OER initiatives in African Higher Education

Successes, challenges, and lessons learnt

OER Africa

Contents

List of abbreviations

AfriVIP	African Veterinary Information Portal
ATEN	African Teacher Education Network
BOEI	Becoming an Open Education Influencer
CC	Creative Commons
CILT	Centre for Innovation in Learning and Teaching
COL	Commonwealth of Learning
CPD	continuous professional development
DHET	Department of Higher Education and Training
DOT4D	Digital Open Textbooks for Development
ICT	information and communication technology
KNUST	Kwame Nkrumah University of Science and Technology
KPI	key performance indicator
LMIC	lower- and middle-income countries
LT Collab	Learning and Teaching Collaborative for Success
M&E	monitoring and evaluation
MOOC	massive open online course
NGO	non-governmental organization
NMU	Nelson Mandela University
NOUN	National Open University of Nigeria
OEEH	Open Education for Eye Health
OEI	Open Education Influencers
OER Term Bank	Open Educational Resource Term Bank
OER	open educational resources
OUI	Open UCT Initiative
OUT	Open University of Tanzania
OUUK	Open University, United Kingdom
PCR	polymerase chain reaction
ROER4D	Research for Open Educational Resources for Development
SADiLaR	South African Centre for Digital Language Resources
SME	subject matter expert
SSA	sub-Saharan Africa
TESSA	Teacher Education in Sub-Saharan Africa
TQF	Transnational Qualifications Framework
UCT	University of Cape Town
UM	University of Michigan
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UP	University of Pretoria
VC	vice chancellor
VUSSC	Virtual University of Small States of the Commonwealth

Executive summary

Successes

Initiatives have conducted effective **OER advocacy and capacity-building** activities for OER users and creators.

Initiatives developed **resources, repositories, and research**.

Initiatives created **frameworks and guidelines** on OER development and use.

Users from diverse contexts were able to **access** materials.

Institutions leveraged **inter-institutional collaborations** aimed at OER advocacy, use, development, and knowledge sharing.

Some initiatives **mainstreamed OER** into institutional practices and achieved some post-project continuity.

Initiatives had some **impact on teaching and learning** – by improving access to materials and providing capacity-building for educators.

Champions on the ground played a significant role in advocacy and OER implementation.

Challenges

It was difficult to sustain momentum after initial activities, particularly due to **changing personnel and competing commitments**.

Pace of adoption was often slower than anticipated.

OER capacity building and advocacy efforts faced obstacles, e.g. **a lack of time, skills, and willingness to participate**.

For some initiatives, there was **inadequate internet connectivity, data, and devices**, which are essential for much OER-related work.

Building a sustainable model can be challenging due to **a lack of financing, incentives, and structural drivers**.

It was difficult to **align accreditation requirements** with OER use or implementation.

Suggested actions

Undertake **localization** (i.e., adapting resources for different geographical, pedagogical, political, or technical contexts) by conducting research on what content is already available, what can be adapted, reasons why localization is necessary, what should be created, and in which languages.

Prioritize **capacity-building** for academics in Africa by supporting the orientation of existing and new staff regarding pedagogical competencies and OER.

Review, refine and/or develop **institutional policies** to support capacity-building. This includes provision of incentives for academics and other stakeholders; support mechanisms; and requisite time for academics to pursue capacity-building opportunities.

Tailor the messaging in advocacy efforts to optimize adoption. This may involve using tools such as social media campaigns and communications strategies to outline objectives, reach specific audiences, and convey key messages.

Create a system that provides different layers of **institutional support**. This might include financial and symbolic support from institutional management, together with peer recognition and awards for OER design and implementation.

Seek out and nurture **partnerships and collaborations** with government and other institutions to fully harness the potential of OER by sharing resources, expertise, and guidance.

Mainstream OER within institutional processes, e.g. introduce performance metrics for OER development and use for academics; development an OER strategy; create and update an institutional repository for OER and set institution-wide targets for implementing open practices.

Encourage stakeholders to consider how policies will be implemented as part of the OER policy design process.

The proliferation of policies creates more rules, which can act in opposition to openness. **Simplify policies** at the national and institutional levels in aid of 'opening up' opportunities for OER use and implementation of open practices.

Define impact metrics as early as possible. Undertake rigorous and regular data collection to monitor OER development, use, research, policy implementation, and practice.

Undertake further research on OER implementation in higher education and CPD development areas for academics in Africa.

Background

Open educational resources (OER) are often endorsed as offering several potential benefits to improving education including: increasing access to educational materials; improving scalability and circulation of resources; providing the opportunity to adapt resources to suit students' needs and contexts; and obviating the need to buy expensive textbooks that are often not relevant for the context.[1],[2],[3] The term 'OER' was coined in 2002 by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Although the concept of OER emerged in the Global North through initiatives like the Massachusetts Institute of Technology's (MIT's) MITOpenCourseWare initiative in 2001, OER are gaining traction in Africa, with an increasing number of OER initiatives focusing on areas such as OER advocacy, practice, and research. Today, the concept has been codified around the world, particularly through the unanimous adoption of the UNESCO Recommendation on OER in 2019.

To assess the long-term contribution to establishing sustainable OER practices in African higher education, OER Africa undertook a retrospective analysis of selected initiatives. The research sought to understand their effectiveness and what might be learnt from them to enable better development and support of OER practices. It also aimed to use this engagement to deepen OER Africa's understanding of professional development needs amongst African academics to enable more effective OER practices. The process involved preparing profiles on several African OER initiatives in higher education to gain an understanding of the effectiveness of each initiative, followed by this analytical summary report. This report collates the findings from the OER initiatives , highlighting the implications of the findings for better development and support for effective OER practices.

Methodology

In the initial phase of the research, the OER Africa research team (hereafter referred to as the team) conducted desktop research to identify potential initiatives that could be profiled. The following qualifying criteria were used:
1. Active participation of African organizations (though the lead organization need not be based in Africa).
2. Evidence of at least some OER-related activities in higher education (though the overall initiative could extend beyond higher education).
3. Sufficient availability of documentation online in English to be able to compile a profile of the initiative (with preference given to initiatives for which there was an evaluation report).
4. Attempts to develop, adapt, and/or harness OER *or* development of policy, rather than being limited to advocacy or research.
5. Evidence that the initiative has been operational for at least two years to enable meaningful assessment of its effectiveness.

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[1] Hilton, J. (2016). Open educational resources and college textbook choices: a review of research on efficacy and perceptions. https://link.springer.com/article/10.1007/s11423-016-9434-9

[2] Engler, J.N. & Shedlosky-Shoemaker, R. (2018). Facilitating Student Success: The Role of Open Educational Resources in Introductory Psychology Courses.
https://journals.sagepub.com/doi/full/10.1177/1475725718810241

[3] C. Hodgkinson-Williams & P. B. Arinto (Eds.), Adoption and impact of OER in the Global South.
http://www.roer4d.uct.ac.za/roer4d/edited-volume

6. Ability to identify and contact at least one key individual who remained in a position to comment meaningfully on the long-term effects of the initiative.

In addition, the selections for the sample sought to accommodate the following:
1. Representation of initiatives across regions (West, East, Southern Africa).
2. A combination of single-institution initiatives and initiatives involving collaborations between multiple institutions.
3. Incorporation of some initiatives led by or involving national governments, if possible.
4. Incorporation of initiatives that included:
    a. some initiatives led by OER Africa and others in which OER Africa was not directly involved,
    b. some initiatives led by African organizations and some by international organizations,
    c. some initiatives led by universities and some by other organizations (NGOs, donors, etc.), and
    d. some donor-funded initiatives and some funded by governments and/or institutions.

The final sample included representation from across the continent, including Nigeria, Ghana, South Africa, Tanzania, and initiatives that have operated in multiple African countries. Due to language limitations in the team, the focus was on initiatives in Anglophone countries. The research sample included a diverse set of initiatives (in line with the criteria above), consisting mainly of once-off OER initiatives, but also instances where institutions have engaged in multiple OER-related activities. Once the initial list had been compiled, the OER Africa management team met to review it and select the initiatives that would be profiled.[4]

The team used a mixed-methods approach to gather data: a short survey distributed online via SurveyMonkey; desktop research; and online in-depth interviews with initiative representatives (see Appendix one for research instruments). The most appropriate method/s were decided on an initiative-by-initiative basis. The table below outlines the initiatives profiled and indicates the number of survey responses and interviews conducted for each initiative.

Table 1 List of initiatives covered in the research sample

Initiative	Country/ies	Survey responses	Interviewees
Open Education for Eye Health (OEEH)	East and Southern Africa	1	2
Teacher Education in Sub-Saharan Africa (TESSA)	Sub-Saharan Africa	1	1
OER Term Bank	South Africa	1	1
Open Education Influencers at Nelson Mandela University (OEIs at NMU)	South Africa	1	1
Kwame Nkrumah University of Science and Technology (KNUST)	Ghana	0	3

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[4] Two initiatives that were included in the selection (African Virtual University and Cape Peninsula University of Technology) did not respond to requests to participate in the research. The OER Africa team added Nelson Mandela University's Open Education Influencers (OEIs) to the sample later than the other initiatives. Although the initiative did not fit all the criteria mentioned above (for example, it had been operating for less than two years when it was selected), the team still thought it was worth profiling because of its innovative approach and influence on Open Educational Practices (OEPs) at NMU.

Initiative	Country/ies	Survey responses	Interviewees
Virtual University of Small States of the Commonwealth (VUSSC)	Multiple African countries	2	2
National Open University of Nigeria (NOUN)	Nigeria	1	1
University of Cape Town (UCT)	South Africa	2	2
African Veterinary Information Portal (AfriVIP)	South Africa	0	4
African Teacher Education Network (ATEN)	West, East, and Southern Africa	0	1
Open University of Tanzania (OUT)	Tanzania	1	4

Limitations and research challenges

Although the study was initially anticipated to be completed within a year, it took two years to complete. The onset of the COVID-19 pandemic affected the initial research plan to conduct in-person visits to four of the institutions. The research plan was thus adjusted to collect data via questionnaires and online interviews. Whilst contributors were all helpful and generous with their time, it was difficult to contact some of them to arrange interviews. There were also long lead times between data collection, write-up, and review, which extended the process (exacerbated by the COVID-19 pandemic and the consequent pressure that some contributors were under to assist with shifting administrative and teaching and learning activities at their respective institutions).

In situations where initiatives were completed more than five years ago, some contributors had trouble recalling details due to the time that had elapsed. In other instances, key people had left the institution (taking with them valuable knowledge of the initiative), whilst in other cases there was a lack of documentation. This necessitated frequent follow-ups with representatives to glean further information to make the case studies as detailed and accurate as possible. Despite the OER Africa team's efforts, some data was still unavailable or could not be shared publicly.

Findings

This section starts by providing an outline of each initiative that was profiled in the research and then examines the successes, strengths, and achievements of the profiled initiatives. It also summarizes common challenges that emerged across the initiatives, as well as insights that the researchers gained during the process, to outline key lessons learnt about OER initiatives in African higher education.

Overview of the initiatives

From the start of the research process, the team sought a distribution of initiatives in all three key areas of OER, namely, policy, practice, and research. The initiatives in the table below demonstrate wide ranging activities in these areas. A summary of each initiative in the sample is provided below, while the full set of case studies can be accessed here.

Table 2   Summary of initiatives in the sample

Initiative name	Scope	Description
Open Education for Eye Health (OEEH)	Practice	Open Education for Eye Health (OEEH), a cross-country initiative led by the International Centre for Eye Health at London School of Hygiene and Tropical Medicine, focuses on collaboratively developing and delivering a series of seven open online courses and associated OER. It aims to empower students, educators, managers, and leaders in eye health to build knowledge and skills in public health eye care and strengthen both clinical and teaching practice for the elimination of avoidable blindness.[5] Established in 2015, OEEH has a core team of five people, together with 130 individual collaborators from approximately 30 countries.[6] OEEH also set up formal partnerships with various institutions, including the University of Cape Town (UCT) in South Africa and the College of Ophthalmology of Eastern Central and Southern Africa in Kenya. To date, the initiative has created approximately 300 OER in several disciplines, including Public Health, Global Health, Ophthalmology, Diabetes, Neglected Tropical Diseases, Trachoma, and Neonatal Care.[7] The OEEH team facilitates a process of content development for the programme and markets it with that audience in mind. For the content development, the OEEH team has instituted a structured process in which it briefs collaborators by setting out course objectives, learning outcomes, design, content creation, course delivery, and assessment. The team seeks to involve collaborators at each stage of this process. There is also an expert steering group for learning design, which helps map out student activities and agree on who could assist in writing content.[8] In 2016, OEEH, along with 37 collaborators from 12 countries, developed a massive open online course (MOOC) titled 'Eliminating Trachoma', an avoidable blinding disease caused by a bacterium. The MOOC focused on improving access to training, as well as equipping and mobilising health workers. At the time that OEEH published a conference paper on the MOOC in September 2019, more than 5,000 people from a diverse range of professional backgrounds and disciplines had participated in the MOOC.[9] Between 2015 and 2019, the initiative was funded by two organizations: The Seeing is Believing programme from Standard Charter Bank and the Queen Elizabeth Diamond Jubilee Trust. Now that the funding cycle has ended, OEEH is

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[5] London School of Hygiene and Tropical Medicine. (2020). Open Education for Eye Health. Retrieved from http://iceh.lshtm.ac.uk/oer
[6] Collaborators represented the following countries: Australia, Botswana, Brazil, Cameroon, Canada, China, Egypt, Ethiopia, Ghana, India, Ireland, Kenya, Malawi, Malaysia, Mexico, Morocco, Mozambique, Nepal, New Zealand, Nigeria, Paraguay, Rwanda, Saudi Arabia, Solomon Islands, South Africa, Switzerland, Tanzania, Uganda, United Kingdom, USA.
[7] London School of Hygiene and Tropical Medicine. (2020). Open Education for Eye Health. Retrieved from http://iceh.lshtm.ac.uk/oer
[8] Interview with Sally Parsley (Technical Lead) and Daksha Patel (Academic Lead), 9 April 2020.
[9] See https://iceh.lshtm.ac.uk/open-education-moocs/

Initiative name	Scope	Description
		trying to find ways of ensuring that the content remains relevant and up-to-date. The initiative secured additional funding until the end of 2020 to complete updates on the courses and to finalise one additional MOOC. It has delivered courses for free and has been limited to generate sufficient income to sustain itself based only on upgrades. Since 2021, the project has been delivering courses on demand to enable busy professionals to have flexible access.
Teacher Education in Sub-Saharan Africa (TESSA)	Policy Practice Research	Teacher Education in Sub-Saharan Africa (TESSA) is a multi-country collaborative network that helps to improve the practice of teachers and teacher educators operating across the region. TESSA is donor-funded and was conceived as an emergency response to the teacher training crisis in sub-Saharan Africa (SSA) and has been active since 2005, a time when there was a focus on the millennium development goals of Education for All. Today, it provides both a bank of OER linked to school curricula and a network of educators who work to improve learning and teaching. The OER are designed to support teachers and teacher educators in developing active approaches to learning.[10] Coordinated by the Open University, UK (OU UK), the TESSA network includes 14 African institutions, while partners include the Commonwealth of Learning (COL), World Vision in Zambia, Saide, the Kenya Institute of Special Education, the Kenyan Institute of Curriculum Development and the African Council for Distance Education, and the Zambian Ministry of General Education.[11] To date, the initiative has created approximately 100 OER in English, 75 of which are also available in Kiswahili, French, and Arabic. The OER cover primary school curricula, as well as handbooks and toolkits for teachers and teacher educators. The resources are aimed at teachers, teacher educators, and teacher learners. The team has recently added resources to support foundation literacy and foundation numeracy. TESSA also has ten free online courses available, which are designed to mediate the TESSA OER.
Open Education Influencers at Nelson Mandela University	Policy Practice Research	Open Education Influencers (OEIs), or #OpenEdInfluencers, is an initiative based at Nelson Mandela University (NMU) in Port Elizabeth, South Africa. The initiative has been officially operational in its current form since 2018. It seeks to influence decision-makers to adopt OER through advocacy and facilitation, while aiming to affect decision-making and practice through activities to publicise and entrench the use of open education praxis. A core part of the initiative are OEIs, who are ambassadors for the use of open textbooks at NMU. They target all levels in the university – undergraduate, post-graduate and teacher education – across all faculties, advocating for the use of open materials and increasing awareness about the use of OER. In 2018, the initiative launched an effort to increase awareness, access, adoption, and creation of openly licensed materials at NMU. The university has actively supported this initiative. In 2018, it appointed and trained three NMU

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[10] Teacher Education in Sub-Saharan Africa. (nd). About us. Retrieved from http://www.tessafrica.net/about-us
[11] Survey response from Kris Stutchbury, Academic Director of TESSA, 19 February 2020.

Initiative name	Scope	Description
		students to become OEIs and assist with OER advocacy. In 2019 and 2020, it shifted student support under the umbrella of the Learning and Teaching Collaborative for Success (LT Collab) at NMU. The initiative has various project partners, including: Siyaphumelela Programme (an initiative of Saide) and the Kresge Foundation, which provided access to a three-year cycle of project funding from 2020 to 2022; University of Massachusetts Amherst and The Open University UK, which collaborated on and co-created the Becoming an Open Education Influencer (BOEI) online empowerment course during lockdown 2020; and ProductionHauss, the OEIs' media partner in Port Elizabeth.[12] . In 2022, the OEIs will present workshops on student advocacy and empowering student voices via the BOEI course to the Siyaphumelela University Network of 27 South African universities. They will also conduct workshops on how to create and support the creation of open textbooks for the same network. In an effort to develop OER-related skills, the initiative created the BOEI course, a practical, fully online course that supports influencers of and for open education. Each module contains openly licensed materials. The course empowers users to gain insights, skills, and experiences in OER, open licensing, open textbooks, and advocacy.
OER Term Bank	Practice	Open Educational Resource Term Bank (OERTB) was an initiative by the University of Pretoria (UP), UCT, and the South African Department of Higher Education (DHET). It aimed to establish an online, multilingual term bank, specifically aimed at South African university students. The initiative ran between 2014 and 2017, servicing all eleven official South African languages in various subject areas.[13] Today, students are still able to use OERTB to access key subject-specific terms and definitions in one of those languages.[14] The rationale behind the project was that research has shown that students learn better when important terms and definitions are in their mother tongue. For students to complete their studies successfully using a second language within three or four years, learning about concepts in their mother tongue creates a strong foundation for them, helping them grasp fundamental concepts more easily. Funded by DHET, project participants included three senior academics from the two universities as joint project leaders,[15] a term bank manager, editors, as well as external translators and language practitioners. In addition, subject matter experts (SMEs) were an important part of the process. Language practitioners and SMEs worked together to

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[12] Survey response from Gino Fransman (Project Lead), 17 July 2020.

[13] Subject areas are: Academic vocabulary; Accounting; Anthropology; Augmentative and Alternative Communication; Building Science; Chemistry; Communication Pathology; Criminology; Economics; Family Medicine; Literature; Mathematics; Philosophy; Political Science; Psychology; and Sociology.

[14] Open Education Resource Term Bank. (2020). About. Retrieved from http://oertb.tlterm.com/about/

[15] Tshwaane, B. (nd). University of Pretoria. Partnerships and Collaborations: African Languages. Retrieved from https://www.up.ac.za/african-languages/article/17948/partnerships-and-collaborations

Initiative name	Scope	Description
		create definitions and add or remove terms.[16] They provided translation and contextualisation services in subject areas. Anecdotal evidence suggests that students found the term bank to be an effective learning tool. The project manager at UCT also used the term bank in his workshops.[17]
Kwame Nkrumah University of Science and Technology (KNUST)	Policy Practice Research	Kwame Nkrumah University of Science and Technology (KNUST), based in Kumasi, Ghana, introduced OER in 2008 through its College of Health Sciences, when the William and Flora Hewlett Foundation sponsored a project to develop health-related OER.[18] The Initiative focused on policy, practice, and research regarding health-related OER. It covered eleven disciplines at both undergraduate and postgraduate levels. In January 2009, the Health OER design phase commenced. The project team organized sensitization, policy, and production workshops for administrative heads and faculty members. This involved staff from the College of Health Sciences, the KNUST library, the ICT Directorate, the Department of Communication Design, and other parts of the university as part of a strategy to 'build a multidisciplinary team for the development and use of OER at KNUST'.[19] KNUST faculty created several OER as a result of the initiative. Most of these are housed in the KNUST open access institutional repository. Another of the initiative's main accomplishments was the development of an OER policy for the institution. KNUST was also involved in setting up the African Health OER Network. OER Africa and a consortium of African health institutions, including KNUST, University of Ghana, University of the Western Cape, UCT, and UM launched the African Health OER Network in 2009 with the aim of developing a continent-wide network to share knowledge, address curriculum gaps, and use OER to advance health education.[20]
Virtual University of Small States of the Commonwealth (VUSSC)	Policy Practice Research	The Virtual University for Small States of the Commonwealth (VUSSC) is a network of small countries that are committed to the collaborative development of free content resources for use in an educational context.[21] VUSSC is led by a management committee of representatives from small states in all regions of the commonwealth, supported by the Commonwealth of Learning.

[16] Open Education Resource Term Bank. (2018). Narrative Report.

[17] Interview with the term bank manager, 22 April 2020.

[18] KNUST OER. (nd). History. Retrieved from https://websys.knust.edu.gh/oer/pages/sections.php?siteid=knustoer&mid=23&sid=123

[19] Donkor, P. (2011). Developing and using Open Educational Resources at KNUST. Digital Learning Resources. Retrieved from https://www.oerafrica.org/system/files/9305/201105digitallearningresources-developingandusingoeratknust_0.pdf?file=1&type=node&id=9305

[20] KNUST OER. (nd). History. Retrieved from https://websys.knust.edu.gh/oer/pages/sections.php?siteid=knustoer&mid=23&sid=123

[21] United Nations Sustainable Development Goals. (nd). Virtual University for Small States of the Commonwealth (VUSSC).
Retrieved from https://sustainabledevelopment.un.org/partnership/?p=7702

Initiative name	Scope	Description
		Since its inception, VUSSC has provided a collective mechanism for developing, adapting, and sharing courses and learning materials. It has also acted as a forum for institutions to build capacity and expertise in online collaboration, eLearning, and information and communication technologies (ICT).[22] Educational institutions work with VUSSC in designing, developing, and delivering post-secondary, skills-related courses and university-level programmes in areas that enhance their economic, social, and community growth. To this end, VUSSC promotes the sharing and transfer of course content, learning materials, and resources using Creative Commons (CC) licences.[23] Among various educational activities, VUSSC facilitates collaboration between experts and educators from small states in developing and sharing OER. It has sought to assist small states to build the capacity of their educational institutions by creating accreditation mechanisms and facilitating educational programme offerings.[24] Over the years, it has collaborated with various partners to carry out its OER-related work. These include ministries of education, universities, colleges, and development organizations. Since 2013, VUSSC has been involved in several OER-related initiatives in countries around the world. This includes activities in Africa Namibia, Botswana, Mauritius, Eswatini, and Lesotho.
National Open University of Nigeria (NOUN)	Policy Practice Research	NOUN is an ODL institution with more than 180,000 students. It is Nigeria's largest tertiary institution in terms of student numbers and runs 103 study centres across the country.[25] NOUN initiated an OER project in 2014, which involved all faculties at the institution. The aim of the ongoing project is to integrate OER at all levels of teaching and learning at the institution to enhance the quality and access to higher education.[26] The institution's OER portal[27] offers access to a range of courses and downloadable material for educational purposes and an integrated search engine that provides multiple filters for maximum efficiency.

[22] Survey response from Mr John Lesperance, former COL education specialist, 5 March 2020

[23] Commonwealth of Learning. (nd). Virtual University for Small States of the Commonwealth (VUSSC). Retrieved from https://www.col.org/programmes/vussc/virtual-university-small-states-commonwealth-vussc

[24] Survey response from John Lesperance, former education specialist at COL, 5 March 2020.

[25] OER World Map. (2021). National Open University of Nigeria. Retrieved from https://oerworldmap.org/resource/urn:uuid:706a40cc-77eb-11e5-9f9f-c48e8ff4ea31

[26] International Council for Open and Distance Education. (nd). National Open University of Nigeria commissions a unit for Open Educational Resources. Retrieved from https://www.icde.org/knowledge-hub/national-open-university-of-nigeria-commissions-a-unit-for-open-educational-resources

[27] See http://www.elibnouonline.net

Initiative name	Scope	Description
		NOUN set up a special OER unit in August 2014, reporting directly to the vice chancellor. Focusing on OER policy, practice and research, the unit is tasked with 'leading awareness seminars, technical training, and capacity-building workshops, as well as transforming NOUN courses into open-licensed OER'.[28] NOUN has collaborated with several partners through its OER activities and its approach to OER and MOOCs entails multiple activities, including awareness-raising around OER, technical training, converting existing course materials into OER, and collaborating with institutions and organizations in OER and MOOCs. Through these activities, NOUN aims to address the teaching and learning needs of students and academics.[29]
University of Cape Town	Policy Practice Research	UCT is South Africa's oldest university and one of Africa's leading teaching and research institutions. The university has a long history of involvement in OER and OEPs.[30] Through its Centre for Innovation in Learning and Teaching (CILT), UCT has spearheaded several open education projects. **OpenUCT Initiative** Active between 2011 and 2014, the OpenUCT Initiative (OUI) was an intra-university special project hosted collaboratively by the Centre for Higher Education Development and UCT Libraries. The OUI engaged with the academic community and university management to institutionalise open practices at UCT, which included co-steering development of UCT's Open Access Policy.[31] Its aim was to institute a regulatory environment so that OER-related work could be mainstreamed at UCT. The initiative also had an advocacy objective, as it sought to bring issues of open education and open access onto the radar of the broader community. One of the initiative's main outputs was developing and launching the OpenUCT institutional repository in 2014. The OUI aggregated and detailed UCT's full OER collection that was previously housed in the Open Content portal, absorbing it into the OpenUCT repository.[32] Following OpenUCT's launch, UCT Libraries took over management and development of the platform, and it is now also an online academic research information service of UCT Libraries.

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[28] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria

[29] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria

[30] Open Educational Practice (OEP) encompasses teaching techniques and academic practices that draw on open technologies, pedagogical approaches and OER to facilitate collaborative and flexible learning.

[31] CILT. (2020). OpenUCT. Retrieved from http://www.cilt.uct.ac.za/cilt/openuct

[32] CILT. (2020). OpenUCT. Retrieved from http://www.cilt.uct.ac.za/cilt/openuct

Initiative name	Scope	Description
		Research for Open Educational Resources for Development (ROER4D) Hosted by CILT, the Research for Open Educational Resources for Development (ROER4D) project was an international research project studying OER adoption, which ran between 2013 and 2017. Its core activity was to investigate how OER adoption could meet the increasing demand for accessible, relevant, high-quality, and affordable education in the Global South. It focused on post-secondary education, basic education, teachers, and government funding, as well as examining the potential impact of OER adoption and associated OEPs. Through its activities, ROER4D engaged 103 researchers in 18 sub-projects across 21 countries from South America, sub-Saharan Africa and Asia. These researchers were coordinated by Network Hub teams at two centres: UCT and Wawasan Open University in Malaysia. **UCT Vice Chancellor's (VC's) OER Adaptation Project** The UCT VC OER Adaptation Project ran from 2013 to 2016 and sought to empower students to adapt their lecturers' learning content into OER. It was a bottom-up initiative in which five postgraduate students would search for and request lecturers' high-quality learning materials in the Humanities, Commerce, Science, and Engineering and the Built Environment Faculties. Through a process of copyright clearance and enhancement, the students would then adapt the materials into OER, which would in turn be shared on the institutional repository, OpenUCT. The students were supported by a student coordinator, who arranged training on copyright and metadata and provided quality assurance for the materials they adapted. The initiative aimed to improve student awareness of open education and related concepts. In 2015, the project received additional funding to focus on upskilling UCT librarians on OER-related issues through workshops. The project also used funding to continue with advocacy work by organizing events and administering small OER grants. **Digital Open Textbooks for Development (DOT4D)** CILT launched the DOT4D initiative in July 2018. Its overarching objective was 'to contribute to improving inclusion in South African higher education by addressing equitable access to appropriate and relevant learning resources.'[33] The project had three components: research into open textbooks; grants to produce open textbooks; and advocacy. The project aimed to make an argument for the role of open textbooks in redressing injustices in higher education. To this end, DOT4D researched the ecosystem of open textbook publishing at UCT and supported policymakers and other stakeholders in developing institutional and national policy frameworks that regulate open textbook publishing and address long-term sustainability mechanisms. The initiative also made grants of up to ZAR80,000 (approximately US$5,150) available to nine open textbook initiatives at UCT. Grant recipients were required to license materials produced with the aid of the DOT4D grant under a Creative Commons Attribution (CC BY) licence.

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[33] DOT4D. (2020). About. Retrieved from http://www.dot4d.uct.ac.za/about-32

Initiative name	Scope	Description
		DOT4D also worked with Creative Commons, UCT Libraries, and the Department of Health Sciences Education to develop and curate the UCT Open Content Finder, which assists lecturers and students in finding affordable, appropriate teaching and learning resources that can be used during remote teaching.[34]
African Veterinary Information Portal (AfriVIP)	Policy Practice Research	AfriVIP was launched in February 2014 as the result of an ongoing partnership between UP's Faculty of Veterinary Science and OER Africa, which began in 2012. The portal was part of a broad project to share intellectual property under an open licence. At inception, it was also seen as a test case to explore the potential for wider adoption of OER and open licences across the university and at veterinary faculties/schools in the Southern African Development Community (SADC) region. The overarching aim of the project was to improve the quality of veterinary science education in Africa through collaboration in the development, sharing, and re-use of educational and research resources under open licences, to enrich both African and global veterinary science knowledge networks and educational programmes. In the second half of 2017, with funding and technical support from OER Africa, UP worked with other African veterinary education institutions to create a collaborative materials development working group, as part of the African Deans Forum. AfriVIP ran for approximately five years from 2014 to 2017, and the OER project within the African Deans Forum was active for just over a year (2016 to 2017).
African Teacher Education Network (ATEN)	Practice	OER Africa and TESSA worked together to establish ATEN in 2010 as a way of promoting OER, facilitating dialogue, and sharing existing teacher education content as OER. ATEN was a loosely connected group of teacher educators whose aim was to encourage understanding, use, and sharing of OER to support teacher education and development in Africa. Participants in the network were from several countries in West, East, and Southern Africa, viz., Botswana, Ghana, Kenya, Malawi, Mauritius, Mozambique, Nigeria, South Africa, Swaziland, Tanzania, Togo, Uganda, and Zambia, as well as the UK and USA. The initiative was operational for two years from 2010 to 2012.[35] In promoting OER, ATEN activities involved: • Pre-conference workshops on OER, in partnership with organizations such as TESSA, Distance Education and Teachers' Training in Africa, the National Association of Distance Education and Open Learning in South Africa (NADEOSA), and the Distance Education Association of Southern Africa. • Searching for funding opportunities to assemble various collaborative teams to develop OER useful to the teacher education community.

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[34] DOT4D. (2020). Boosting OER Discoverability: The UCT Open Content Finder. Retrieved from http://www.dot4d.uct.ac.za/news/launch-uct-open-content-finder
[35] OER Africa. Teacher Education. Retrieved from https://www.oerafrica.org/african-teacher-education-network

Initiative name	Scope	Description
		• Building a Community of Practice with contacts made during conferences to share lessons and experiences.
Open University of Tanzania (OUT)	Policy Practice Research	OUT is an ODL institution, operating through a network of 30 regional centres and ten coordinating centres spread throughout the United Republic of Tanzania and beyond the country borders to other parts of Africa.[36] OUT has engaged in several OER initiatives, starting from 2008 when it began working with OER Africa. The case study considers the broader implementation of OER at OUT, and in particular '*The Institutionalization of OER Practices Project'*, a collaboration between OER Africa and OUT, that ran between 2008 and 2016. OER Africa collaborated with the OUT management team, the OUT Institute of Educational and Management Technologies, and the OUT Library to implement the activities of the *Institutionalization of OER Practices Project*. The project was framed by a Participatory Action Research approach designed to share and disseminate the project outcomes.[37] It focused on the following: 1. developing an OER policy, 2. developing and piloting OER material, 3. conducting capacity building seminars and workshops to sensitize staff about OER, teaching, and research, and 4. preparing scholarly publications. OUT was involved in other OER initiatives focused on developing OER and received support from other organizations, including COL, in developing its OER policy. Based on its work in OER, OUT prepared approximately 15 scholarly publications which were published in various journals in Tanzania and internationally. Some of these resources are available via the institutional repository.

[36] Open University of Tanzania. History of the University. Retrieved from https://www.out.ac.tz/history-of-the-university
[37]OER Africa. Open University of Tanzania (OUT). Retrieved from https://www.oerafrica.org/our-networks/open-university-tanzania-%E2%80%93-out-tanzania

Successes, strengths, and achievements

The research process provided significant insight into the gains that OER initiatives in African higher education institution have made. This includes undertaking advocacy and capacity building; developing resources, repositories, and research; developing frameworks and guidelines on OER development and use; improving access to materials for users; undertaking inter-institutional collaboration; mainstreaming OER into institutional practices; as well as influencing teaching and learning. However, a lack of data in some cases meant that the research was unable to measure the full extent of these practices.

Effective advocacy efforts, awareness raising about OER, and capacity building

Initiatives have carried out advocacy focusing both on promoting the initiatives themselves, as well as OER use and adoption more generally. These efforts included capacity building efforts and skills development for OER users and creators, as well as creating networks of champions on the ground. Activities have occurred at various levels, ranging from workshops that outline the merits of OER to working with governments to promote OER at the national level.

Advocacy activities have significantly impacted on staff teaching and learning practices. They have started using OER in their work – as was the case in the OEIs case study, where four permanent staff started using OER because of the OEI's advocacy. The project lead also successfully advocated for one of the the key performance indicators (KPIs) for staff to include reference to using OER. Some initiatives also reported that awareness and understanding of the concept of OER had increased among academic staff, resulting in OER becoming more integrated with institutional practices. For example, at OUT, contributors noted that the advocacy aspect was very important in raising awareness of OER and the workshops and seminars provided capacity for staff members to be more active OER users; the result being that staff developed themselves professionally to improve their pedagogy.

Initiatives also undertook capacity-building activities for both OER users and creators. This included academics and students, but also extended to those working in specific sectors like healthcare. Initiatives used OER advocacy strategies that included training staff and students in OER advocacy, which was an effective way of cascading OER knowledge and skills through the institution. For example, both OEIs and the UCT's Vice Chancellor's OER Adaptation Project trained student facilitators in copyright, Creative Commons, and OER advocacy. These students then cascaded their training to other staff and students at their institution, with demonstrable impact being seen in the fact that staff embedded OER into their work.

Capacity-building activities have also supported skills development for initiatives such as DOT4D, VUSSC, AfriVIP, and OUT. This included skills development in OER policy writing, OER licensing, content development, repurposing, and accreditation of OER courses. For example, VUSSC sought to build capacity in OER development and use from the outset, which was essential because the turnover of people was high, so the team had to establish mechanisms to train both OER users and OER creators continuously. With the latter, VUSSC used its training to provide OER creators the skills to train others in their own countries. This too had a cascading effect that helped to

spread the concept of OER throughout the countries.[38] More than 2,000 participants from 31 countries were directly involved in VUSSC training courses and formal programmes, and approximately 110 courses and modules were developed.[39]

In the case of AfriVIP, the OER Africa project manager estimated that between 60 and 80 teaching staff were trained during the capacity building workshops run by OER Africa, and during the Mixed Matters continuous professional development (CPD) workshops. As part of the Deans Forum, at least one person per institution (five in total) received detailed training on how to find and use OER. General OER awareness training was provided to small groups of staff during the UP/OER Africa visits to the Deans Forum member institutions. Similarly, the workshops and seminars that OUT hosted improved awareness and understanding of the concept of OER among academic staff, with OER reportedly becoming more integrated with institutional practices. The result of this was that staff developed themselves professionally to improve their pedagogy.

Champions have played an important role in advocacy and capacity building activities for initiatives like ATEN, NOUN, and TESSA. In the case of ATEN, many teachers became aware of the concept of OER, and some became champions advocating for OER to supplement or complement the prescribed textbooks. A key lesson from this initiative was that advocacy can demonstrate how OER can address challenges that teachers experienced:

> *By and large, you only get buy-in when teachers have an immediate need for something. If they have a challenge and OER helps them with that, then they will engage.[40]*

At NOUN, the academic director took on the role of OER champion by using her context and networks to spur OER activity:

> *Coming from an ODL institution, I thought my institution was better suited to learn about OER because we have materials online and are funded by government. So I wrote a proposal and submitted it to the VC. Before then, we had brief workshops in that area (2013). Attended a workshop in 2013, Economic Committee of West Africa States. If we were able to get our institutions to buy-in, they would support us with capacity building. I reached out to UNESCO, the then coordinator came to Lagos to talk to the senate members, they educated us about OER, the ability of OER and why my university should buy into it.[41]*

TESSA spent a lot of time identifying and supporting champions, including people in senior positions such as deans or heads of department and those who saw their involvement in the programme as an opportunity to become better known and more expert in their institutions. The TESSA team found that local champions were a powerful force for promoting OER adoption; as they introduced new resources or ideas, champions would emerge to take those concepts forward. A notable effort in this regard was the development of the TESSA Ambassador Scheme, where TESSA sent those who are accepted into the programme a pack of resources to help them publicise the initiative. The contributor also noted the use of a WhatsApp group to exchange ideas about how to use the materials.

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[38] Interview with John Lesperance, former education specialist at COL, 15 May 2020
[39] Email correspondence with VUSSC representatives, 28 October 2021
[40] Interview with Tony Mays (ex-ATEN project manager), 10 September 2020.
[41] Interview with Jane-Frances Obiageli Agbu, Director NOUN-OER Unit, 9 April 2020

Despite these successes, one of the main constraints in measuring the impact of these advocacy efforts is a lack of tracking and availability of what happened following advocacy efforts. For example, although NOUN encouraged other institutions to openly license their materials, which – anecdotally at least – improved OER awareness and use amongst these institutions, cumulative statistics were unavailable to demonstrate the rate of OER adoption.[42] This is a significant area for improvement as accurate tracking can strengthen the value proposition for OER use, as well as providing a clearer sense of strengths and challenges of the initiatives' activities.

Developing resources, repositories, and research

Resources

Several initiatives have made an invaluable contribution by developing and adapting OER. This includes creating or repurposing OER, or developing materials that facilitate OER-related skills development. For example, in developing and repurposing OER, NOUN made materials available for sharing and reuse by internal and external students and academics. The initiative has created approximately 200 OER to date.[43] Despite this success, the several links on the OER portal were broken at the time of writing. TESSA has created approximately 100 OER in English, 75 of which are also available in Kiswahili, French, and Arabic. The OER cover primary school curricula, as well as handbooks and toolkits for teachers and teacher educators. The team has recently added resources to support foundation literacy and foundation numeracy. TESSA also has ten free online courses available, which are designed to mediate the TESSA OER. In addition, TESSA content for each subject has been aligned to the curriculum in each country where it has been used. Similarly, KNUST made extensive progress in producing health-related OER, including interactive cases, instructional animations, images, and videos. As part of the KNUST Health OER project, OER developers created two narrated animations on the polymerase chain reaction (PCR), and disseminated them to 150 third-year Clinical Microbiology students via USB drives and CDs. A survey administered to students indicated that most students (87%) regarded the e-learning animations as one of the most important contributors to their understanding of PCR.[44]

Regarding adaptation, initiatives such as UCT's VC OER Adaptation Project contributed numerous OER to the institutional repository. Lecturers were provided small grants that allowed them to employ students. The adaptation project was particularly innovative because it 'took an agile alternative approach in supporting lecturers in developing their own enabling systems for OER production, specifically through employing students to reduce the time costs of OER engagement.'[45]

To develop OER-related skills, OEIs created the Becoming an Open Education Influencer (BOEI) course, a practical online course that supports influencers of and for open education. The BOEI course empowers users to gain insights, skills and experiences in open principles, such as OER, open licensing, open textbooks and advocacy. The course consists of six modules: Open (a shortened, remixed edition of the Commonwealth of Learning's 'Understanding OER' course);

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[42] Interview with Jane-Frances Obiageli Agbu, Director NOUN-OER Unit, 9 April 2020

[43] Survey response from Jane-Frances Obiageli Agbu, Director NOUN-OER Unit, 19 February 2020

[44] Donkor, P. and Tagoe, N. (2010). Health Open Educational Resources: Lessons from Kwame Nkrumah University of Science and Technology. Retrieved from http://oerworkshop.weebly.com/uploads/4/1/3/4/4134458/09_health_oer.pdf

[45] King, T.W. (2017). Postgraduate students as OER capacitators. *Open Praxis*, vol. 9 issue 2. Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/566/315

Ubuntu;[46] Advocacy; Facilitation; Influencing; and The Sustainable Development Goals. Each module develops a specific set of skills for OER users and creators.

The focus was not solely on resource development, but also on ensuring that the resources were of a high quality, responsive, and contextually appropriate. For example, OEEH steering groups had external members based in lower- and middle-income countries (LMICs) and who were therefore familiar with the context for which they were writing. Steering groups were careful about who they selected as content authors and facilitators. They also brought in subject experts, thus ensuring that evidence-based best practice was shared and was relevant. As a result of OEEH's activities, more than 300 OER, created with 110 collaborators from 25 countries, are available to download, reuse, share, and adapt for local training needs.[47]

Developing research

Image courtesy of STEPS Centre, Flickr (CC BY-NC)

Through their work, initiatives have also developed a valuable body of OER-related research. OEIs conducted research on student experiences with textbook access and usage of OER, which found that at least a third of students were not purchasing textbooks for their courses, primarily because they were too expensive, while another third was only purchasing selected textbooks. The research showed that several students were digitising copies of textbooks and distributing them to peers, demonstrating the value of more cost-effective electronic versions. OEIs used this research to inform its own activities and hopes that it will provide insight into the value of open

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[46] A term originating from the Nguni language group in southern Africa meaning "humanity". It is sometimes translated as 'I am because we are' (or 'I am because you are'), or 'humanity towards others'.
[47] Commonwealth Eye Health Consortium. (2020). Supporting public health training for eye care across the Commonwealth through Open Education. Retrieved from https://cehc.lshtm.ac.uk/oers/

education in current curriculum development efforts, ultimately resulting in including OEPs in a curriculum development policy that would provide all students with access to OER.

ROER4D's main research output was a 16-chapter edited volume, *Adoption and Impact of OER in the Global South*, together with an open data collection for its six sub-project studies. The project undertook four research projects on OER and OEPs in sub-Saharan Africa, making a significant contribution to OER research on the continent. These were:

- *Tracking the money for Open Educational Resources in South African basic education: What we don't know.*
- *Teacher educators and OER in East Africa: Interrogating pedagogic change.*
- *Factors shaping lecturers' adoption of OER at three South African universities.*
- *OER in and as MOOCs.*[48]

The ROER4D project team produced ten journal articles, three book chapters, two monographs, five keynote addresses, ten conference papers, 75 conference presentations, 64 blogs and several teaching sessions with postgraduate students and staff.[49]

Also at UCT, DOT4D's research provided insight into the benefits and drawbacks of open textbook authoring, demonstrating that open textbooks and related open practices provide a means of addressing economic, cultural, and political injustices. Open textbooks, the initiative showed, have the potential to promote an enabling pedagogy for social justice and the transformation in South African higher education.[50] The body of research that such initiatives have produced has been a significant success as it has highlighted the complexities of OER adoption and provided insights and lessons learnt regarding the implementation of OEPs.

Developing frameworks and guidelines on OER development and use

The initiatives created useful frameworks and guidelines to optimise and facilitate OER development use, repurposing, and adoption. This provided structure to OER-related activities for VUSSC, NOUN and OUT, while serving as a valuable means of mainstreaming practices. VUSSC developed the Transnational Qualifications Framework (TQF), which allows countries to compare their qualifications to transfer credit from one programme to another. The TQF seeks to make qualifications more readable and measurable, thus contributing to a more flexible workforce and easier comparison of qualifications.[51] It allows courses and degree programmes that VUSSC creates to be adapted into recognised courses that students can take for credit through

[48] Hodgkinson-Williams, C. and Arinto, P.B. (eds). (2017). Adoption and impact of OER in the Global South. Cape Town & Ottawa: African Minds, International Development Research Centre & Research on Open Educational resources. Retrieved from http://www.africanminds.co.za/wp-content/uploads/2017/08/171204-AM-ROER4D-combined-Web.pdf

[49] Hodgkinson-Williams, C. and Arinto, P.B. (eds). (2017). Adoption and impact of OER in the Global South. Cape Town & Ottawa: African Minds, International Development Research Centre & Research on Open Educational resources. Retrieved from http://www.africanminds.co.za/wp-content/uploads/2017/08/171204-AM-ROER4D-combined-Web.pdf

[50] Cox, G., Masuku, B. and Willmers, M. (2020). Open Textbooks and Social Justice: Open Educational Practices to Address Economic, Cultural and Political Injustice at the University of Cape Town. *Journal of Interactive Media in Education*, 2020(1), p.2.

[51] Keevy, J., Chakroun, B. and Deij, A. (2010). Transnational Qualifications Frameworks. Retrieved from https://www.etf.europa.eu/sites/default/files/m/720E67F5F1CC3E1DC125791A0038E688_Transnational%20qualifications%20frameworks.pdf

educational institutions in small states.[52] The TQF has helped to promote the use of OER, because it has allowed those who develop openly licensed content and courses to increase the value of the materials by accrediting them and transferring accreditation to other qualifications. Because the TQF permeates all courses or content that VUSSC develops (which are also openly licensed), there is natural alignment between the TQF and OER advocacy at VUSSC.

VUSSC also worked with the University of Eswatini to develop an OER guide for students in post-secondary education. The former education specialist who was engaged in the initiative noted that the impact of the guide was widespread:

> *We wanted everybody to buy-in and it worked well because it was accepted by faculties, accepted by management. It's been downloaded widely by many other countries.[53]*

Following the development, VUSSC conducted a sensitization campaign, which helped to promote the guide.

NOUN technical training staff (supported by senior administration) worked with UNESCO to develop a framework for efficient OER conversion. As many NOUN course materials were in a PDF format, they needed to be converted to Microsoft Word for editing. During the format conversion process, editors copy-edited course content, added interactive elements where applicable, and updated it to ensure that it was relevant. This process led to marked quality improvements in the OER. Once the process was complete, the OER were released on the NOUN website in three formats: ePUB, Open Document Text, and PDF with a Creative Commons-Attribution-Share Alike (CC-BY-SA) licence.[54] Note that at the time of writing however, several links on the website were broken. These frameworks have played a significant role in formalising OER development processes within the initiatives, as well as ensuring a level of uniformity within the production process.

Similarly, OUT prepared an online guide for students on how to access OER. It is hosted on the university library page and details how students can search for various resources, including OER. The guide is used during orientation sessions, which are conducted every two months (via face-to-face sessions or online via Zoom), to introduce students to the guide and show them how to navigate the various sources of information.

Increased access to materials for users

The case studies revealed that users from diverse contexts were able to access to materials as a direct result of the initiatives' work. For example, TESSA OER have been used across a wide range of programmes in all partner institutions, with an estimated combined[55] enrolment of one million teacher learners and in-service teachers. The biggest contributors to this enrolment were the

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[52] Lesperance, J. (nd). Increasing access to higher education in small states. Retrieved from https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi6q-_b7pbyAhWhoVwKHYW1BU0QFnoECAMQAw&url=http%3A%2F%2Fwww.cedol.org%2Fwp-content%2Fuploads%2F2012%2F07%2FAN13_Lesperance_VUSSC_CH_FINAL.doc&usg=AOvVaw2rILXb759YXRPyuACCaPCQ
[53] Interview with John Lesperance, former education specialist at COL, 15 May 2020
[54] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria
[55] Comments received from Kris Stutchbury, Academic Director of TESSA, 14 December 2020

University of South Africa (UNISA), Open University Sudan, OUT, and the National Teachers' Institute in Nigeria.

These findings extend to other LMICs. At the time of the research, OEEH had reached more than 37,000 people from 188 countries and territories, over 66% of whom reported working in health/social care[56] and 58% of whom were based in LMICs according to their IP addresses – suggesting that the offerings were also relevant for the other 42% of people based in other contexts.[57] Because OEEH also offered open registration, individuals and eye health teams could engage with colleagues from different contexts.
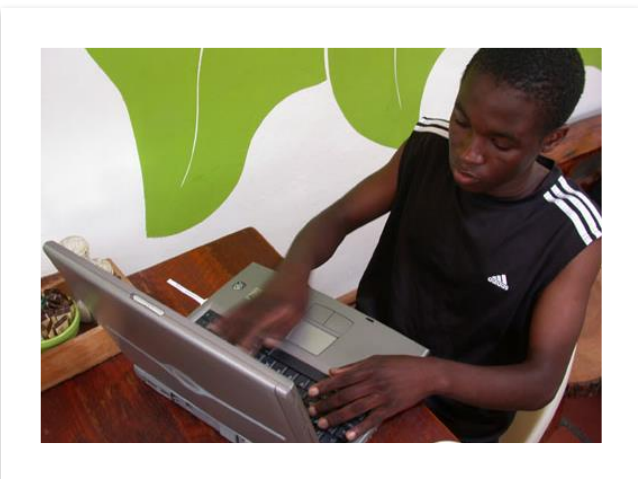

Image courtesy of Frerieke, Flickr (CC BY-NC)

Initiatives have also developed repositories to store the resources that they create, thus widening access to pertinent knowledge. One example of this is AfriVIP, which was established in 2014 under an open licensing framework as an online portal of veterinary information, educational and research resources and CPD opportunities for veterinary, para-veterinary professionals, and students.[58]. By 2019, AfriVIP had 561 resources including related assets uploaded, with a total of 44,431 resource downloads. Similarly, the Open UCT Initiative (OUI) developed and launched the OpenUCT institutional repository in 2014, which aggregated and detailed UCT's full OER collection together with scholarly outputs produced at UCT.[59] NOUN developed a microsite on the university's portal to store its OER, while OER Term Bank successfully established an online, multilingual term bank, specifically aimed at South African university students. OER Term Bank gives students access to key subject-specific terms and definitions, and services all eleven official languages in South Africa.

KNUST also developed its own online repository, KNUST OER, to house all materials developed under the initiative, as well as other OER. KNUST's OER involvement enhanced the institution's influence at the national level, where the KNUST OER repository was designated as the national open access repository.[60] Usage statistics indicate that, between 1 June 2012 and 30 November 2021, the website had received 253,551 page views, with users spending an average of two

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[56] According to the pre-course survey with a ~20% response rate for all enrolments

[57] Survey response from OEEH Project Lead, 11 March 2020; This was collected for most enrolments but the quality of this data is contested, may undercount LMIC enrolments

[58] University of Pretoria, Faculty of Veterinary Sciences. (2014). Faculty of Veterinary Science launches first veterinary online information portal (AfriVIP) in Africa. Retrieved from https://www.up.ac.za/faculty-of-veterinary-science/news/post_1652292-faculty-of-veterinary-science-launches-first-veterinary-online-information-portal-afrivip-in-africa

[59] CILT. (2020). OpenUCT. Retrieved from http://www.cilt.uct.ac.za/cilt/openuct

[60] Hoosen, S., Butcher, N., Hornsby, D. and Ngugi, C. (2012). Strengthening and Sustaining the African Higher Education and Research Space (AHERS) through Information and Communications Technology, Open and Distance Learning, and Open Educational Resources. African Development Bank. Retrieved from https://www.techylib.com/en/view/hushedsnail/strengthening_and_sustaining_the_african_higher_education_and_res

minutes 30 seconds on the website.[61] However, content on the website has not been updated in at least the last five years, so usage of the materials is declining. Resource downloads for the KNUST OER website were not made available, but six KNUST resources on the OER Africa website were downloaded a collective 3,672 times. Overall, the statistics above demonstrate that these resources and repositories have been accessed by thousands of users, suggesting that they have improved access to valuable knowledge, but that ongoing effort is required to sustain this benefit.

The importance of these repositories extends beyond the repository itself, as their development means that some institutions have had to build supporting infrastructure to accommodate the repositories. For example, OUT installed the relevant ICT infrastructure and customised Moodle platform to support their work, including its institutional repository.[62]

Storing resources on multiple platforms also appears to improve access to users from diverse contexts – both within and outside the institutions themselves. This was the case with AfriVIP's YouTube channel, which had 148 videos, over 3,800 subscribers, and 1,307,416 views. Similarly, KNUST OER's YouTube channel, established in 2011, created a series of materials that are accessible to anyone in the world. At the time of publication, it had garnered 2,219,314 views and had nearly 7,000 subscribers and approximately 92 videos on its channel. The most popular video, 'Benedict's Test – Qualitative Test in Carbohydrates', had received 378,000 views. Videos have received several positive comments, a sample of which is provided below.

> *Thank you , well explained! (2018)*
>
> *Tomorrow is our practical final paper and it is really useful Thanks mam!... (2020)*
>
> *Thank you so much it's understandable and helps a lot (2020)*
>
> *As a college student with absolutely no interest in ******* science, I'm ultra thankful for this video. It's in plain English with simple instructions. THANK YOU... (2021)*

Thus, while many of the initiatives reviewed have improved access to educational materials for those within their institutions, it is clear that access has been broadened beyond those institutions as people from around the world have been able to use the resources.

Inter-institutional collaboration

Institutions are increasingly leveraging inter-institutional collaborations aimed at OER advocacy, use, development, and knowledge sharing. These collaborations have enabled them to broaden their impact, network, share experiences, and learn from others.

NOUN reported that it has been approached by some institutions in Nigeria to use its educational materials. In cases where materials that institutions requested were not licensed as OER, NOUN developed and added an institutional licence template to the materials so that other institutions could use and adapt the materials.[63]

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[61] Google Analytics usage statistics, provided by Dr John Serbe Marfo, 1 December 2021
[62] Nihuka, KA., and Mallinson. B. (2015). Towards Integration of Open Educational Resources for Professional Development of Lecturers At The Open University Of Tanzania
[63] Interview with Jane-Frances Obiageli Agbu, director NOUN-OER unit, 9 April 2020

Under AfriVIP, a network with the other institutions was built, called the African Deans Forum. Partners submitted resources, and the UP contributor for AfriVIP observed that the process of interaction with other veterinary schools in the region (and other disciplines) was a wonderful experience for UP staff involved in the initiative. Whilst there are no measurable benefits from these two cases, contributors reported that this kind of networking had a positive influence, particularly by creating positive perceptions of working with external universities and partners.

Initiatives like OEIs reported significant involvement in open education communities, partnerships, and conferences such as University of Massachusetts, Amherst, the Open University, United Kingdom and the Global OER Graduate Network. It also received input and guidance from several experts in Open Education in South Africa and globally.

TESSA used key partnerships with organizations such as Saide, the Zambian Ministry of General Education, and the African Council for Distance Education to direct efforts at improving the adoption and use of TESSA OER. These linkages also helped TESSA undertake specific activities such as soliciting assistance in authoring and the critical reviewing of materials. Moreover, inter-institutional collaboration amongst universities and champions was key in developing curriculum aligned content. Partnerships also assisted TESSA with project coordination, IT support and communication support.

Through collaboration with higher education institutions around the world, VUSSC has been one of the first networks to develop openly licensed full programmes in several subjects, including business and entrepreneurship. These have been adopted and offered by universities in Commonwealth countries, as well as on other platforms such as OERu. Overall, these examples demonstrate how a commitment to collaboration is valuable for leveraging networks and expertise to develop OER activity. They also provide evidence of the importance of sustaining activities over the long term.

With reference to inter-institutional knowledge sharing, KNUST partnered with the University of Michigan (UM), where the latter provided an intern and visiting staff to upskill staff and share lessons learnt about OER creation. This partnership was crucial in creating momentum for OER-related implementation at KNUST.[64] Through its Health OER initiative, the College of Health Sciences at KNUST also partnered with OER Africa, the University of Ghana, the University of Cape Town, and the University of the Western Cape. The Health OER Initiative began in November 2008 and was aimed at developing health-related OER through collaboration between African institutions. By late 2009, the partner institutions had submitted a successful two-year follow-on grant proposal to the Hewlett Foundation and launched an African Health OER Network, with the aim of developing a continent-wide network to share knowledge, address curriculum gaps, and use OER to advance health education.[65]

OUT established partnerships with universities and institutions such as the Dar es Salaam College of Education and OER Africa, which facilitated knowledge sharing regarding OER development and adaptation, and allowed the OUT team to cascade this information to other institutions, particularly when OUT was assisting other units to establish ODL activities. [66] OUT also linked up

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[64] OER Africa. (2009). Health OER Briefing Document. Retrieved from
https://www.oerafrica.org/resource/health-oer-overview
[65] KNUST OER. (nd). History. Retrieved from
https://websys.knust.edu.gh/oer/pages/sections.php?siteid=knustoer&mid=23&sid=123
[66]Interview with Shadrack Mbogela, Doreen Mushi, and Dr Athumani Samzugi (Open University of Tanzania), 14 July 2020

with the Tanzania research and education network (TERNET), a network of Tanzania higher education and research institutions aiming at providing network infrastructure and associated services for enabling sharing of education and research resources inside and outside the country.[67]

The ROER4D initiative has received acclaim for sharing high quality OER research from a Global South perspective. The research and researchers from the network have also had broader influence following the ROER4D activities, for example, assisting in writing OER policies for provincial education ministries in Sri Lanka and implementing state-sponsored OER portals for teacher professional development in three states in India.[68] This demonstrates a level of continuity in collaborative processes once relationships have been established, together with the fact that these initiatives are contributing to a broader OER community.

Initiatives also gained significant benefit from collaborating on content development. This included VUSSC, which oversaw collaborative course development where participants from different countries would meet to develop courses and establish networks for further online collaboration. This was particularly effective because collaborators felt that they had a stake in the process:

> *As small developing countries, the needs and aspirations are very similar and the common aim is to produce materials which are of high quality, relevant, user friendly, adaptable, and portable… Quality and relevance are reinforced by the cross section of people who work together. They are not only educators but 'stakeholders' with various combinations of experience, interest, knowledge and skills on offer for the development of the selected course.[69]*

Similarly, OERTB used Creative Commons licensing to empower collaborators who assisted them by giving potential collaborators different options under which they could license their work and by crediting them next to each entry they provided. Not only do these two examples speak to the effectiveness of intra-institutional collaboration; they also demonstrate that giving people a stake in the collaborative process can yield positive results. Ultimately, the examples presented in this section illustrate the power that collaboration can have in promoting knowledge development and sharing, as well as increasing the impact of OER initiatives.

Mainstreaming OER into institutional practices

It became clear throughout the research that OER activities need to move from an institution's periphery to its mainstream to ensure long-term sustainability. Mainstreaming OER and related practices ensures they are integrated into institutional practices in meaningful ways. Initiatives like OUI and OEIs reported successes in mainstreaming OER into institutional practices and achieving a certain level of continuity – even after the initiative had ended in some cases. OpenUCT was a

[67] Hoosen, S. and Butcher, N. (2019). Understanding the Impact of OER: Achievements and Challenges. UNESCO Institute for Information Technologies in Education.

[68] Hodgkinson-Williams, C. and Arinto, P.B. (eds). (2017). Adoption and impact of OER in the Global South. Cape Town & Ottawa: African Minds, International Development Research Centre & Research on Open Educational resources. Retrieved from http://www.africanminds.co.za/wp-content/uploads/2017/08/171204-AM-ROER4D-combined-Web.pdf

[69] Vaai, E.K. (nd). Virtual University of the Small States of the Commonwealth (VUSSC) model for development: Open Educational Resources. Retrieved from https://wikieducator.org/images/a/a1/Emma_Kruse_Vaai.pdf

particularly successful example of this. Once the OUI ended, stakeholders at the institution agreed that the library should take on the role of maintaining the OpenUCT repository, which was a significant success for OUI as the initiative's outputs became part of the institution's operations. The OUI also used small grants of up to ZAR10,000 (approximately US$650) for staff and students to develop or adapt teaching and learning content into OER. These grants were mainstreamed when they were incorporated into the university's general teaching and learning grants. This work was also a precursor to [UCT's Open Textbook Award](#), which recognises the efforts of open textbook authors and promotes the creation and reuse of OER, thus formally rewarding open practices.

OEIs also had success in mainstreaming OER-related CPD into institutional processes. As mentioned, the project lead advocated for one of the KPIs for staff to reference OER use. Moreover, all new contract staff in the LT Collab's Academic Literacy Writing Programme are required to complete the BOEI course, providing a focus on OER-related CPD that assists staff with teaching and learning. OUT also embedded OER knowledge into the library-led information literacy training for staff and students in each academic year.[70]

OER-related policy development has also been a commonly used tool in attempts to mainstream open practices in institutions. KNUST had its OER policy, which was developed as a result of the Health OER initiative, approved by the college board, academic board and council; NOUN created a comprehensive OER policy for the institution; and OUT developed an institutional OER policy while also amending other policies to include OER. For the AfriVIP initiative, participants at UP realised that the UP intellectual property (IP) policy was conservative and did not support the use of OER. Participants encouraged the university to review the IP policy, a process which, at the time of writing, was still underway.[71] Whilst policies have been developed and revised to support OER, and although initiatives largely reported that the policies continue to guide the development and usage of OER, there was limited evidence of structured measures that institutions were taking to operationalise the policies, highlighting a gap in OER implementation, as well as a need to ensure that stakeholders consider implementation as part of the OER policy design process. Moreover, efforts to gather statistics to support statements regarding the policies were often unsuccessful, suggesting a lack of data in this regard. Alternatively, the lack of data could indicate that mainstreaming has not been as successful as noted by some initiatives, which raises the issue of ensuring robust monitoring and evaluation (M&E) of OER policy implementation.

Impact on teaching and learning

The research demonstrated that initiatives have had an impact on teaching and learning practices in terms of providing CPD for educators and improving access to materials. In terms of teacher practices, some initiatives have provided opportunities for CPD. TESSA's emphasis on changing practice at all levels of the school system was one example of this. Some teacher educators found the TESSA materials to be completely new and saw them as being an 'eye-opener'. The 2012 evaluation found that the materials had benefited teachers because the OER 'fused theory and practice; shifted perceptions from teacher as a "know it all" to "teacher as facilitator of learning"; and greatly enhanced the relevance of pupils' learning experiences.'[72] In the evaluation, teachers

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[70] Interview with Shadrack Mbogela, Doreen Mushi, and Dr Athumani Samzugi (Open University of Tanzania), 14 July 2020

[71] Interview with Dietmar Holm (Deputy Dean University of Pretoria Faculty of Veterinary Sciences), 13 October 2021

[72] Harley, K. & Barasa, F.S. (2012). Teacher Education in Sub-Saharan Africa (TESSA). Formative Evaluation Report. Retrieved from

also provided positive feedback regarding their use of TESSA materials and how it had led to changes in how they conceptualised and planned their teaching. For example:

> *Definitely it did because the materials exposed me to new resources for use and the interactive methodology advocated has made me to reflect a lot on what learning as a process entails.*
>
> *No doubt it has because one has to think critically about what to teach, how, when and where.* [73]

TESSA materials have also supported CPD for teachers by, for example, being used to cascade training to teacher educators in Tanzania. The Tanzanian Government adopted a 'competency-based curriculum' which supports a cascading CPD programme for teachers in mathematics, physics, chemistry, and biology. In each of these subjects, there are 15 national facilitators who each trained 20 regional trainers per subject in each region of Tanzania. Those regional trainers went on to train local teacher educators to use TESSA materials, equating to thousands of secondary science teachers who were exposed to TESSA OER. In a survey, teachers indicated that their pedagogical skills had improved; that there was more interaction in their classrooms and that the TESSA OER were valuable reference materials.[74]

NOUN's academic staff were trained to write materials that use existing OER. At the national level, leadership and academic staff from other institutions were invited to join NOUN's OER projects with a view to building a Nigerian Open Education ecosystem. This ecosystem would be characterised by collaboration on university course development and sharing resources that are continuously improved based on teaching and learning praxis.[75]

Both the TESSA and NOUN examples above demonstrate how initiatives can impact on CPD for teaching and learning beyond the initiative itself and can find expression within new groups.

For initiatives like OUT, NOUN, and VUSSC, OER have also provided greater access to rich materials for teaching and learning through, for example, videos, presentations, modules, and supplementary teacher's notes. In the case of VUSSC, the Bachelor of Business Entrepreneurship programme at Botswana Open University was repurposed for use in two new programmes. Two courses were redistributed and remixed for use in the Bachelor of Commerce curriculum and nine for the Bachelor of Business Accounting curriculum. Some of the long-term outcomes of the BOU project are that graduates have been employed, promoted, or have started their own businesses. In addition, a high-quality curriculum has been implemented at the institution. This process, in turn, has enhanced the capacity of BOU staff to develop OER, as well as creating new opportunities for OER adaptation.[76]

http://www.tessafrica.net/sites/www.tessafrica.net/files/TESSA_Formative_Evaluation_Report_October_2012.pdf

[73] Harley, K. & Barasa, F.S. (2012). Teacher Education in Sub-Saharan Africa (TESSA). Formative Evaluation Report. Retrieved from http://www.tessafrica.net/sites/www.tessafrica.net/files/TESSA_Formative_Evaluation_Report_October_2012.pdf

[74] Teacher Education in Sub-Saharan Africa. (2015). TESSA presentations at DETA 2015. Retrieved from http://www.tessafrica.net/sites/www.tessafrica.net/files/files/TESSA%20presentations%20at%20DETA%202015_final.pdf

[75] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria

[76] Survey response from Dr Mairette Newman, Education Specialist at COL, 29 April 2020

Materials that were developed through the abovementioned initiatives have also aided institutional responses to the COVID-19 pandemic by equipping educators with the skills to respond to new teaching and learning demands in an online environment. For example, AfriVIP held capacity building workshops at UP run by OER Africa, as well as Mixed Matters CPD workshops. In these workshops, academic staff were encouraged to reflect on OER and teaching and learning methods, while being equipped with skills to find, adapt and license OER and develop new and useful courses and materials. This process was useful, as one contributor explained:

> *That was extremely valuable in 2020 when we had to suddenly move to completely online. We were so well prepared compared to other institutions. We were very successful in moving from our status quo to an online environment, and it had a very significant impact… all the courses we did in the years 2014–2018… we were so well prepared when 2020 arrived – with a lot of material prepared, and a lot of mindsets changed… people were not completely frightened of using prerecorded video or making a short video with assessment – because we did it before.*[77]

Thus, initiatives made noticeable gains regarding teaching and learning practices, most notably by improving access to materials, supporting CPD, and creating new opportunities for OER adaptation and use. However, there is a need for recent data to demonstrate measurable impact in this regard, together with evidence that the initiatives that are still active are using such data to modify their activities and processes.

Challenges

While initiatives have experienced significant gains and successes, they have also faced several challenges in implementation, adoption, and capacity. This includes obstacles regarding advocacy efforts, a slower pace of OER adoption than the initiatives had initially anticipated; a lack of institutional buy-in for the initiatives themselves as well as the concept of OER; staff turnover, with the result that champions leave and new ones must be found; and, more fundamentally, issues with access to internet connectivity and devices.

Lack of internal ownership of OER and the aims of initiatives

One of the key challenges that was highlighted in several initiatives was sustaining momentum after initial activities, particularly within the context of changing personnel and competing commitments. For AfriVIP, shifts in leadership, handover processes, and technical support created lags in implementation. For ATEN, although teachers were excited during and immediately after workshops, the network lost priority once they returned to work and had to manage other commitments. There is limited evidence that OER activities continued once the Health OER initiative ended at KNUST. These examples suggest that the absence of sustained momentum, slower pace of adoption, and a lack of resources, were the result of a lack of internal ownership of the concept of OER and the initiatives' aims.

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[77] Interview with Dietmar Holm (Deputy Dean University of Pretoria Faculty of Veterinary Sciences), 13 October 2021

VUSSC also faced challenges where the materials authoring team needed to maintain momentum for project activities over a long period. Because the network involved multiple countries, VUSSC needed to find a way of engaging stakeholders from all countries. Thus, every three years, it would bring participants from each country together to identify areas of need, challenges, and priorities of individual countries. Then, people were grouped together to share content and country participants reviewed each other's content. VUSSC would also bring subject matter experts in, depending on what topic they were covering. This kept people talking and engaged. While this is an innovative approach that appears to have maintained momentum in the long-term, it is also resource-intensive and may not be feasible for all initiatives.

OER capacity building and advocacy efforts faced obstacles such as a lack of time, skills, and willingness

Image courtesy of Rawpixel Ltd, Flickr (CC BY)

Although participants derived value from capacity building and advocacy efforts, contributors frequently raised the issue of gaining and sustaining participation. In some cases, OER initiatives were regarded as projects that required extra work and time commitments, which was sometimes met with resistance. There were various reasons for this, including that advocacy around understanding the value proposition of OER takes time and effort, and that initiatives tended to underestimate the time and energy required for such advocacy (as in the case of AfriVIP). In addition, at some institutions, staff were not recompensed for their work in creating and using OER.

A lack of time was an issue raised by both students and academics. For example, some academics who were involved in DOT4D wanted to collaborate with others but could not because of conflicting schedules or an unwillingness of some academics to be involved. The team sought to solve this by introducing incentives such as an annual Open Textbook Award. For the VC OER Adaptation Project at UCT, students struggled to manage the time required to solicit content and adapt the OER while balancing their course loads. When the project was concluding, students indicated that they would have preferred a more structured, production-focused model with dedicated weekly or bimonthly workshops to support their adaptation activities.[78]

A related issue was that the workload would often fall on one person or a small group of people, particularly those who had been selected or volunteered themselves to be champions. Although TESSA was greatly dependent on people on the ground to push the initiative forward, ambassadors were promoted to higher positions over the years, and their active involvement in the initiative diminished, leaving a gap in promoting use of TESSA materials.

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[78] King, T.W. (2017). Postgraduate students as OER capacitators. *Open Praxis*, vol. 9 issue 2. Retrieved from https://openpraxis.org/index.php/OpenPraxis/article/view/566/315

Initiatives like OEIs, the UCT VC OER Adaptation Project, and AfriVIP also experienced transience with staff and students, which made it challenging to build capacity over a sustained period of time. This is an important consideration for sustaining initiatives long-term – while champions are charged with core aspects of implementation, these findings suggest that, because professional positions change over time, there should be well-established handover and continuity plans in place to ensure that activities can continue without losing momentum. The findings also raise the question of whether champions are using the knowledge that they have gained about OER after they are promoted, and whether they continue with their advocacy (even in an informal capacity).

Despite CPD efforts noted by several initiatives, contributors also reported a lack of wide-ranging skills, including specialised OER-related skills such as adaptation, searching, and licensing, together with limited professional development opportunities to develop such skills. At OUT, the institution faces a shortage of trained instructional designers to develop course materials, though for the country as a whole and not just the institution. OUT also found that there is a need to develop skills in integrating OER into teaching resources, searching for appropriate OER, and writing and editing course materials. Similarly, VUSSC and the UCT VC OER Adaptation Project found that initial hesitance from academics to participate in the initiatives was compounded by a lack of understanding of open licensing, as some found Creative Commons licences confusing (for example, academics were unsure about how to attribute content that they had edited).[79] VUSSC sought to resolve this by providing periodic CPD workshops on these topics, though it became clear through the research that sustained capacity building activities and monitoring following these activities would be of great value.

Compounding this lack of skills is that subject specialists were not always available to assist in OER creation and adaptation and that their expertise was not always aligned with the initiatives' needs. At KNUST, for example, students from the Department of Communication Design who assisted in creating OER for the Health Sciences faculty were trained in multimedia design, but not in health sciences or pedagogical principles. Their limited subject knowledge made it difficult for them to understand the surgical and laboratory procedures they were filming. As a result, they did not always focus the camera on what the lecturer wanted to highlight.[80] This insight is particularly concerning as it has implications for the quality of OER produced. The Health OER project at KNUST was developed with funding from the William and Flora Hewlett Foundation as well as support from UM, which included a UM visiting professor who provided training and OER development support. It is not clear how long OER-related activities continued in the department once this support ceased.

A final constraint to capacity building efforts was that initiatives experienced resistance to OER adoption. For example, participants at UP found it difficult to recognise the benefit of OER for them personally because academics were 'at the top of their game'[81] in terms of producing quality resources and the OER they found during their searches were of an inferior quality to their own resources. While some staff were happy to produce and share their own resources, most saw no personal advantage derived from sourcing existing OER. OEIs at NMU, NOUN, and DOT4D experienced similar resistance and reluctance, as summarized below.

[79] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria
[80] Ludewig Omollo, K. (2011). Growing an Institutional Health OER Initiative: A Case Study of the Kwame Nkrumah University of Science and Technology.Retrieved from https://www.oerafrica.org/FTPFolder/Website%20Materials/Health/case_studies/2011.05%20Knust_Low_Res.pdf
[81] Interview with Andrew Moore (OER Africa project manager), 11 December 2020.

- **OER are sometimes viewed as direct competition to published textbooks.** OEIs experienced a fair amount of resistance from publishers and vendors on campus in their efforts to assist academics to find 'textbook equivalents' that were openly licensed.
- **Initial efforts were sometimes greeted with suspicion, particularly when staff were asked to share their courses with other instructors in the institution or externally.** Prof. Peter Donkor, the former pro vice-chancellor and former provost at the College of Health Sciences at KNUST, questioned this reluctance: 'We struggle to have access to information. If we have information, why do we not also share it as part of a pool of universities? Using OER, our institutions are able to exchange information for the purpose of improved learning'.[82] In cases such as NOUN however, as the initiative gained traction, using OER made staff more amenable to sharing their own content.
- **Some lecturers were concerned about the exposure that use of their materials for OER adaptation might entail.** This is known as the 'sunflower effect', where lecturers are comfortable to create and share materials for students to use, but feel exposed if they are shared more widely as it might expose them to critique.[83]

These findings highlight the complexities of OER advocacy and CPD, particularly regarding participants' time limitations, sustaining OER activities, and ensuring that participants have the requisite skills. They also foreground the importance of shifting the mindsets of stakeholders, such as academics, to improve adoption. Although it is difficult to provide solutions to these challenges, there is evidence that sustained advocacy efforts can have an impact in the long term, thus emphasizing the need to ensure that initiatives prioritise sustainability and develop innovative strategies to mainstream their activities.

Building a sustainable model can be challenging

There are various, often complex, reasons why OER initiatives have not been sustainable in the long-term. Although this section does not tackle these exhaustively, it does outline the most frequently raised issues regarding sustainability challenges. The key lessons derived from these challenges are explored in greater detail below.

The compromise between autonomy and continuity came to the fore, as some initiatives needed to make difficult decisions about how to mainstream their activities into existing university structures. For some, this had the effect of compromising on the initiative's vision. NOUN made provision for OER creation in its course materials development budget rather than a separate budget item. However, this funding arrangement means that there are insufficient funds available to implement OER optimally. A separate budget would assist OER development and adaptation, as converting existing government-funded course materials into OER requires dedicated time and resources.[84]

Similarly, AfriVIP was faced with limited external funding. The AfriVIP portal was hosted on an OER Africa server which UP continued to fund until 2020. The faculty initially decided to maintain the platform to assess how frequently it would be used and whether it was financially feasible to sustain. They explored options such as commercialising some resources with an external partner

[82] Ludewig Omollo, K., Rahman, A., & Yebuah, C. (2011). Producing Open Educational Resources From Scratch: The Case Of Health Sciences At University Of Ghana And Kwame Nkrumah University Of Science And Technology. ResearchGate.

[83] Correspondence with Dr Glenda Cox, DOT4D Project Coordinator, 27 August 2021

[84] Hoosen, S. and Butcher, N. (2019). Understanding the Impact of OER: Achievements and Challenges. UNESCO Institute for Information Technologies in Education.

to provide CPD points with the idea that the resources would be open, but attaining CPD points would be a paid service. However, this model did not require an OER platform so the idea was abandoned. UP also considered including advertisements on the site, but decided that there would not be sufficient traffic to the website as the discipline is small. Thus, the faculty has ceased hosting the platform. All resources were transferred to UP and are being stored in a Google Drive folder. These examples point to a missed opportunity in terms of building on the successes that initiatives have had. They also highlight the importance of longitudinal support, which might include financial support, peer recognition, and support for design, copyrighting and publishing.

Related to this is the issue of incentives and structural drivers to build sustainability into initiatives. As one contributor from the Open UCT Initiative noted, if teaching, resource development and OER are not specific criteria measuring success, it is hard to shift OER away from being a peripheral activity towards being a core activity within an institution. This makes OER initiatives far more vulnerable to changes in faculty and shifts in institutional practices or priorities.

Slower pace of OER adoption than anticipated

Pace of adoption was a key concern for initiatives, particularly in cases where the initiative had undertaken advocacy activities and CPD to support adoption. Initiatives such as VUSSC and TESSA found that it took longer for the target audience to adopt sustainable OER practices. There were several reasons for this, one being a lack of awareness and willingness to implement OER knowledge and another that initiatives found it difficult to motivate people to use OER.

VUSSC found that, even though it had undertaken extensive capacity building for design, development, and delivery of courses and learning materials, not all countries adopted OER at the pace it had hoped. This could have been partially due to a lack of access to resources and unfamiliarity with the concept of OER, but a related issue was that some countries experienced difficulties in motivating people to develop OER because not everybody saw OER as a valuable source of educational materials. The TQF played an important role in tackling this issue, as it allows countries to compare the level of their materials with those from other countries. VUSSC also employed a bottom-up approach and involved people at all points in the process, which bolstered adoption.

Both TESSA and VUSSC found that there were sometimes political motivations for the lack of adoption. A contributor relayed an anecdote when TESSA provided a library of materials consisting of 75 units to several schools in sub-Saharan Africa. When they returned to one of the schools three months later, the materials were still in their boxes. The contributor explained that there was friction between district education advisors and teachers, as the former did not always have hands-on experience of classroom implementation, but still saw themselves as more expert. She added that 'this school is next to the district education office, someone from the office works there.'[85] This demonstrates the challenge of introducing new materials into situations where control is centralised and people in charge are significantly removed from the classroom. Similarly, VUSSC noted that, although there is data that point to the cost savings[86] and the pedagogical

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[85] Interview with Kris Stutchbury, Academic Director of TESSA, 16 April 2020

[86] VUSSC significantly reduced the costs of developing its courses by pooling resources and using OER. One contributor noted: 'We estimated that to develop a Master's programme would be more than US$10,000. When we collaborated with countries, the resources they put in was minimal – allocating one or two staff. We didn't have to develop the course from scratch. One country would develop content for one module and share it to have it peer reviewed. So they didn't have to develop a full programme on their own. That reduced the cost in each country. Then we shared that with other countries. It was only the time that staff spent.'

benefits of adopting OER, many decision-makers and policy-makers either do not understand how OER work or must navigate complex political networks to embed OER use.

Access to internet connectivity and devices

Adequate internet connectivity and devices form the foundation of much OER-related work because they facilitate the underlying processes of searching for, developing, and adapting OER. Although improving digital capabilities and access was beyond the remit of most initiatives in the sample, the lack thereof was a challenge that initiatives such as KNUST, OUT, and ATEN experienced for both students and faculty.

In some cases, educators and students could not afford internet or devices, while others experienced poor connectivity and bandwidth challenges. For example, while KNUST's institutional repository sought to improve access to educational materials by licensing them as OER and mounting them on the institutional repository, students sometimes did not have devices or data to access them. Even networks and internet access within the institution were often limited.[87]

However, partnerships and increased collaboration can be effective in tackling such issues. From 2010 onward, several network infrastructure improvement projects took place at KNUST. For example, in late 2010 Vodafone installed a 45 megabit per second network on campus and offered bandwidth at a 50% discounted rate for the next six years.[88] This demonstrates the role that such partnerships can play in supporting OER initiatives. In addition, the West African Research and Education Network collaborates with universities in West and Central Africa to provide high-quality internet capacity. UbuntuNet does the same for Southern and East Africa. Both networks have strong ties and financial support with the European Union and Geant.

A related issue is the lack of access to data on the initiatives' activities. Initiatives such as DOT4D, OEEH, and KNUST highlighted that, although there are numerous open materials being created, it is difficult to track how they are used. This is a key area that could provide empirical evidence regarding the use and development of open materials, and for the provision of internet and devices. OER Africa's research has confirmed this, as it has been challenging to obtain accurate usage statistics from several initiatives, many of whom explained that they did not possess such statistics. In some cases, it was also challenging for the OER Africa team to gather information and conduct research due to broken links. Overcoming this issue might involve using a content dissemination platform that would grant the initiative access to access and view statistics via Data Protection Regulation rules in a country or region. It could also include structuring analytics better so there are more sophisticated analytics on a particular resource, which could track where a resource is being used and how it was accessed. This could be supplemented by a qualitative study analysing students' use of OER.

Accreditation

Initiatives have faced challenges in aligning accreditation requirements with OER use or implementation, with participants calling for more formalised recognition mechanisms. VUSSC has

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[87] Interview with OER Africa technical team lead, Monge Tlaka, 15 September 2021
[88] Ludewig Omollo, K. (2011). Growing an Institutional Health OER Initiative: A Case Study of the Kwame Nkrumah University of Science and Technology.Retrieved from https://www.oerafrica.org/FTPFolder/Website%20Materials/Health/case_studies/2011.05%20Knust_Low_Res.pdf

perhaps been the most successful OER initiative to implement an accreditation process for OER through the TQF, but, overall, although many users find the OER useful, initiatives have had to consider how to integrate formal accreditation into their activities. This was the case for OEEH, where although it had started out as a knowledge-sharing initiative, users wanted accreditation that would be formally recognised. OEEH also happens to be operating in the medical field, where hierarchy and adherence to accreditation norms are deeply entrenched, and is now looking into how it can reach professional practitioners from a global audience through formal accreditation mechanisms and institutions. Recent progress has seen the OEEH team developing a postgraduate certificate using the open courses. The course is accredited for CPD and is also on demand on the FutureLearn platform. The [postgraduate certificate](#) is in its final approval stage.

OUT found that accreditation bodies sometimes view OER with suspicion because of a lack of familiarity with them. To overcome this, they invite representatives from the ministry and accreditation bodies to OER-related workshops that OUT hosts to sensitize them.

In an interesting case that demonstrates the complexities around OER and accreditation, TESSA highlighted a disjuncture between theory and practice regarding assessment. The TESSA OER conceptualise knowledge about teaching as subjective and socially constructed by an individual's environment, whereas in-service and pre-service teaching courses tend to treat knowledge about teaching as objective and fixed.[89] The disjuncture between theory and practice presented a challenge as TESSA materials did not always fit into how teacher education was being implemented on the ground. This disjuncture continued when considering how teacher learners are assessed. TESSA materials support pedagogical content knowledge in some countries like South Africa and Kenya, where the team has seen people use the materials to introduce a practical element beyond the examination. This includes encouraging teacher learners to create a teaching and learning resource and evaluate it. At the end of their teaching practice, they give the resource to the school. The evaluation of this resource is part of the assessment. In those circumstances, TESSA is extremely useful because it allows for practical learning. However, teacher training ultimately culminates in an examination, which focuses more on a set of rules in which teaching is presented as unproblematic. This example demonstrates that accreditation norms are not always aligned with the intention or subject matter of the OER.

Lessons learnt

The successes and challenges outlined above, together with the insights that OER Africa's researchers have gained during the research process, yield several key lessons concerning the influence that specific activities have had in entrenching open practices, as well as highlighting areas for improvement and opportunities for future initiatives.

Leverage the power of localization

The research demonstrated the power of localization efforts, from VUSSC's TQF for formal qualifications to OER Term Bank's terminological translation and TESSA's materials for teachers and teacher educators, which remain relevant even though some were developed a decade ago. The latter's relevance is evidenced by the enthusiastic response the materials have had in Zambia, where they were integrated into the existing structures and processes for school-based CPD and

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[89] Survey response from Kris Stutchbury, Academic Director of TESSA, 19 February 2020

into the curriculum of all the government-run colleges of education. Initiatives like OEEH have also brought in subject experts and participants from LMICs, therefore ensuring that evidence-based best practice is shared and is applicable. This has had a significant impact on the relevance of the materials. Efforts to localize materials have been widespread and well-received, particularly because contextually relevant materials greatly aid teaching and learning, while ensuring that local knowledge finds expression in formal education.

However, the research has also shown that because these processes are resource-intensive, efforts to localize content should be balanced appropriately. A contributor to the ATEN case study notes:

> *Every country thinks that its curriculum is unique and wants to create its own content. However, there is much overlap and topics common across countries, and initiatives will be more sustainable if focus is placed on collating content of common topics across countries into one platform.*

This suggests that we should view efforts for localization with a practical lens of what content is already available, ensuring that initiatives operate as efficiently as possible.

Another dimension of OER localization and accessibility is the format in which resources are published, as shown in the NOUN case study, where the contributor explained that NOUN published its OER in three formats, PDF, ePUB, and odt:

> *Interestingly, although there were always three versions of the courses available, the ePUB version was found to be the most interesting by staff and students, because it is the most portable. The ePUB format can be navigated using a wide variety of mobile devices. The podcasts that came with many OER packages made listening to courses while on the move very interesting and convenient. Students responded positively to this.* [90]

This suggests that the format of OER matters; key to ensuring that OER are widely used and appropriate for a specific context is to think about the target audience and devices that are most popular amongst that group. Catering to these varying requirements 'democratises access to OER for academic reuse (odt), self-print (PDF), and for mobile devices (ePUB)'.[91] Note that at the time of publication, several resources on the NOUN OER website were not accessible in the formats mentioned above, while the newer NOUN OER Portal had limited resources.

Undertake ongoing capacity building

Ongoing CPD efforts are central to sustainable OER practices. Beyond this, though, this research has highlighted the value of combining CPD and OER practices to drive positive pedagogical change. CPD is critical in terms of foundational skills for creating and working with OER. For example, the VUSSC team learnt the importance of reinforcing skillsets through CPD. The team initially assumed that all participants would have the necessary ICT skills but found that they needed to build capacity in this area. The model that VUSSC used focused on 'the three Cs' –

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[90] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria

[91] Hoosen, S. and Butcher, N. (2019). Understanding the Impact of OER: Achievements and Challenges. UNESCO Institute for Information Technologies in Education.

capacity, collaboration, and content. This multi-pronged approach allowed VUSSC to improve OER capacity, promote collaboration between country participants, and produce OER-related content. However, a VUSSC contributor noted that capacity building was still required, including information around copyright and how to adapt OER, skills that were mentioned across numerous case studies.

In line with the above, the need for ICT skills required for OER creation and adaption was mentioned by several initiatives, including ATEN and OUT. ATEN recognised early on that teachers were not inclined to work online and many did not see creating content as part of their role. At that time, there were requirements to use ministry resources, limited internet connectivity, and a lack of ICT skills among teachers. Over time, when working with teachers and as internet connectivity increased, there were some changes, and whilst training activities were very useful and informative, still thousands of teachers have not heard of OER. Thus, there is still a need to train teachers and other users on OER, as well as providing access to CPD opportunities for digital competency, skills which cannot be taken for granted.

The flipside of this is that because the concept is fairly established in academic circles within higher education, OER knowledge and skills can also be taken for granted. DOT4D provided training for project participants on understanding copyright and CC licences but noted that it would be useful to have greater efforts to help academics understand these concepts and their implications. There were several queries around reading, external sites, and video fair use, amongst other topics. This suggests that, although academics might be aware of CC licensing conventions through general channels and training conducted under the initiative, there is still a need to communicate details about concepts such as licensing and fair use. Academics consistently approach the DOT4D team for assistance in their open textbook work. Although OER advocacy and capacity building efforts have helped to promote use of OER and sensitizing users about key concepts, the initiatives above have highlighted critical gaps in understanding these concepts, thus highlighting a demand for capacity building in these areas, as well as a requirement for more advocacy regarding the benefits of OER and OEPs. This also calls for clear communication mechanisms and increased opportunities for reinforcing learnings on OER following initial capacity building contact. Communities of practice can play a crucial role in this respect.

Sustain OER advocacy at all levels

Advocacy activities are crucial to build momentum and gain buy-in, and this research has shown that there is a demand for them. These activities should occur at multiple levels within institutions, so it is important to consider messaging complexities. OUT reported that, through advocacy activities, including workshops and seminars, lessons gained from the projects have been transferred to other units within the institution and to other institutions. At UCT, the OUI team partnered with the research office to link OpenUCT with its existing seminar series. As the director noted, 'it works better if you link it to a discourse and language and set of interests that people already have... If you do the advocacy work, people will come round to agreeing'. [92]

Students have also played a significant role in advocacy efforts. The initiatives at UCT demonstrated that, although their time at the university was limited, students were tech savvy and able to understand and use concepts such as copyright and CC licensing. This is a promising finding about the role that students can play in supporting OER-related activities, particularly

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[92] Interview with Prof Laura Czerniewicz, Director of OUI, 10 July 2020

within the context of academics' time constraints. Students have played a similarly important advocacy role for the OEIs initiative.

Advocacy also plays a role in gaining support for the initiatives themselves. For OER Term Bank, there is a great deal of terminology research and development that needs to be undertaken for African languages. As such, a contributor indicated that greater exposure from its institution would be useful. For example, the team had wanted to put the link for OERTB on Blackboard, but there was not enough time to complete the phase for exposure and marketing of the platform.

> *Exposure is a critical part that needs attention – more workshops, campaigns, making people more aware of the term bank… More awareness campaigns should have been organized in the first year.[93]*

These examples demonstrate that advocacy activities occur at multiple levels and with several stakeholders, which may include the initiative, institutional leadership, staff, and students. Thus, targeted messaging focusing on the initiatives themselves, as well as the concept of OER, can significantly assist advocacy efforts by appealing to different audiences.

The role of champions

OER advocacy is an ongoing need for the initiatives themselves and the institutions in which they operate. Initiatives have implemented innovative mechanisms to ensure the continuation of advocacy efforts, and champions have a crucial role to play in this advocacy. Thus, supporting them should be central to advocacy planning.

TESSA highlighted the importance of finding a way to give people space to contribute regardless of their position in an institution. This may involve developing a meritocracy in which people are rewarded for the work that they do to advocate for OER and raising the profile of OER champions in an institution.

The transience of champions was also raised as a challenge, suggesting that, because professional positions change over time, there should be well-established handover and continuity plans in place to ensure that activities can continue without losing momentum. The findings also raise the question of whether champions are using the knowledge that they have gained about OER after they are promoted, and whether they continue with their advocacy (even in an informal capacity), including when they move to a new institution. This provides a significant area for future enquiry.

Move OER from the periphery to the core of the institution (provide institutional support)

The research also indicated that sustainability is far more effective when practices are mainstreamed and/or institutionalised and when participants and institutions have a stake in the process. This holds true for initiatives such as OEIs and OpenUCT. Communities of Practice, where responsibilities are dispersed rather than relying on one person, could be an effective way of maintaining momentum while ensuring that staff can continuously upskill one another. Linked to this is the importance of ensuring that faculty-specific initiatives are not 'pigeonholed', but rather that the planning team takes measures to expand such initiatives to other parts of the university where possible. This may require, amongst other measures, holding funding aside for institutional

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[93] Interview with the term bank manager, 22 April 2020.

advocacy and sustainability drives. Related to this, initiatives need innovative funding models and longitudinal support that will allow them to become sustainable. Moving OER from the periphery to the institution's core also ameliorates the problem of staff turnover.

Different layers of support would be useful in achieving initiatives' objectives. Only through comprehensive, consistent support structures can initiatives facilitate sustainable OER practices. Such support would include financial and symbolic support from institutional management, but it would also apply at the systemic level, with processes such as peer recognition and awards for OER design and implementation. These systems might also be supported by systems to assist in design, copyright, and publishing. Moreover, planning should be a priority from the beginning of the initiative. Plans should be iteratively adjusted regularly to accommodate changes in context and lessons learnt during implementation.

Harness the power of collaboration

The value of institutional support and collaboration have been demonstrated throughout this report. However, the transitory nature of staff and leadership at institutions has come to the fore as being a key issue, as has maintaining momentum under these circumstances. This indicates a need for firm institutional commitment to OER-related activities that are independent of management changes, together with accompanying budgets to implement activities. A NOUN contributor suggested that this might be achieved by, for example, situating an OER unit under a statutory directorate to ensure continuity in activities within the institution.[94]

The research also highlighted the complexities of the regulatory and cultural environments within which OER initiatives in higher education operate. As one contributor from UCT noted:

> *[An OER] is just a resource, as good or bad as any resource. The process of creating or adapting the resource is the catalyst for thinking about pedagogical, learning design; curriculum; pacing; etc. This is hugely beneficial.[95]*

OER thus present an opportunity to think about teaching and learning in innovative ways that promote access and, in the best case, turn the tide against gatekeeping knowledge. However, institutional structures and educational processes at the institutional and national level (such as curriculum approval and accreditation) do not always provide a conducive environment for OER to flourish. Thus emphasizing the importance of reinforcing the links between OER, pedagogy and curriculum at all levels, from the educator and student to institutions and national and regional bodies. This drives home the importance of advocacy, as well as of creating an OER ecosystem where such links can be strengthened.

Another key to effective implementation is collaboration with other stakeholders – both within the institution and externally – as a way of leveraging networks to provide expertise, support, and guidance. Working with external partners has allowed initiatives to share knowledge and learn which practices work, suggesting that cultivating such relationships is extremely worthwhile. The NOUN OER unit, for example, has connections around the world[96] that are willing to respond to

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[94] McGreal, R. (2018). OER and MOOCs at the National Open University of Nigeria. Contact North. Retrieved from https://teachonline.ca/tools-trends/oer-and-moocs-national-open-university-nigeria
[95] Interview with Prof Laura Czerniewicz, Director of OUI, 10 July 2020
[96] Partners include UNESCO, RETRIDOL and Commonwealth of Learning (COL), COL's Regional Training and Research Institute for Distance and Open Learning, and various universities in Nigeria and West Africa.

questions or points of clarification, so they draw on these resources when needed. Buy-in from these stakeholders is thus a very important component of a successful initiative.

Build sustainability into initiatives

As noted above, ensuring that initiatives' gains are sustained and built upon is a complex issue. Sustainability should be a consideration from the planning stage and should be prioritised throughout the initiative. Initiatives such as VUSSC and TESSA have achieved this by having champions involved in implementation on the ground. This is particularly important if initiatives hope to have an impact that lasts beyond their life cycle.

In line with this, the design phase for the initiative should include costing and outline processes that need to change to ensure that, when the initiative's funding runs out, the initiative's work can continue and that this becomes part of the institution's running cost. Initiatives such as OEEH experienced challenges regarding resourcing, which was partially related to planning. OEEH found that taking on a lot of courses is expensive and draining, so it is important to balance content delivery with uptake and impact. This balance is particularly difficult to strike with a small team. Because delivering quality content is resource-intensive, the temptation is to focus on the content and neglect the wider collaboration, networking, and marketing needed to drive uptake and impact. To aid this, the project leads indicated that a good approach would be to embed collaboration within seed funding and planning. The design phase should also consider how to sustain long-term relationships with service-providers and partners, which reduces dependencies on leadership and management and ensures continuity regardless of staffing shifts.

Although the research did not explore these implications comprehensively, it did reveal key insights into the contributing factors undergirding sustainability. These can broadly be divided into the development of innovative models and advocacy.

Innovative models, agreements for continuation and institutional embedding

A recurring theme of several case studies is that, once funding ends, there is not a sustainability plan, or staff to work on the initiative part-time. This begs the question of how to embed projects within the structure of an institution from the design phase.[97] In the context of some of the challenges to sustainability such as funding constraints, initiatives have employed innovative approaches to ensure that their work leaves a legacy and continues after the initiative has finished.

Developing a sustainability plan early on has benefited initiatives as it gave them time to find alternative support mechanisms. OER Term Bank prioritised sustainability of its platform while the initiative was still running. When the project ended, the team put funding aside to host the project for three years. Similarly, when OEEH's funding cycle ended, it tried to find ways of ensuring that the content remained relevant and up to date. The initiative secured additional funding until the end of 2020. When they were interviewed, contributors anticipated moving to a mixed funding model and would potentially increase their revenue stream by formalising their courses. Note however that at the time of writing this, the website did not have any OER on it.

Initiatives have also mainstreamed their activities into institutional practices by being absorbed by existing departments or organizations. The OUI was taken over by the UCT library, while the OEIs

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[97] Interview with OER Africa technical team lead, Monge Tlaka, 15 September 2021

initiative is situated in the newly configured student support arm of the institution, within the Academic Literacy Writing unit in the LT Collab. The South African Centre for Digital Language Resources (SADiLaR) approached the OER Term Bank team to express interest in providing funding and hosting for OERTB. Funded by the South African Department of Science and Innovation, SADiLaR aims to create a repository of resources for South African languages. If the OERTB team and SADiLaR reach an agreement, the link to the OERTB will be provided on the SADiLaR website and the team will have access to OERTB's usage data. At the time of writing, negotiations were still underway for SADiLaR to host of OERTB, which would ensure continued access for potential users and enable updating of content.[98] Being linked to an established segment of an institution means that these initiatives can draw on resources and networks from that segment, which contributes to their sustainability.

A key element of sustainability is embedding OER creation, use and advocacy into institutional practices. Initiatives have used various tools for this, including policy and practice. For example, the mainstreaming of OpenUCT was influenced by UCT's Open Access Policy. The policy is rare because it specifically mentions OER, unlike most in Africa that focus solely on open access to research outputs. The UCT OER collection is also a part of the institutional repository and is thus integrated into institutional praxis. Moreover, CILT adopted a principle of openness in its own work, thus promoting Creative Commons licences as a default starting point both internally and when working with academics. Related to this is the issue of incentives and structural drivers to build sustainability into initiatives. As one contributor from the Open UCT Initiative noted, if teaching, resource development and OER are not specific criteria measuring success, it is hard to shift OER away from being a peripheral activity towards being a core activity within an institution. This makes OER initiatives far more vulnerable to changes in faculty and shifts in institutional practices or priorities.

Ensure there are rewards, and incentives for participation

Rewards and incentives – financial and otherwise – have proven to be a highly effective way of entrenching OER practices. Initiatives have achieved this in different ways, such as including criteria for OER use creation as part of key performance indicators and presenting awards for those who have developed OER. Initiatives such as DOT4D and UCT's VC OER Adaptation Project provide evidence that incentives, such as grants and awards, can change behaviour and encourage OER development.

The research therefore highlighted a need for rewarding the open education culture at higher education institutions, without which it will most likely remain at the periphery of institutions. This might include incorporating OER into academics' KPIs, offering greater exposure for the OER that individuals produce, absorbing open educational practices into existing committees and structures, and placing greater emphasis on OER outputs to incentivise lecturers to use OER.

Adopt policy and create accompanying structures to implement that policy

Much has been said about the importance of OER policies in sustaining OER activities at higher education institutions, and the research has cited the development of OER-related policies as one of the key successes of several initiatives such as OUT, NOUN and KNUST. Moreover, case studies

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[98] Open Education Resource Term Bank. (2018). Narrative Report.

such as VUSSC reiterated the importance of policies at the national level to support OER adoption and sustainability, with some VUSSC member countries possessing national level OER-related policies such as [Namibia](#) and [Seychelles](#).

However, it has become clear that policy implementation is as important as policy development. The presence of an OER policy does not automatically create a sustainable enabling environment for OER adoption. There was limited evidence of institutions taking structured measures to operationalise OER-related policies, highlighting a gap in OER implementation and accountability. This also foregrounds the need to ensure that stakeholders consider implementation as part of the OER policy design process, particularly because effective education policies rely significantly on strong implementation.[99] One may argue that while policies create structure and rules for implementation, if they are overly complex and prescriptive, they can act in opposition to the concept of openness and contribute to [overly complex education systems](#). This suggests a need to simplify policies at the national and institutional levels in aid of 'opening up' opportunities for OER use. Finally, OER-related policies only form part of an enabling environment for OER at institutions. Such an environment also consists of a commitment to OER in strategic plans, as well as detailing the roles and responsibilities for implementation. Central to OER adoption is creating a holistic enabling environment that is conducive for OER to flourish.

Set up a monitoring and evaluation (M&E) plan

Because OER are open for adaptation and change according to different circumstances, initiatives like VUSSC have found that monitoring their quality can be difficult, which may affect their reusability. OEIs is keeping detailed records of intentions and aims, the purpose being to share this information with others for replication at other institutions. Thus, M&E in terms of OER usage statistics and with reference to the initiatives themselves, is crucial to measure impact and adjust strategies. The research has revealed the importance of creating tools for measuring outcomes throughout project implementation. In turn, this also means remaining amenable to shifts in the project context and engaging iteratively with the project team.

Define and track metrics for measuring success

Several initiatives have demonstrated significant demand for their OER. By 2019, AfriVIP had 561 resources including related assets uploaded, with a total of 44,431 resource downloads. These included documents, PDFs, videos, and slides. Between September 2016 and August 2020, 22,236 people visited the AfriVIP website. Similarly, usage statistics for KNUST OER indicate that between 1 June 2012 and 30 November 2021, the KNUST OER website received 253,551 page views. Open UCT provides a publicly available tracker for its [usage statistics](#).

Despite these positive findings, what has also become evident throughout the research process is the general paucity of publicly available data on initiatives, which might be used to tackle many of the challenges mentioned above by informing advocacy efforts, capacity building, collaborations, and future initiatives' aims. Initiatives may consider addressing this need where necessary by defining clear metrics for success at conception, and then implementing regular monitoring processes.

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[99] Viennet, R. and Pont, V. (2018). Education policy implementation: A literature review and proposed framework. Organization for Economic Co-operation and Development. Retrieved from https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP(2017)11&docLanguage=En

Acknowledge the impact of the COVID-19 pandemic on OER initiatives in higher education

The COVID-19 pandemic forced many initiatives to adjust their strategies and change activities. However, it has also presented significant opportunities for initiatives to strengthen the value proposition of OER. At UCT, students and academics were desperate for resources, which enabled a lot of sharing and collaboration. For example, CILT produced several resources about going online, all of which were CC licensed.

The pandemic and initiatives such as DOT4D highlighted that open textbooks provide a tool to address economic, cultural, and political injustices. Under the right circumstances and when implemented effectively, they therefore hold potential to promote an enabling pedagogy for social justice and transformation in South African higher education.

Further opportunities lie in shifts in favour of online learning. At the time that the ATEN project was implemented, conferences tended to be face-to-face and thus interaction with teachers was limited in terms of numbers that the conferences physically allowed and there were few funding opportunities for teachers to travel to these conferences. With the growth of virtual conferences, there is potential to reach a much larger audience as they can accommodate much larger numbers, albeit without face-to-face interactions.

Conclusion

This research has confirmed that, although OER initiatives in Africa have experienced successes in the areas of advocacy, resource development, access, and collaboration, they still face a complex set of obstacles in realising their objectives. These challenges include, but are not limited to, resource constraints, levels of knowledge about OER, adoption, and ensuring sustainability of OER-related practices.

What has also become evident throughout the research process is the paucity of publicly available data on the initiatives and that this data is needed to tackle many of the challenges mentioned above by informing advocacy efforts, capacity building, collaboration, and the aims of future initiatives. Sustained growth of effective OER initiatives and open practices on the continent requires multiple interventions (such as sustainable operating models and accreditation mechanisms), some of which were beyond the remit of this research to explore comprehensively. However, drawing from the findings above, the following recommendations are offered to aid development and support for effective OER practices and CPD at African higher education institutions.

- Undertake **localization efforts** with a practical lens by conducting landscape research regarding what content is already available, what can be adapted, reasons why localization is necessary, and what should be created.
- Prioritise **capacity-building** for academics in Africa by supporting the orientation of new staff regarding pedagogical competencies as well as OEPs in general and OER in particular. This includes allocating adequate resourcing for such activities and clearly defining CPD as a strategic objective for the institution.
- Review, refine (and where necessary, develop) **institutional policies** to support capacity-building, with an emphasis on providing incentives for academics and other stakeholders,

support mechanisms (such as personnel) and requisite time for academics to pursue capacity-building opportunities. OER capacity development should fall within this scope.

- Tailor the messaging in **advocacy efforts** to optimise adoption. This may involve the use of tools such as social media campaigns and communication strategies to outline objectives, audiences, and key messages.
- Create a system that provides different layers of **institutional support**. This might include financial and symbolic support from institutional management, but it would also apply at the systemic level, with processes such as peer recognition and awards for OER design and implementation. These systems might also be supported by mechanisms to assist in design, licensing, and publishing. Moreover, planning should be a priority from the beginning of the initiative and plans should be iteratively adjusted to accommodate changes in context and lessons learnt during implementation.
- Actively seek out and nurture **partnerships and collaborations** with government and other institutions to share resources, expertise, and guidance, as well as facilitate intra-institutional collaboration to fully harness the potential of OER. Reinforce the links between OER, pedagogy and curriculum at all levels from the educator, to the students, to institutions and national and regional bodies.
- **Mainstream** OER within institutional processes. This may include introducing performance metrics for OER development and use for academics; encouraging development of an OER strategy; and setting institution-wide targets for implementing open practices. Such efforts could also focus on promoting buy-in for CPD efforts at the start of initiatives, and when there are changes in leadership, to ensure continuity and sustainability.
- Encourage stakeholders to consider how policies will be implemented as part of the OER policy design process.
- The proliferation of policies creates more rules, which can act in opposition to openness. **Simplify policies** at the national and institutional levels in aid of 'opening up' opportunities for OER use and the implementation of open practices.
- **Define metrics on impact** as early as possible and undertake rigorous and regular data collection to measure OER development, use, research, policy implementation, and practice. Make this data openly available and use it to inform future initiatives, collaborations, knowledge sharing, and open practices.
- **Undertake further research** on OER implementation in higher education and CPD development areas for academics in Africa.

Appendix One: Research instruments

OER Africa initiatives: Research questionnaire

OER Africa is conducting an analysis of African OER initiatives in higher education, their effectiveness, and the implications they have for better development and support for OER practices. We would appreciate your support to understand the initiative you have been involved in better. The findings will be shared with the global OER community and others interested in educational innovations.

Please complete the following questions as fully as possible and feel free to share any supporting documents. 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. The blocks will expand automatically to accommodate your answers as you begin typing. Your responses will be treated confidentially, and we will not use names or identifying information in any reporting.

When you have compiled the information, we would be grateful if you could email your response to [insert mail address here].

1. Name:

2. Country:

3. Organization:

4. Position:

5. Email:

6. Please indicate the name of the OER initiative you are covering in your responses to this questionnaire.

7. What is/was your role and your organization's role in the initiative?

8. Please describe the scope of the initiative. What is/was its purpose and aim?
    Please feel free to provide URLs or attach reports to this questionnaire.

9. Which aspect of OER does/did the initiative focus on? (tick all that apply)

Policy	
Practice	
Research	
Other (please specify)	

10. Please complete the table below to provide more details on the initiative:

Project participants	
Project achievements	
Project challenges and how they have/were met	
Partners	
Years operational (please indicate if it is ongoing)	
Source of funding	
Amount of funding	
Number of OERs created	
Disciplines	
Level (undergraduate, postgraduate, teacher education)	

11. Does/did the initiative focus on skills development for the OER developers/creators? If yes, please note the skills gained as part of this initiative.

12. Does/did the initiative focus on skills development for the OER users? If yes, please note the skills gained as part of this initiative.

13. Does/did this initiative have an impact on teaching and learning? If yes, please describe, with specific examples.

14. Would you be willing to participate in a follow up interview to discuss the project?

Yes	
No	

15. If yes, please provide us with your Skype ID or telephone number for the interview.
If no, please suggest an appropriate person (and contact details) who might be willing to speak to us about the project.

Thank you for completing this questionnaire!

OER Africa initiatives: Research interview schedule

Note: Tenses of questions will need to change depending on whether it is a current/past project

1. Name:

2. Country:

3. Organization:

4. Name of initiative:

5. What would you say are the greatest successes of the initiative?

6. What are the main challenges faced and how were they met?

7. What support would you need for the project to roll out more effectively?

8. What knowledge resources and/or skills development would allow you to implement the project better?

9. What were the main lessons that you learnt throughout the project?

10. What mechanisms/steps have been or will be put in place to make this initiative sustainable?

11. What would you say has been the broader impact, if any, of the initiative?

12. Based on your experiences, which are the main area(s) where capacity building is still required to enable more effective implementation of OER practices? (Probes: project implementation, understanding OER and open concepts, finding OER, adapting and creating OER, open licensing.)

12. Based on your experiences, which are the main area(s) where capacity building is still required to enable more effective implementation of OER practices? (Probes: project implementation, understanding OER and open concepts, finding OER, adapting and creating OER, open licensing.)

13. Do you think that the project provided any evidence that pushing ahead with OER is worthwhile as part of improving teaching and learning in African higher education?

14. Do you have any additional comments about the project?