own internal targets to produce a specific number of OER per year.

- Unisa has found that while there has been a major focus on OER integration in tuition (academic), the regional offices have been side-lined in the process. UNISA is thus working with these regional centres to develop regional strategies to produce OER suitable in the regional contexts.

- Unisa is currently rebranding its OER repository and the Unisa MOOC pilot project as a UNISA OPEN LEARNING SPACE.

- There is also some evidence of OER adoption at Unisa from conference papers presented. For example, Sphamandla L Mncube from the Department of Information Science presented the paper, 'Promoting open educational resources through library portals in South African Universities' in September 2018.[424]

University of the Western Cape (UWC)

- UWC has 'Library Guides' that students can access on various subject.[425] Some of these are OER.

- The School of Public Health created a repository of OER in Public Health in 2000, targeted at post-graduate students. [426]

Other evidence of nascent OER activity in South African Higher Education are described below.

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420 Email communication with Linda van Ryneveld, September 2018
421 UNISA. (no date). Open Educational Resources: Unisa and OER. Retrieved from http://libguides.unisa.ac.za/c.php?g=355663&p=2399098.
422 Email communication with Denzil Chetty. Received October 5, 2018.
423 See UNISA. (no date). Unisa Open — OER Funding. Retrieved from https://www.unisa.ac.za/sites/corporate/default/Unisa-Open/OER-Funding
424 see Department of Information Studies, University of Zululand. (2018). Conference Programme — 19th Information Studies (IS) Annual Conference. Theme: 'Navigating the digital economy'. 12-14 September 2018, Richards Bay, Kwazulu-Natal, South Africa. Retrieved from http://www.lis.uzulu.ac.za/conference/docs/19th%20Information%20Studies%20(IS)%20Annual%20Conference%20programe%20%2012-14%20September%202018.pdf
425 See UWC Library. (no date). Subject Guides. Retrieved from https://libguides.uwc.ac.za/?b=g&d=a
426 University of Western Cape. (no date). Repository of Open Education Resources in Public Health. Retrieved from https://www.uwc.ac.za/Faculties/CHS/soph/Pages/Open-Education-Resources.aspx

- At the Durban University of Technology, there is some anecdotal evidence of OER activity for economics indicated by a public lecture on 'Developing DUT's Economics Modules as Open Educational Resources'.[427]

- At North West University, Prof Jako Oliver has been appointed as a UNESCO Chair of Multimodal Learning and OER and is planning some OER research activities.

- Stellenbosch University's Faculty of Military Science (FMS) is involved in developing an OER portal which will support teaching and learning from first year level through to doctoral level. It will also act as a curation platform for key presentations by lecturers as well as podcasts, video clips and other material will be archived and curated on this portal for use by students here and elsewhere.

- University of Fort Hare participated in the TESSA initiative which was coordinated by the Open University (OU), UK and donor funded.[428]

- University of the Witwatersrand's Library has the most extensive OER portal for access to other institutions' OER,[429] but there no specific OER initiatives at this stage.

- At Vaal University of Technology, an article by Machika and Dolley (2018) mentions the potential of OER for VUT and develops a macro and meso-level framework for the possible implementation of OER at VUT.[430]

- University of Venda (UoV) participated in the ACEMaths Project: a Collective OER Initiative for Teacher Education run by SAIDE in 2007. UoV also reused the UCT OER, 'A guide for first year students' as-is in the same year in which it was published, namely 2009.[431].

- The University of the Western Cape (UWC) and the University of Cape Town (UCT) participated in an OER health initiative organized by OER Africa from 2008-2012, along with two Ghanaian universities--the University of Ghana and the Kwame Nkrumah University of Science and Technology. UCT produced 41 resources and UWC produced 24.

Overall as illustrated by the relatively few OER policies, strategies and/or initiatives elaborated upon in the OER Policy and the OER Initiative sections above, there is no demonstrable evidence that there is a wider acceptance of OER creation and distribution per se. In South Africa this may have to do with the Copyright Act of 1978 which grants employers (in this case universities), default copyright ownership over employee's 'creations' (e.g. textbooks, presentations, worked examples) undertaken in the course of their work. This has 'crucial implications for OER advocacy because it reveals that there are two potential agents of OER activity — the educator (use/creator) and the institution (default copyright holder)' (ROER4D, 2017, p.4). Thus according to Trotter (2016), if educators do not possess copyright over their teaching materials, it is difficult to encourage them to contribute OER when they have no legal standing to do so.[432] However, institutions can determine their own intellectual property policies thereby granting employees (i.e. academics in this case) copyright over

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[427] Pillay, K. (2017). DUT prof launches free open e-textbook to save students money. *The Mercury*. Retrieved from https://web.facebook.com/notes/the-mercury/dut-prof-launches-free-open-e-textbook-to-save-students-money/10154474146043208/?_rdc=1&_rdr
Sibiya, S. (2016). Prof van der Merwe talks 'free access' to DUT books. Retrieved from http://www.dut.ac.za/prof-van-der-merwe-talks-free-access-to-dut-books/

[428] Thakrar, J., Zinn, D. & Wolfenden, F. (2009). Harnessing Open Educational Resources to the challenges of teacher education in Sub-Saharan Africa. *The International Review of Research in Open and Distributed Learning*, *10*(4), 1–15. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/705/1319

[429] University of the Witwatersrand. (no date). Open Educational Resources for Humanities & Social Sciences: Introduction to OERs. Retrieved from http://libguides.wits.ac.za/c.php?g=145496&p=951909

[430] Machika, P. and Dolley, F. (2018). Framework for a Learning Management System at a University of Technology with a Weak Information Technology Maturity System. *South African Journal of Higher Education, 32*(2), 176–191. Retrieved from http://www.jsaa.ac.za/index.php/sajhe/article/download/1502/1779

[431] Driscoll, M. (2011). Open Education Around the World: Study.com Speaks with the University of Cape Town https://study.com/articles/Open_Education_Around_the_World_Education_Portal_Speaks_with_the_University_of_Cape_Town.html

[432] Trotter, H. (2016, June 1). How Intellectual Property (IP) policies affect OER creation at South African universities. Retrieved from http://roer4d.org/2298

their own work or assigning copyright to the institution. Trotter reports that currently 20 of the 25 universities in South Africa retain the copyright over academics' work and only five universities assign copyright to the academics allowing them to release their work under a licence of their choosing.[433]

As OER use and/or adaptation is inherently tricky to assess as the most permissive licensing allows for reuse without a share-alike commitment, it is not possible to comment definitively extended use of OER across all South African Higher Education institutions. However, the cross-regional survey undertaken in the ROER4D project which surveyed four South African institutions and 34 instructors reports that 35% university staff use OER, 32% do not and 32% are not sure. The use of OER by South African university staff is well below the 51% average use of OER in higher education institutions in the Global South.[434]

There is some discussion of OER in the South African media[435] which indicates that the OER concept is being discussed, but the concept of OER is not always that well explained or conflated with other 'open movements' such as open source.

Language(s) in which OER are produced

There are eleven official languages in South Africa. The most common language spoken as a first language by South Africans is Zulu (23%), followed by Xhosa (16%) and Afrikaans (14%). English is the fourth most common first language in the country (9.6%) but is understood in most urban areas and is the dominant language in government and the media. Most South African universities' language of instruction is in English, although Stellenbosch University has adopted a multilingual language policy. A Draft Language Policy for Higher Education is currently out for public comment. OER are predominantly produced in English, but there is one project, the Open Educational Resource Term Bank, is deliberately multilingual and includes common academic terms in all eleven languages.

OER Financing and Sustainability

The growth of OER is increasing at universities where either the institution or individual lecturers are able to attract funding from international donors and government to support OER initiatives. For example, at UCT OER have been supported through the Vice-Chancellor's special project fund and seed-funding provided for the development of MOOCs through a UCT-funded project. The Centre for Innovation in Learning and Teaching (CILT — formerly the Centre for Educational Technology) has been able to attract donor funding each year from 2007 to date in order to pursue an OER and Open Educational Practices (OEP) agenda.

The University of Cape Town and University of the North West have both been designated UNESCO chairs related to OER and have, by implication, underwritten some of senior academics' time to advance the OER cause.

However, at other universities there may be little awareness of OER:

> With little awareness amongst management [at University of Fort Hare] there is no official strategy or ambition towards OER, which means that the administration is unlikely to play any role in awareness raising activities. Given that lecturers lack permission to share their teaching materials as OER, the small proportion of lecturers who are aware of OER lack any formal incentive to spend time raising awareness amongst their colleagues. While they may able to proclaim the virtues of OER use, the fact that they cannot share their own materials as OER does limit its potential appeal in terms of the overall enterprise (Cox & Trotter, 2017b:311).

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433 Trotter, H. (2016, June 1). How Intellectual Property (IP) policies affect OER creation at South African universities. Retrieved from http://roer4d.org/2298

434 De Oliveira Neto, J.D., Pete, J., Daryono, J. & 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). Retrieved from https://doi.org/10.5281/zenodo.599535

435 Lubala, S. (2017, April 28). Open source is the future of teaching. *Mail & Guardian*. Retrieved from https://mg.co.za/article/2017-04-28-00-open-source-is-the-future-of-teaching
    Trotter, H. (2018, February 27). Opportunities and obstacles for open education. *University World News, 494*(1). Retrieved from http://www.universityworldnews.com/article.php?story=20180223045114408
    Trotter, H. (2016, June 1). How Intellectual Property (IP) policies affect OER creation at South African universities. Retrieved from http://roer4d.org/2298

As mentioned above, the ROER4D research the cross-regional study by De Oliviera Neto et al. established that of the 34 educators who responded from four higher education institutions in South Africa, 35% reported using OER, 32% said they were not sure and 32% declared that they had not used OER (2017: 81). Only 15% of educators reported adapting existing OER, while 85% did not. Eighteen percent of lecturers confirmed that they had indeed created openly licenced materials, but 82% had not created OER. The average of the use of OER across the 295 educators across all nine countries surveyed suggests that South African OER use in higher education institutions is moderate to poor and that OER adaptation of 15% is similar to the average of 18% revealed across all 28 institutions surveyed in nine Global South countries. The creation of OER by higher education educators in South Africa (18%) is a little lower that the average of 23% in the nine Global South countries surveyed.[436]

Overall, countries in the Global South should be creating more of their own OER that draw on local epistemic perspectives, local examples and are shared in local languages. More adaptation would fulfil the value proposition of OER more directly and allow for localization and translation. Higher use (i.e. reuse 'as-is') is not unilaterally recommended as the challenges are that this type of OER copying may unwittingly entrench Western epistemic positions, sustain the hegemony of the English language and unintentionally weaken alternative perspectives on knowledge. One example that most intentionally includes marginalized languages is the OER Term Bank mentioned above. Another set of open educational textbooks/websites specifically targets Developing Countries where ear, nose and throat (ENT) surgery is practised differently 'e.g. open partial laryngectomy, oncologic surgery without radiation or chemotherapy, open sinus surgery, and hammer-and-gouge mastoid surgery.'[437]

The South African DHET has shown that it is willing to fund cross-institutional OER development activities (e.g. the OER Term Bank) and this is an encouraging development. It may be able to attract funding from the European Union or from local commercial enterprises, for example, to fund additional OER projects that benefit all the HEIs in South Africa. One of the most promising is the currently closed, Open Architecture project,[438] where a private-public partnership has been established between industry and a university. The developers of this initiative are willing to consider making the materials openly available. However, currently the partnership is exclusive to the Cape Peninsula University of Technology and the architects in the industry.

Research and Evaluation

Several research papers have been prepared on OER in Higher Education in South Africa, for example:

- Arinto, P.B., Hodgkinson-Williams, C., King, T., Cartmill, T. & Willmers, M. (2017). Research on Open Educational Resources for Development in the Global South: Project landscape. In C. Hodgkinson-Williams & P.B. Arinto (eds). *Adoption and impact of OER in the Global South, 3–26*. Retrieved from https://doi.org/10.5281/zenodo.1038980

- Arinto, P. B., Hodgkinson-Williams, C. & Trotter, H. (2017). OER and OEP in the Global South: Implications and recommendations for social inclusion. In C. Hodgkinson-Williams & P.B. Arinto (eds). *Adoption and impact of OER in the Global South, 577–592*. Retrieved from https://doi.org/10.5281/zenodo.1043829

- Cox, G. (2013). Researching Resistance to Open Education Resource Contribution: An Activity Theory Approach. *E-Learning and Digital Media, 10(2)*, 148–160. Retrieved from http://dx.doi.org/10.2304/elea.2013.10.2.148

- Cox, G. (2016). Explaining the relations between culture, structure and agency in lecturers' contribution and non-contribution to Open Educational Resources in a Higher

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[436] De Oliveira Neto, J.D., Pete, J., Daryono, J. & 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). Retrieved from https://doi.org/10.5281/zenodo.599535

[437] University of Cape Town. (no date). Developing World ENT. Retrieved from http://www.entdev.uct.ac.za/

[438] Open Architecture. (no date). Home Page. Retrieved from http://www.openarchitecture.co.za/

Education Institution. PhD Thesis, University of Cape Town. Retrieved from https://open.uct.ac.za/handle/11427/20300

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- Cox, G. & Trotter, H. (2017b). Factors shaping lecturers' adoption of OER at three South African universities. In C. Hodgkinson-Williams & P.B. Arinto (eds.). *Adoption and impact of OER in the Global South, 287–347.* Retrieved from https://doi.org/10.5281/zenodo.601935

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- Czerniewicz, L., Deacon, A., Walji, S. & Glover, M. (2017). OER in and as MOOCs. In C. Hodgkinson-Williams & P.B. Arinto (eds.). *Adoption and impact of OER in the Global South, 349–386*. Retrieved from https://doi.org/10.5281/zenodo.604414

- Czerniewicz, L., Cox, G., Hodgkinson-Williams, C. & Willmers, M. (2015). Open Education at the University of Cape Town. In C. J. Bonk, M. M. Lee, T. C. Reeves & T. H. Reynolds (eds.). *MOOCs and Open Education Around the World*. London: Routledge.

- de Hart, K., Chetty, Y. & Archer, E. (2015). Uptake of OER by Staff in Distance Education in South Africa. *International Review of Research in Open and Distributed Learning, 16(2)*, 18–45. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/2047

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- 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, 69–118*. Retrieved from https://doi.org/10.5281/zenodo.599535

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- Thomas, D. (2017). OER adoption at the Durban University of Technology: a library perspective. *HELTSA Conference, 21-24 November.* Durban, South Africa. Abstract retrieved from http://www.dut.ac.za/wp-content/uploads/2017/03/Programme-and-Book-of-Abstracts.pdf

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- Wolfenden, F. & Laidlow, M. (eds.). (2012). *TESSA case studies 2010–2011*. Milton Keynes: The Open University. Retrieved from http://www.tessafrica.net/sites/www.tessafrica.net/files/files/TESSA_Case%20studies_combined_final.pdf

The research studies undertaken as part of the ROER4D project provide clear policy directions.[439] The key policy-related finding is ascertaining whether the institution or the individual holds the copyright over the teaching and learning materials produced in the course of HE educators' work. If it is the institution, then funding activities need to be offered directly to institutions to create, adapt, and maintain OER; and the institution needs to provide a repository where OER can be uploaded, maintained, actively marketed and analytic data provided on its use. If it is the individual, then individual grants can be awarded to individual educators or, preferably teams of educators across institutions, to create and adapt OER. The individuals will need to identify host-sites (for example, YouTube — for video) which provide marketing and data analytics.

The following key research questions may be worth exploring within the South African context:

1) What are the perceptions of the value proposition of OER to the institutions currently not, at least publicly, engaging with OER or their associated open educational practices?

2) How are students using OER, open textbooks and general resources on the Internet? (the ROER4d research suggests that students not aware of whether materials on the Internet are OER or not)

3) How could private-public partnerships advance OER in South Africa?

CONCLUSION

For South Africa to realize the educational potential of OER more effectively, the following is recommended:

- Undertake OER readiness research at the 26 universities.

- Hold a high-level seminar with University senior management and university lawyers to review their IP policies and procedures to identify barriers to optimising intellectual capital.

- Fund cross-institutional OER development and adaptation, in association with lecturers and senior students, to best address the need for suitable materials for the South African higher education context. This could be through government, industry, and donor partnerships.

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[439]   Arinto, P.B., Hodgkinson-Williams, C. & Trotter, H. (2017). OER and OEP in the Global South: Implications and recommendations for social inclusion. In C. Hodgkinson-Williams & P.B. Arinto (eds*). Adoption and impact of OER in the Global South*, 577–592. Retrieved from https://doi.org/10.5281/zenodo.1043829

Tanzania

Introduction

The primary focus of the Tanzania OER case study is the Higher Education Sector. Most of the work on Open Educational Resources (OER) in this sector has been by the Open University of Tanzania (OUT).[440]

OUT's interest in OER evolved from the mid-1990s when it first prepared study materials for OUT students, following its establishment in 1992. These resources were prepared using study materials from Indira Gandhi National Open University (IGNOU)[441] and the Kikuyu campus of The University of Nairobi.[442] The agreement with IGNOU included permission to use their materials free of charge, but the materials from Kenya were purchased at a nominal fee. Upon realizing the increasing costs and unsuitability of the materials, the OUT embarked on preparing localized study materials, which were initially sold to students.

In 2008 the OUT promulgated a policy on research, publications, and operational procedures. This policy was accompanied by various incentives including financial incentives, publication credits for promotion, and public recognition of authors as special achievers. Although these incentives were focused on online and distance learning (ODL), they were a precedent for the later promulgation of the university's OER policy and practices.

OER sensitization intensive staff education programmes for academic staff and development have been carried out in collaboration with OER Africa and the Commonwealth of Learning (COL). COL principally funded training workshops and supported the preparation of the OUT's OER policy. This OER policy was formally approved by the University Council in 2016. The result of this, coupled with OUT's decision in 2016 to offer most undergraduate and postgraduate courses in an online mode, is that OUT's courses are being edited to acknowledge original sources and to ensure that they are released under the Creative Commons Attribution (CC-BY) licence. Currently, there are 711 course outlines in OUT's learning management system[443] or via the general OUT website[444] although this is password-protected.

There have also been efforts to develop OER materials by individuals or some units at Mkwawa University College of Education (MUCE) through the African Teacher Education OER Network (ATEN) supported by OER Africa. However, OER is not yet widespread and there is insufficient knowledge about OER among academic staff across several institutions.[445]

OER Policies

In Tanzania, there are no national policies or legislation guiding the use of OER, or the production of study materials using public funds. There is also no national ODL policy, and it is believed that this contributes to the absence of a national OER policy. While the 2016 ICT policy,[446] focuses on enhancing 'local content in all aspects of ICT value chain and local hosting of electronic services', there is no specific mention of OER. Section 3.4 on E-services and Local Content Development; the policy in section 3.4.2 provides three reasons for low or limited local content development as being:

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[440]   Open University of Tanzania. (no date). Home Page. Retrieved from https://www.out.ac.tz/index.php?lang=

[441]   http://ignou.ac.in

[442]   http://www.uonbi.ac.ke

[443]   OUTLeMS. (no date). Login Page. Retrieved from https://elms.out.ac.tz/login/

[444]   The Open University of Tanzania. (no date). Home Page. Retrieved from https://www.out.ac.tz/

[445]   Mtebe, J.S. and Raisamo, R. (2014a). Challenges and Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL), 15*(1), 249-271. Mtebe, J.S. & Raisamo, R. (2014b). Investigating Perceived Barriers to the Use of Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL), 15*(2), 43-66.

[446]   The United Republic of Tanzania — Ministry of Works, Transport and Communication. (2016). National Information and Communications Technology Policy. Retrieved from https://tanzict.files.wordpress.com/2016/05/national-ict-policy-proofed-final-nic-review-2.pdf

1) Lack of policy and legal framework on local traffic and hosting,

2) Lack of policy for promotion of local content development in the country, and

3) Inadequate competence and investment from both the public and private sectors.

The general picture is a lack of funding for implementation of the National ICT policy, and no explicit budget line for public funding of OER in any education sector. At Open University of Tanzania (OUT) however, OER is funded largely from funds that are self-generated by OUT as well as occasional funding from some foreign funding sources. Furthermore, OUT does have two policies which relate to OER:

Open Educational Resources (OER) Policy for The Open University of Tanzania (2016). — https://www.oerafrica.org/resource/open-educational-resources-oer-policy-open-university-tanzania

This institutional policy notes that OER are the principal sources of study materials at OUT and encourages staff to take interest in producing OER. The specific objectives of the policy are:

i) To provide guidelines on how to formulate the necessary strategic outputs, tasks and performance indicators to achieve OER creation and integration in the development and delivery of OUT courses;

ii) To develop awareness about the concept and practices related to OER among all OUT academic community and the general public;

iii) To guide capacity building among the academic staff and supporting personnel for the creation, identification, storing and integration of OER in their courses;

iv) To ensure preparation of all required guidelines and manuals for OER creation, integration and dissemination including open licensing procedures.

Typically, public higher education institutions use their own budgets to support OER development. At OUT, the process usually involves external reviews by academics who do not teach at the institution in which materials are prepared, thus encouraging better quality of materials. The materials are released under a CC-BY licence after an audit of the materials.

OER Use and Adoption

Open University of Tanzania

In addition to OUT's work in converting their courses to OER (as described in the introduction), OUT was also involved in other OER projects. for example, in 2005, OUT participated fully in two African-wide OER initiatives:

- OUT worked with other African universities to produce the first set of African Virtual University's (AVU) OER in Science, Mathematics, ICT and Education.[447]

- OUT is also a founder member of TESSA, an International Research and Development Initiative for Teachers in Sub-Saharan Africa that led to production of OER for primary and secondary schools in four languages (English, French, Portuguese, and Kiswahili).[448]

OUT was also one of the first Tanzanian universities to host MIT's open courses on its website in 2008. OUT has also used existing Memoranda of Understandings (MOUs) with The National Open University of Nigeria (NOUN) and Zimbabwe Open University (ZOU) to adopt and adapt some of their materials under the CC-BY licence.

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[447]   These course materials are available from https://www.avu.org/avuweb/en/programmes-and-courses/courses, htpps://oer.avu.org/handle/123456789/86, and https://elms.out.ac.tz/login
[448]   See https://www.tessafrica.net

OUT, together with the Dar es Salaam University College of Education (DUCE)[449], and the Tanzania Education and Research Network (TERNET)[450] is also collaborating with OER Africa on an initiative focusing on creating OER aligned to the professional development needs expressed at each of the institutions concerns.

OER at Mkwawa University College of Education (MUCE)

Mkwana University College of Education (MUCE), a constituent college of the University of Dar es Salaam (UDSM), participated in OER sensitization workshops hosted by OER Africa, during which staff expressed interest in improving their course materials by integrating OER. This engagement resulted in several OER being developed and adapted by MUCE staff. The first three draft OER materials were produced in 2012, focusing on 'Improving Content Mastery of Pre-service Teachers'. The following OER were produced under a CC-BY licence:

- Analysis 2 (Mathematics),

- Basic Concepts in Education and Measurement and Review and

- Social Science Methods for Pre-service Teachers.

The predominant languages used for teaching in Tanzania are English and Kiswahili languages, and OER are mainly produced in English.

OER Financing and Sustainability

Funding for OER in Tanzania is insufficient. However, once more public funds are made available, it will be necessary to have national plans on how to effectively allocate such funds. Currently, as noted above, very few Tanzanian institutions have adopted OER development and utilization. For those that have, OER has little or no impact on the design and development of educational resources as each institution adapts and adopts OER to suit its institutional style and needs. There is a reasonable balance between OER efforts of using and adapting existing materials compared to producing new materials — when staff are educated about OER, they prepare new OER material or adopt and adapt other materials.

Research and Evaluation

There is limited research on OER in Tanzania to date and most of it has been in assessing interest in accessing and adopting OER. Existing research has not documented the work that OUT has done in OER, with research by Mtebe et al.[451] neglecting to mention the role played by OUT on OER in Tanzania. There are currently a few PhD research efforts on OER at OUT focusing on the challenges and success factors for developing OER.

Other examples of OER research conducted in Tanzania are:

- Haule, M.J. (2015). Open Educational Resources Utilisation in Tanzanian Higher Learning Institutions, *College of Business Education Journal*, *1*(1). Retrieved from www.bcj.cbe.ac.tz/index.php/bej/article/view/5

- Komba, W., and Mays, T. (2014). Mkwawa University College of Education (MUCE) and University of Dar-es-Salaam (UDSM), Tanzania Integrating OER into Teacher Development Programmes: A Case Study. Retrieved from https://www.oerafrica.org/download/file/fid/6738

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[449]   University of Dar es Salaam, Dar es Salaam University College of Education. (no date). Home Page. Retrieved from http://duce.ac.tz
[450]   Tanzania Education and Research Network. (no date). Home Page. Retrieved from https://www.ternet.or.tz
[451]   Mtebe, J.S. and Raisamo, R. (2014). Challenges and Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL), 15*(1), 249-271.
        Mtebe, J.S. & Raisamo, R. (2014). Investigating Perceived Barriers to the Use of Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL), 15*(2), 43-66.

- Mtebe, J.S., and Raisamo, R. (2014a). Challenges and Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL). 15*(1), 249-271. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1687/2771

- Mtebe, J.S., and Raisamo, R. (2014b). Investigating Perceived Barriers to the Use of Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL). 15*(2), 43-66. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1803/2841

- Nihuka, K.A., Mbwette, T.S.A., and Kihwelo, P. (2014). Open Educational Resources Initiative at The Open University of Tanzania: Challenges and Lessons Learned. Retrieved from http://repository.out.ac.tz/400/1/Nihuka%2C_K._A.%2C_ Mbwette%2C_T._S._A.%2C_Kihwelo%2C_P._F._%282014%29._OER_initative_at_the_ open_university_of_Tanzania.pdf

- Samzugi, A.S. & Mwinyimbegu, C.M. (2013). Accessibility of OER for Distance Learners: The Case of OUT. *HURIA Journal of the Open University of Tanzania*. *4*(1). Retrieved from https://www.ajol.info/index.php/huria/article/view/110779.

Research issues that could potentially be explored are:

- The impact of conversion of OUT study materials into OER on the learners from different universities in Tanzania (other non-OUT students who use these materials)

- Investigate the efficacy of Tanzanian universities preparing OER as individual universities compared to forming joint national authorship teams for different subjects.

Conclusion

Mtebe and Raisamo (2014b) identified several barriers hindering OER adoption in Tanzania higher education institutions, which need to be addressed for effective adoption of OER: lack of access to computers and the Internet, low Internet bandwidth, lack of policies, and lack of skills to create and/or use OER.[452] Thus, to enable Tanzania to realize the educational potential of OER more effectively, the following is recommended:

- Educate all Tanzanian academicians the meaning and importance of OER to increase awareness.

- Develop a national OER policy to drive OER use.

- Create a strategic plan outlining the role of OER in Tanzania including joint initiatives by public and private universities. This could for example, include OUT working with other Tanzanian universities to convert its materials into OER.

Tunisia

Introduction

The case study on OER in Tunisia focuses on the university sector. There are two institutions that have interest in OER, viz: The Virtual University of Tunis (VUT), and the University of Sousse.

The VUT was established in 2002 as a public university with the main objective of creating online learning and assisting and supporting other public universities in using ICT. The VUT is the

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[452]   Mtebe, J.S. and Raisamo, R. (2014b). Investigating Perceived Barriers to the Use of Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning (IRRODL), 15*(2), 43-66. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1803/2841

administrator of the LMS (Moodle) for all the other public universities in the country. Given its objective, the VUT participates in international projects related to ICT in higher education, such as:

- REFRER project (Réseau francophone de ressourceséducativesréutilisable) — a French-speaking network of reusable educational resources. The objective of this project, which is financed by 'the International Organization of La Francophonie', is mainly to offer access to educational resources and provide a reference to database management.

- IDNEUF project (Initiative pour le développementnumérique de l'espaceuniversitaire francophone) — an initiative for digital development of the French-speaking university space which offers (i) many educational resources in French (courses, slideshows, tutorials, questionnaires, reference lists, self-assessments, etc.) and (ii) the possibility that users can contribute to the meta-portal by referencing or proposing resources.

The University of Sousse became involved in OER through the University Twinning Network (UNITWIN)/UNESCO Chairs in open educational resources. A hub has been constituted at the University of Sousse with the objectives of raising awareness about OER and establishing/customizing a platform able to host educational resources. The vision was to create a receptive environment concerning the idea of the openness of educational resources. In this vein several awareness-raising actions have taken place, including

- a Barcamp on OER as a participation of this university to the Open Educational week 2016.[453]

- A round table about the promotion of the platform of the University of Sousse.[454],[455]

- The First seminar on OER.[456]

- A Facebook page[457]

The concept of OER is not widespread in Tunisia. The main reason for this situation is the specific Tunisian university context. More particularly,

- The VUT whose platform hosts OER and other digital resources has limited interactions with the other public universities which have the larger mass of students and faculties.

- Public and private universities not only have a limited use of ICT in teaching, but also have no incentive and no obligation to use ICT and/or interact with VUT. This implies that awareness about OER and easy location of resources are a major obstacle to be addressed. The result is that OER repositories are to a large extent unused and unknown.

- Apart from VUT, other public universities have no proper online storing space, as this is meant to be centrally provided by the VUT.

The few people who have heard of OER are of the view that it is difficult to implement it in the Tunisian context.The VUT itself recognizes this, as evidenced in its development plan,[458] which acknowledges the following:

> the 'VUT' has an online database of validated educational resources produced by Tunisian teachers and / or international partners. This hitherto little used resources because they are little known will be the object of a targeted communication, in the first place on the VUT website[459]

453 Open Education Week. (2016). Barcamp OER. Retrieved from https://www.openeducationweek.org/events/barcamp-oer

454 Open Education Week. (2017). OER Sousse 2017. Retrieved from https://www.openeducationweek.org/events/oersousse2017

455 OER Univ Sousse You Tube page. Retrieved from https://www.youtube.com/channel/UCoQxW59qmHjfWMsNKwVmxPA/videos?shelf_id=0&sort=dd&view=0

456 UNESCO and The UNESCO Chair on Open Educational Resources, University of Sousse, Tunisia. (2016). Les RessourcesÉducativesLibres REL. Retrieved from http://www.services.uc.rnu.tn/oer/index.html

457 See https://www.facebook.com/Unesco-Univ-Sousse-OER-1858872431048236/

458 Université Virtuelle de Tunis. (2016). 2016 — 2019 Plan Stratégiquestratégique — Enquête de deveniruneuniversitéinnovantede référence à l'échellenationale et internationale. Retrieved from http://www.uvt.rnu.tn/documents/plan-strg-uvt.pdf

459 The VUT development plan is in French. Specifically it states' The 'vut' dispose en ligne d'une importante banque de ressources éducatives validées produites par des enseignants tunisiens et/ou par des partenaires internationaux. Ce corpus jusqu'alors peu utilisé car peu connu sera l'objet d'une communication ciblée, en premier lieu sur le site de l'UVT.

The same sentiment has been echoed by others. For example, Professor Lilia Cheniti (head of online learning department in the university) noted the absence of open practices in her interview with SlideWiki. The SlideWiki question was 'How does your organization plan to use the SlideWiki platform beyond the duration of the project' Professor Lilia Cheniti starts her response by précising that 'A culture of open access and open resources is lacking in Tunisian universities. This is particularly true in my university, where I am Assistant professor and Head of the Online Learning Department.'[460]

Relevant Policies

VUT's 2016-2019 Strategy — http://www.uvt.rnu.tn/documents/plan-strg-uvt.pdf

The VUT has a twofold objective: the first is to raise the visibility of the existing educational resources and the second is to develop new resources to meet the expectations of students, businesses and civil society. There is no explicit financial commitment associated with this strategy.

In Tunisia, most educational materials are not accessible via the Internet. In practice, professors prepare the educational material that s/he personally use in the classroom. There is neither incentive nor a regulation that constraints him/her to upload the educational resources to the LMS. However. in cases where a Professor wants to do this, he (she) needs to follow administrative procedures in both his/her university and the VUT. The reason for this dual process is because:

- The LMS is centrally managed by the VUT.

- Universities are not fully competent in the Learning Management System (LMS). In practice, universities (apart from the VUT) do not have the dedicated personnel to manage digitized educational resources.

Once this is done and the educational resource is hosted, it becomes available only to faculties and students enrolled in Tunisian national universities. It thus becomes a digital educational resource but not an open one.

Even though there is no specific legal mention, some educational resources hosted at VUT, titled 'e-doc', are freely accessible. There is no statement on VUT's site specifying the legal status of the educational resources, and it is unlikely that legal issues would emerge concerning educational resources in the Tunisian context.

There is no commitment to OER at the governmental level, and thus no requirement that materials produced by public funds should be released as OER.

OER Use and adoption

Virtual University of Tunis — e-doc — http://pf-mh.uvt.rnu.tn/

This is a repository where courses in various disciplines are hosted. However, since 2013, only Master theses of VUT students have been deposited. These are considered OER but cannot be remixed as they are released in a pdf format. The repository is open to students, professors and the general public. Given the financial crisis that the country is experiencing there is no potential for sustainability

Réseau francophone de ressourceséducativesréutilisables (REFRER) — Francophone Network of Reusable Educational Resources Project http://www.refrer.licef.ca/

The Francophone Network of Reusable Educational Resources Project (REFRER) is a project financially supported by the International Organization of La Francophonie. The project ran over 24 months and ended in December 2014. Its objectives were as follows:

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[460] Garatzogianni, A. (2018). SlidewikiInterview with Prof. Lilia Cheniti at the University of Sousse, Tunisia. Retrieved from https://slidewiki.eu/2018/08/28/slidewiki-interview-with-prof-lilia-cheniti-at-the-university-of-sousse-tunisia/

- Promote the benefits of teaching and learning;

- Provide access to OER; and

- Provide support to participants and communities through providing technical and methodological guides for the different stakeholders involved in a resource bank: manager, evaluator, contributor/author, (re-) user and indexer

Project partners were from the following countries and organizations

- Canada
  - Centre LICEF, Télé-université
  - Responsible principal et Gestionnaire du projet
- France
  - Fondation UNIT — UniversitéNumériqueIngénierie et Technologie
- Morocco
  - EspaceNumériqueOuvert pour la Méditerranée (e-Omed)
  - Coordonnateur SUD
  - Ecole Mohammadiad'Ingénieurs
  - Ecole Supérieure de Technologie Fès
  - Ecole Supérieure de Technologie de Salé
- Tunisia
  - UniversitéVirtuelle de Tunis

VUT was particularly concerned with

- establishing a tool (ORI-OAI) that is interfaced to the VUT digital working environment.

- developing a quality method i.e. Quality for Reuse (Q4R)[461] that is adapted to the Tunisian

The project received international funding, which ended at the close of the project.

Initiative pour le développementnumérique de l'espaceuniversitaire francophone (IDNEUF) — Initiative for the digital development of the French-speaking university space — https://www.auf.org/nouvelles/actualites/idneuf-des-milliers-de-ressrouces-educatives-libre/

IDNEUF's objective is to offer a 'meta-portal' providing free access to Francophone educational resources. The meta-portal would facilitate attaining and pooling of these resources and promote access to all students, teachers, researchers and public trainees. It offers numerous French-language educational resources (courses, slideshows, tutorials, questionnaires, reference lists, self-assessments, etc.) in open access. Considering its objective and functionalities, IDNEUF tackle OER. However (apart VUT) Tunisian universities are not directly involved in this project. They are not necessarily aware about its existence and are not legally required nor encouraged to use the resources it contains. The initiative is funded by the Francophone University Agency and is regarded as sustainable.

UNITWIN/UNESCO Chairs Programme

The aim of the UNITWIN/UNESCO Chair is to raise awareness about OER and pave the way to establish the necessary technological infrastructure to host OER. The Chair is currently hosted at the university of Sousse. There is no funding for this.

SlideWiki — https://slidewiki.eu/about/

SlideWiki is funded under the Horizon 2020 EU research and innovation funding programme, covering the period from 1 January 2016 to 31 December 2018. Its main objective is to create an open source online platform dedicated for OpenCourseWare (OCW) that permits

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461   Quality for Reuse. (no date). Home Page. Retrieved from http://www.q4r.org/Home/tabid/74/language/en-US/language/fr-FR/Default.aspx

the creation and the sharing of OER in the form of slides. This platform semi-automatically translates the content into more than 50 different languages.The University of Sousse is subcontracted by the SlideWiki Consortium Partners for the external trials of the SlideWiki platform over its final year.

Officially, Tunisia is an Arab country, henceforth Arabic is formally the official language; yet French is widely used. Legislative texts for example are published in both languages (Arabic and French). Moreover, the spoken language is the Tunisian Dialect which is a mixture of Arabic, French and Italian. The overwhelming majority of courses are taught in French. A very small proportion of courses are delivered in Arabic. These courses are in general in the domain of humanities (Arabic literature, law, history). The educational resources that exist in VUT's free repository are predominately in French, and there are not more than a dozen documents written in Arabic.

OER Financing and Sustainability

There has been no deliberate national investment dedicated to producing OER, with OER production completely dependent on international projects. Little has been done in terms of awareness, dissemination, and incentives to encourage faculties to use, reuse, and re-mix the existing materials.

As highlighted above, the main OER producer in Tunisia is the VUT. This institution has no clear legal connections with the other universities, and thus few professors participate in VUT-organized activities. Although there are no institutional constraints to prevent professors for accessing VUT's services which are offered for free, there are no incentives (moral nor financial) to encourage faculty members to use the VUT free educational materials. Moreover, the VUT is located in an independent building in the capital, far from any university. This geographical location has contributed to the general lack of awareness of VUT's activities, projects, and events by the majority of Tunisian faculties.

REFRER and IDNEUF resources are available on VUT's website. VUT has also linked to MIT's OpenCourseWare. There is no known/documented initiative focusing on ensuring investment of the educational material that ensures a greater diversity. The OER initiatives are not sustainable in that there is no explicitly defined mechanism to generate funding. There is no business model behind the production of OER and more generally the mechanism of creating social value from OER is to a large extent fuzzy. Henceforth, for the moment, the OER production mechanisms are far from being self-sustained.

Potential areas for improvement are:

- Considering the scarcity of financial resources and the difficulty of institutional change for the transitional economies like Tunisia, the focus should be on the most cost-effective ways to introduce OER. One way of doing this is to consider OER use as a requirement for faculty promotion.

- Consider the implementation of decentralizing ICT services. There needs to be an increased understanding and acknowledgement that the use of educational platforms is not synonymous with distance learning and that the use of ICT needs to be introduced in teaching. Adequate ICT infrastructure and the necessary personnel to support and maintain ICT systems are a requirement to use OER in higher education.

- Include open licences such as the Creative Commons licences within the National Intellectual Property Rights legislation.

- Encourage universities (either public or private) to use and produce OER by providing grants.

- Increase awareness and work at changing mindsets to promote new skills and creative thinking. This can focus on the following:

  ◦ Developing Professors' ICT skills;
  ◦ Emphasize the value of sharing resources and knowledge;

- ◦ Increase awareness and enhance understandings of OER;
- ◦ Provide incentives (monetary and non-monetary) related to the use and production of OER. More explicitly, the university should reward both students (in terms of grades) and professors (in terms of revenue) when producing or using OER.
- ◦ Identify and reward change agents/champions among professors.

Any approach to promote OER also needs to take cognisance of the current context. Professors in the Tunisian context act in a cultural context and education system where they are responsible for their classroom and retain the final say over all the educational materials. Any change from this closed, centric setting to a collaborative situation is very challenging, and needs to be addressed with sensitivity particularly with regard to the design of appropriate incentive schemes.

Additionally, under current regulation, faculty members are tenured within two or three years. After this period, there is an absence of any monetary incentive that may push them to make any effort. This characteristic makes any change in the higher educational sector (especially a change that requires supplementary efforts) very difficult (if not impossible) to introduce. In this very particular demotivating context, it becomes of crucial importance to introduce the above-mentioned measures as incentives.

Research and Evaluation

There has been no study commissioned by the government that is related to OER. Furthermore, there are no research reports that provide any rationale for policy and funding to promote OER. Thus, the following research issues can potentially be explored in the Tunisian context:

Institutional level

- Explore the extent to which OER use will likely alleviate the pressure on higher education institutions, as universities situated in the capital Tunis and in the coastal towns suffer from overcrowding and they face the challenge of meeting enrolment demands. It may be worthwhile to investigate the potential benefits of students using OER (in terms of meeting the demand) and universities themselves (in terms of the management of the available spaces).

- Analyze institutions' organizational process and practices to assess how they could support/impede the production and better use of OER. This will include assessing formal and informal rules impacting on OER and how organizational actors (faculties, students and administrators) implement these rules. This will allow for guidance in modifying legal and regulatory practices towards adequate OER financing and producing systems that foster OER practices in the Tunisian context.

Professor level

- Analyse the perception of the professors related to OER adoption and use.

- Understand the potential fears and concerns that professors have regarding OER.

Societal level

- Analyse the benefits of OER in terms of informal education and assess the possibility of capitalizing on using OER in this sector.

- Analyse the cost benefits of OER.

Conclusion

To enable Tunisia to realize the educational potential of OER more effectively, the following is recommended:

- Establish ICT departments at each Tunisian university so that they are not legally dependant on VUT for ICT support.

- Introduce a new regulation that eases the legal obligation of the face to face teaching and permits a flexibility in the education system by allowing distance/virtual teaching to be implemented along with the current system that requires physical attendance. Even though it is possible that professors interact with their students through the LMS, their efforts are not legally recognized and therefore they could not be monetized. Moreover, student grading is based on in-person examinations. This exclusive classroom–based physical system that was been established well before ICTs were available needs to be relaxed to be able to harness the potential of ICTs.

- Design incentives to encourage faculties to use OER, and perhaps make OER use a requirement for eligibility in certain positions, for example, the promotion from assistant to associate or to full professor should (to a certain extent) depend of the production and/or use of OER.

United Kingdom

Introduction

The focus of the UK case study is on higher education and informal learning.

The Joint Information Systems Committee (JISC) is a national educational technology organization, providing infrastructure (including the high-speed Joint Academic Network — JANET), services, and research for the higher education sector. JISC worked with the Higher Education Funding Council for England (HEFCE), which oversaw funding to universities (this has since been replaced by the Office for Students, OfS), to launch a major OER initiative in 2009 called the UKOER programme. This ran from 2009-2012[462] and was conducted in three phases with 65 OER projects, covering a range of issues related to OER. This includes projects to develop and release OER, research into OER impact, and toolkits for OER adoption. The programme was very successful in raising awareness of OER and led to the founding of the annual OER conference in 2010 which, although initially focused on the UKOER community, has since expanded to a more international audience. The conference has been held annually since 2010 and its continued growth is symptomatic of a resilient OER community in the UK, whose foundations lie in the UKOER programme.

In 2006, the UK Open University (OU) received funding from the Hewlett Foundation to launch the OpenLearn OER repository. OpenLearn hosts content produced as part of the Open University's distance learning courses, as well as bespoke material. This has gone on to be the largest OER repository in the UK, with over 12,000 hours of OER material, open courses, and badged content. It receives around 9 million visitors annually.

Although OpenLearn is focused on OpenUniversity material, it also has a companion site OpenLearn Create where anyone can create and host content. However, it is primarily a single institution solution. In contrast, JISC founded JORUM, the UK OER repository in 2002. This housed OER from all UK higher education providers under a range of Creative Commons licences. It acquired approximately 16,000 resources. It was closed in 2016, and around 9,000 of these resources were migrated as part of an app store. It covered all disciplines in its content, and although it had a dedicated following, it was closed because its impact was not felt to match the investment required to maintain it as an ongoing service.

There is general acceptance of openness in education in the UK, allied to open access policies associated with publication, and evidenced by the continued success of the OER conference. However, the closure of JORUM, and the discontinuation of nearly all the projects funded under the JISC UKOER programme once funding ceased, indicates that sustainability is an issue. This has been related to later investment in MOOCs from many universities, which in some respects have superseded OER as the main open education focus.

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462   see JISC. (no date). Open Education. Retrieved from https://www.jisc.ac.uk/rd/projects/open-education

Open access policy — http://www.hefce.ac.uk/rsrch/oa/

In the UK, four Higher Education Funding Bodies — Research England, the Scottish Funding Council (SFC), the Higher Education Funding Council for Wales (HEFCW), and the Department for the Economy, Northern Ireland (DfE) — provide 'block grant funding' to support research infrastructure and enable institutions to undertake ground-breaking research. These higher education funding bodies introduced a policy for open access publications. The policy states that, to be eligible for submission to the Research Excellence Framework (REF 2021),[463] authors' final peer-reviewed manuscripts must have been deposited in an institutional or subject repository. Deposited material should be discoverable, and free to read and download, for anyone with an Internet connection. Its intention, like most OA policies, is to make publication that arises from publicly funded research available to all.

Leicester OER for schools — https://schools.leicester.gov.uk/services/planning-and-property/building-schools-for-the-future-bsf/open-education-for-schools/

Leicester City Council has given permission to the 84 community and voluntary controlled schools across the city to create and share OER, by releasing the learning materials they create under an open licence. By default, the rights of work created in the line of employment are assigned to the employer, unless a specific agreement has been made. This permission makes sharing resources simpler for everyone at these schools.

Edinburgh University — https://www.ed.ac.uk/files/atoms/files/openeducationalresourcespolicy.pdf

The University encourages staff and students to use, create and publish OER to enhance the quality of the student experience, provided that the resources are fit-for-purpose and relevant. The policy states the following:

2. Use, creation and publication of OERs are consistent with the University's reputation, values and mission to 'make a significant, sustainable and socially responsible contribution to Scotland, the UK and the world, promoting health and economic and cultural wellbeing.'

3. It is expected that OERs used, created or published by individual staff and students will normally be single units or small collections (e.g. podcast episodes, small collection of images, etc.).

4. Whether or not OERs are used or published in a School, Department or Service is ultimately a decision for the Head of School, Head of Department or Head of Service as appropriate. Unless stated to the contrary, it is assumed that use, creation and publication of single units or small collections will be allowed. Where use, creation and publication are to be restricted, Schools, Departments and Services are encouraged to identify and communicate a rationale for restriction. It is expected that justifications for restriction will normally be based on protection of commercial interests.

5. University policies on IPR must be adhered to. When using OERs, students and staff must comply with the terms of the licence of use.

There is no national OER policy in the UK. The Association for Learning Technology (ALT) made a call to action for policy makers to highlight to education policy makers and professionals how Open Education and OER can expand inclusive and equitable access to education and lifelong learning, widen participation, and create new opportunities for the next generation of teachers and learners, preparing them to become fully engaged digital citizens.[464] Scotland signed an Open Declaration[465] signalling its government's support of OER.

[463] REF20201. (no date). Home Page. Retrieved from https://www.ref.ac.uk/

[464] Association of Learning Technology. (2017). Open Education and OER — A guide and call to action for policy makers. Retrieved from https://www.alt.ac.uk/news/all_news/open-education-and-oer-guide-and-call-action-policy-makers

[465] Scottish Open Education Declaration. (no date). Scottish Open Education Declaration 0.2. Retrieved from http://declaration.openscot.net/scottish-open-education-declaration-0-2/

Recently work has begun in lobbying for UK OpenTextbook approaches, similar to those prevalent in North America, but this is at an early stage.[466]

Only open access publications and research data are mandated to be released openly, according to the open access policies set out above. Some universities such as Edinburgh, Nottingham and OU have an individual approach (described below). The OU has a policy that all new courses should mandate 5% for open release. The most common approach where OER exists is to have a repository as showcase, which will seek input from faculty, but without an explicit policy, for example University of Nottingham.[467]

There is a lack of adequate financial commitment for OER in the UK. This was the major reason that most of the JISC UKOER projects failed to reach sustainability, and usually closed soon after the funding ceased. The UK HE sector is constructed largely a business with student fees, rather than a publicly funded good. The initial altruistic argument for OER, in sharing knowledge for the benefit of society is difficult to realise in such an environment. However, open education that is couched in more economic terms, such as MOOCs where the sale of certificates is proposed as a revenue generating model, is more likely to be adopted.

OER USE AND ADOPTION

OpenLearn — http://www.open.edu/openlearn/

OpenLearn is an initiative of Open University, which target informal learners who want to learn for interest. It is linked with the BBC, so co-produced programmes (such as Frozen Planet) will have associated learning content hosted on OpenLearn. The material is also targeted at potential OU students, with links through to course registration. OU provides course content, bespoke material, and badged open courses. Covering all disciplines, the OER range from short pieces (five minutes) to courses over several weeks. They are licensed under a CC-By-NC licence. Most of the content is re-versioned from existing OU course material, although some is produced specifically for OpenLearn. Content is also gathered together in collections aimed at specific audiences, for example those entering work for the first time. This initiative is centrally funded. Its initial creation and development were funded through a grant from the Hewlett Foundation. Its sustainability has been maintained by a business model allowing it to generate significant revenue through student registrations.

OpenEd — https://open.ed.ac.uk/

This initiative of Edinburgh University showcases Edinburgh university content under a CC-BY licence. It targets potential students and the general public, and the focus is largely on Scotland and Edinburgh in particular, serving a civic mission. There are three themes for the OER:

- For the common good — resources to enrich the University and the sector, and to enable any member of University of Edinburgh to publish and share online such as understanding licences,

- Edinburgh at its best — showcasing the highest quality learning and teaching resources and collections of resources within each school department.

- Edinburgh's treasures — promoting major collections of interdisciplinary materials, archives, treasures and museum resources that highlight Edinburgh cultural heritage.

These resources are produced by academics, with some central university funding to support their development and the support structures required.

U-Now — https://rdmc.nottingham.ac.uk/handle/internal/79

This initiative of Nottingham University showcases Nottingham university content material used in courses. It is an established part of the University's Five-Year Strategy, and targets

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466   See http://ukopentextbooks.org/ and https://www.jisc.ac.uk/rd/projects/institution-as-e-textbook-publisher as examples of exploratory work on how Open textbooks may gain interest and associated policy.

467   U-Now Open Courseware. (no date). The University of Nottingham's open courseware initiative. Retrieved from https://rdmc.nottingham.ac.uk/handle/internal/79

potential students and educators. It is centrally funded by the University with senior sponsorship from the Vice Chancellor's office, and long-term sustainability is a key consideration in all developments.

JORUM — https://store.jisc.ac.uk/home

JORUM is a repository for UK OER. Funded through JISC, this project has now ceased, although some of the content is still available

UCL Press — https://www.ucl.ac.uk/ucl-press

This initiative of the University College London (UCL) allows access to academic textbooks. UCL Press is the first fully Open Access University Press in the UK. They focus on scholarly monographs, scholarly editions, textbooks, edited collections, and journals. The audience are educators, students, librarians. The textbooks are published under a CC BY-NC-ND 4.0 licence, with digital versions made freely available, and physical copies at an affordable price. The initiative is centrally funded by the University, with some return on physical book sales.

Open Book Publishers — https://www.openbookpublishers.com/

Open Book Publishers (OBP) is a non-profit organization and registered charity. It operates a Platinum Open Access publisher, with permanent and free access to books for readers with no publication fees for the authors. The target audience are educators, students, and librarians and all disciplines are covered. Monographs are published under a CC-BY licence. The initiative is funded through annual library subscriptions of £300, physical book sales, support from a range of foundations. and donations.

Manchester University Press — http://www.manchesteruniversitypress.co.uk

Manchester University publishes academic monographs in the Humanities and Social Sciences disciplines under a CC-BY-NC-ND licence. PDF versions are freely available, and other versions are available for purchase. It thus offers open access alongside conventional publishing. It is funded via author fees (£9850 +VAT 20% UK) plus sales of other versions.

FutureLearn — http://futurelearn.com/

FutureLearn is a private company, owned by the OU, who fund it. It offers a diverse selection of courses from leading universities and cultural institutions from around the world, and targets informal learners, leisure learners, and those seeking professional development. Some courses have a direct link through to qualifications, for example Leeds MOOCs can be used for formal credit. The courses are arguably not really OER as they are not openly licensed, but it represents the biggest 'open' education initiative in UK. Courses are typically 3-8 weeks long with about four hours per week study time. Certification can be purchased upon completion. Its business model is based around sale of certificates.

Open Library of Humanities — https://www.openlibhums.org/

Open Library of Humanities is a registered charity focused on publishing open access scholarship with no author-facing article processing charges. Articles are published under a CC-BY licence. Initially funded by Mellon Foundation, it operates a subscription model from libraries, whereby libraries pay a subscription fee to support open access and free publication of journals.

OER Wales Cymru — http://www.oerwales.ac.uk/

This initiative showcases OER from Welsh universities, covering all HEIs in Wales. There was some initial small project funding from the Welsh HEA and content provided was by all Welsh HEIs. The initiative is now discontinued.

Open Spires — http://openspires.oucs.ox.ac.uk/

OpenSpires makes Oxford University's podcasts available as OER. This content Open t is available for reuse and redistribution by third parties globally, provided that it is used in a non-commercial way and is attributed to its creator. The initiative is funded by the University and received some funding from HEA Academy seed funding.

OER Financing and Sustainability

In the UK, investment in OER is decreasing from a peak around 2010, as seen with the significant investment from JISC around then, and the closure of JORUM and other initiatives at universities, for example, Open Exeter. Concurrently, there has been an increase in the design and development of educational resources, as witnessed through MOOCs, and collaborations such as the Blended Learning Consortium.[468] However, these are not necessarily open.

At an individual level there is some evidence to reuse OER,[469] but nearly all large-scale efforts are aimed at production of new materials. Even the production of MOOCs is all bespoke material. There thus needs to be a stronger emphasis on the benefits of reuse as one of the primary advantages of OER.

The main language in the UK is English and most OER are produced in English. There are few OER produced in Welsh or Gaelic.[470] The BBC provides a range of learning resources from different perspectives and languages.[471] However, while these resources are often free, they are not always openly licensed.

There is little funding currently available for OER, and universities that have maintained successful OER projects do so through central funding from the universities themselves as part of operational costs. However, in some places such as OpenEd and OU, sustainable business models have been created as part of their effective marketing/recruitment strategy. It is also worth noting that while OER funding has often ceased, there was a lot of investment in MOOCs, particularly in FutureLearn.

Research and Evaluation

Research is one of the UK's strengths in OER. It has certainly increased in rigour from the early implementations, which often failed to conduct post-evaluations. The quality of the papers at the annual OER conference is of a high standard, and the OER Hub is globally recognised as a leading OER research unit. The objectives of OER Hub are to build capacity in the OER research domain, conduct research into open education and OER, and produce resources for the open education research community.[472]

There have been several research papers in the UK focusing on OER use in education, for example:

- The JISC conducted a comprehensive evaluation of the UKOER programme.[473]

- The Higher Education Academy (now known as Advance HE) also conducted an evaluation of the UKOER programme.[474]

- The OER Hub conducted global research projects into the impact of OER.[475]

- The Open Educational Practices in Scotland project examined OEP across the Scottish HE/FE sector.[476]

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[468] Blended Learning Consortium. (no date). Home Page. Retrieved from http://www.blc-fe.org/
[469] See De los Arcos, B., Farrow, R., Perryman, L.-A., Pitt, R. & Weller, M. (2014). *OER Evidence Report 2013-2014*. OER Research Hub. Retrieved from https://oerresearchhub.files.wordpress.com/2014/11/oerrh-evidence-report-2014.pdf
[470] There are some resources in Welsh e.g:
OpenLearn cymru. (no date). Home Page. Retrieved from http://www.open.edu/openlearncreate/theme/openlearncymru/home.php).
Gaelic and Welsh language learning are the most common types of resources:
Cymraeg. (no date). Home Page. Retrieved from https://learnwelsh.cymru/
Go-gaelic. (no date). Resources. Retrieved from https://go-gaelic.scot/classroom-resources/#files
[471] BBC. (no date). Bitesize — Revise and Learn. Retrieved from https://www.bbc.com/bitesize
[472] OER Hub. (no date) Home Page. Retrieved from http://oerhub.net/
[473] JISC. (no date). OER Evaluation. Retrieved from https://www.jisc.ac.uk/guides/open-educational-resources/oer-evaluation
[474] Southern, R. (2013). OER International Programme — Evaluation Report. Advance HE. Retrieved from https://www.heacademy.ac.uk/knowledge-hub/oer-international-programme-evaluation-report
[475] OER Hub. (no date). Reports. Retrieved from http://oerhub.net/research-outputs/reports/
[476] OEPS. (no date). Home Page. Retrieved from http://www.oeps.ac.uk/

- The UK OER conference contains many individual pieces of research and evaluation.[477]

The following research questions may be worth exploring in the UK context:

- Why is OER under-used in primary and secondary education?

- How can we promote OER adoption?

- Does OER use improve student recruitment and/or retention?

- How are learners using OER?

CONCLUSION

To enable the UK to realize the educational potential of OER more effectively, the following is proposed:

- A national policy on OER, like that on open access publishing;

- A shift in finance from purchasing copyrighted material to creating openly licensed material; and

- Recognition and reward for producing and using OER.

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[477] See https://oer15.oerconf.org/, https://oer16.oerconf.org/, https://oer17.oerconf.org/, https://oer18.oer-conf.org/

Understanding the Impact of OER: Achievements and Challenges

Authors: Sarah Hoosen and Neil Butcher, OER Africa
Editor: Svetlana Knyazeva, UNESCO Institute for Information Technologies in Education

Are growing policy commitments to OER accompanied by financial commitments to invest in content creation or is open licensing driving down the perceived economic value of investing in creating high quality educational content? Is the emergence of OER fostering diversity and inclusion across and within countries or is it facilitating new forms of cultural imperialism? How strong is the connection in policies supportive of OER to clearly defined pedagogical improvements? What research is being undertaken alongside OER policy implementation to measure the real educational impact and cost-effectiveness of openly licensed educational materials?

These are some of the questions this publication raises, with the input from OER experts from 15 countries in five UNESCO regions. This publication is a partnership between UNESCO Institute for Information Technology in Education (UNESCO IITE) and OER Africa (an initiative of Saide). It critically reviews the growth of OER – its achievements and challenges – and its potential impact on education systems around the world. It is hoped that this publication will stimulate debate about the impact of OER and encourage governments to engage with OER in ways that drive defined pedagogical improvements, while encouraging equity and diversity in global knowledge networks.