OPEN PRAXIS

2016 Open Education Consortium Global Conference Selected papers

OPEN PRAXIS

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Editorial policies

Open Praxis is a peer-reviewed open access scholarly journal focusing on research and innovation in open, distance and flexible education. It is published by the International Council for Open and Distance Education—ICDE

The aim of *Open Praxis* is to provide a forum for global collaboration and discussion of issues in the practice of distance and e-learning.

Open Praxis welcomes contributions which demonstrate creative and innovative research, and which highlight challenges, lessons and achievements in the practice of distance and e-learning from all over the world.

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Open Praxis provides immediate open access to content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

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Open Praxis is a quarterly journal published in January–March, April–June, July–September and October–December.

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Research articles and innovative practice articles are subject to double-blind peer review by a minimum of two Reviewers.

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Authors need to register with *Open Praxis* prior to submitting, or if already registered can simply log in and begin the 5 step submission process.

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Journal history

The ICDE Bulletin changed its name to *Open Praxis* in 1993. In 2003 became an electronic journal. In 2011 *Open Praxis* is relaunched as an scholarly and peer-reviewed open access journal, hosted by Universidad Nacional de Educación a Distancia (UNED) in its first period (2011–2017).

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OER and Open Education. Introduction to selected papers

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For a third consecutive year, Open Praxis has partnered with the Open Education Consortium for the publication of selected papers among those presented in the last Open Education Global Conference, which took place in Krákow (Poland) from the 12th to 14th of April 2016. Following a collaboration that led to the publication of special issues in 2014 (vol. 6 issue 2) and 2015 (vol. 7 issue 2), in this occasion the issue collects 8 selected papers.

As stated in the conference website (http://conference.oeconsortium.org/2016/about-oe-global-2016/),

> The Open Education Global Conference is the annual opportunity for researchers, practitioners, policy makers and educators to deeply explore open education and its impact on global education.

> Conference participants learn from thought leaders in open education and have the opportunity to share ideas, practices and discuss issues important to the future of education worldwide. Sessions cover new developments in open education, research results, innovative technology, policy development and implementation, and practical solutions to challenges facing education around the world.

The theme of the conference in 2016 was *Convergence Through Collaboration*, and it featured various tracks, such as integration of open practices, collaboration, open education as strategy, or research to advance open education. The selected contributions relate to these topics and present either research results or innovative practice case studies. Among the diverse issues that the papers cover, we can group them into three main focuses:

- A critical concern with various *dimensions* of open research, addressed in the first two selected papers.
- Relevant examples of *regional and institutional experiences* supporting and promoting open education, presented in the next four papers.
- Experiences of OER addressed to *specific populations*, teachers and women in developing countries respectively, seeking their empowerment through the use of OER, analysed in the last two papers.

Papers submitted for publication in *Open Praxis* have followed a separate review process. The Open Education Global Conference 2016 Programme Committee first reviewed submissions for inclusion in the conference; those accepted for presentation and best rated by the committee were then recommended to *Open Praxis* for peer review and possible inclusion in this issue. The papers followed the usual submission guidelines in *Open Praxis* (i.e. double-blind peer review by two reviewers); additional revisions were requested during the peer review process, and finally eight papers were accepted for publication.

Thomas William King, Cheryl-Ann Hodgkinson-Williams, Michelle Willmers and Sukaina Walji, from Cape Town University in South Africa (*Dimensions of open research: critical reflections on openness in the ROER4D project*), with a concern on favouring coherence between open ideology and open practice, take ROER4D as a case study to reflect upon fours dimensions of openness and exemplify how they approach them to undertake iterative open research. Ideological, legal,

technical and operational openness are systematically analyzed in the paper, applied to ROER4D. The paper is an invitation to develop open research and hold a critical approach. ROER4D was one of the winners of the Open Education Consortium 2016 Project awards, in the category "Open Research".

Robert Farrow, from The Open University (United Kingdom), presents *A Framework for the Ethics of Open Education*. The ethical dimension in educational research and the implications of open data in research are discussed. The author presents a framework for thinking through ethical issues in contexts where openness is emphasized and/or without institutional support. The frame, which includes three positions within the normative theory (deontological, consequentialist and virtue ethics), is then applied to analyse the case of the OER Research Hub project. As the previous paper, this one is also an invitation to other researchers, in this case to incorporate the ethical dimension "in the open".

After those first two papers, which provide a reflection over various dimensions of open research, the next contributions present various relevant experiences of implementation of open education, narrated step-by-step and highlighting decisions, findings and lessons learned.

Jane-frances Obiageli Agbu, Fred Mulder, Fred de Vries, Vincent Tenebe and Abel Caine, from National Open University of Nigeria, Open Universiteit in The Netherlands and UNESCO (*The Best of Two Open Worlds at the National Open University of Nigeria*) present the NOUN case in relation to OER. The paper explains in detail all the steps followed in the institution until they have reached and OER strategy and agenda. Framed within the situation of other open universities worldwide, NOUN has moved towards an OER-based university, and the paper highlights the process and lessons learned. It is remarkable that the Organizational Leadership Award, granted by the Open Education Consortium Board of Trustees, was awarded in 2016 to NOUN due to its strong determination to become a full-fledged OER-based Open University.

Faye A. Chadwell and Dianna M. Fisher, from Oregon State University (US) (*Creating Open Textbooks: A Unique Partnership Between Oregon State University Libraries and Press and Open Oregon State*) introduce an open textbook initiative launched in partnership between the State and the University Library in Oregon. The project is clearly framed and explained in the paper. Being a successful initiative, it is being continued in a second phase now, with more prospective projects for adopting or developing OER in the horizon.

Also referring to open textbooks as OER, Lawrence Hanley and Diego Bonilla, from the California Open Educational Resources Council (US), (*Atolls, Islands, and Archipelagos: The California OER Council and the New Landscape for Open Education in California*) explain the labour developed by this council. It is conformed by representatives from three California public higher education systems, with the mandate of locating, reviewing and curating a collection of open textbooks for the 50 most highly-enrolled courses. The paper explains the project, with a special focus on scale and complexity that the project has to face; on first findings about open textbook adoption and use, analysed through surveys and focus groups; and on sustainability of the council work. These elements are identified as key dimensions of interest to other OER projects.

Closing this section, another institutional experience by Patrina Law and Anne Jelfs, from The Open University (UK) (*Ten years of open practice: a reflection on the impact of OpenLearn*), reports on the OU platform for free learning in its 10th anniversary. After a descriptive overview of OpenLearn, the authors introduce learners' profiles, and focus specially on OU formal students as users of OpenLearn. The authors, building upon the gathered experience and analysis, collect some lessons learned, useful for open course providers. One of the OpenLearn projects, the Badged Open Courses, was recipient of one of the Open Education Consortium 2016 Project awards, in the category "Creative Innovation".

The first paper covering the use of OER with specific populations is written by Lauryn Oates and Jamshid Hashimi, from the Darakht-e Danesh Online Library for Educators in Afghanistan (*Localizing OER in Afghanistan: Developing a Multilingual Digital Library for Afghan Teachers*). They describe the development of a digital library in the three languages taught in the Afghan public school system. The need for localizing and contextualizing resources meets the need for increasing the available resources for teaching. Thus, the digital library purports to, at the end, improve teaching methods and educational quality in Afghan schools. The paper explains the process of creating the digital library, encountered challenges and decisions made in this pioneer initiative in Afghanistan.

Leigh-Anne Perryman and Beatriz de Los Arcos, from The Open University (UK) (*Women's empowerment through openness: OER, OEP and the Sustainable Development Goals*), analyse women's' digital exclusion and study, based on data collected on the OER Research Hub, developing world's women's interest in using OER, barriers to OER adoption, engagement with OER, and perceived impact of OER on teaching practices. This gender-based study describes women's' perceptions and uses about OER and advances their potential for empowerment. The authors suggest some valuable recommendations for OER and OER projects to include a gender equality component.

Finally, a book review completes this special issue about OER and Open Education. Justin Keel, from US, presents a review of *MOOCs: Opportunities, impacts, and challenges. Massive open online courses in colleges and universities*, published by Michael Nanfito.

It is our wish to contribute to the current and exciting debate about open education with the papers included in this issue.

We specially thank from *Open Praxis* to the authors and the reviewers for their valuable contributions, and to the Open Education Consortium for the partnership and collaboration in the preparation of this special issue.

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Dimensions of open research: critical reflections on openness in the ROER4D project

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Abstract

Open Research has the potential to advance the scientific process by improving the transparency, rigour, scope and reach of research, but choosing to experiment with Open Research carries with it a set of ideological, legal, technical and operational considerations. Researchers, especially those in resource-constrained situations, may not be aware of the complex interrelations between these different domains of open practice, the additional resources required, or how Open Research can support traditional research practices. Using the Research on Open Educational Resources for Development (ROER4D) project as an example, this paper attempts to demonstrate the interrelation between ideological, legal, technical and operational openness; the resources that conducting Open Research requires; and the benefits of an iterative, strategic approach to one's own Open Research practice. In this paper we discuss the value of a critical approach towards Open Research to ensure better coherence between 'open' ideology (embodied in strategic intention) and 'open' practice (the everyday operationalisation of open principles).

Keywords: Openness, OER, Open Research, iterative, stategic planning, transparency

Introduction

The Research on Open Educational Resources for Development (ROER4D) project was established in 2013 to contribute to a better understanding of the adoption and impact of Open Educational Resources (OER) in South America, Sub-Saharan Africa and South Asia by developing a body of empirical evidence on OER activity in the Global South. The project comprises 18 sub-projects with 86 participating researchers and research associates across multiple time zones. It is coordinated by a central Network Hub team based at the hosting universities: the University of Cape Town (UCT), South Africa, and Wawasan Open University (WOU), Malaysia.

Since its inception, the ROER4D Network Hub team, under the direction of the Principal Investigator, has aspired to adopt Open Research practices, recognising a natural affinity between OER and the other 'Opens'—Open Access, Open Data, and Open Research. Based on the belief that 'performing research in the open' would lead to greater transparency, accountability and rigour, this approach manifested in an intention to release interim outputs, process documents, and other research products throughout the research process.

In the course of project activity, certain initial assumptions about Open Research practice were revealed to be too optimistic, inappropriate, or difficult to implement. This engagement with Open Research practices led to specific choices in licensing, communication and dissemination that were more nuanced than initially envisaged.

In this paper we discuss the value of a critical approach towards Open Research to ensure better coherence between 'open ideology' (embodied in strategic intention) and 'open practice' (the everyday operationalisation of open principles). Building upon Hodgkinson-Williams and King's (2015) four domains of openness approach as a framework, we demonstrate how initial planning,

complemented by an ongoing, iterative approach towards Open Research, can help to develop strategies to enhance congruence between the various domains of open practice which are appropriate in individual research contexts.

The Four Dimensions of Openness in the ROER4D Open Research Strategy

Defining 'Open Research' in the ROER4D context

While the concept of 'Open Research' may be a new area of practice in social science research, it has been been a preoccupation of biosciences research for some time (Ohmann & Kuchinke, 2009). Although referring specifically to medical research, Ohmann and Kuchinke conceptualise open research as enabling the capacity to achieve "transparency … through open access, open data, open communication and open source software" (2009, p. 45). Wikipedia defines Open Research as an intention to share research publically with concomitant accountability inherent in sharing research methodologies, data and findings without barriers to access:

> Open research is research conducted in the spirit of free and open source software. Much like open source schemes that are built around a source code that is made public, the central theme of open research is to make clear accounts of the methodology freely available via the internet, along with any data or results extracted or derived from them (Wikipedia, n.d.).

Weller has provided helpful explanations about how to "perform research practices in the open" (2012, p. 2), with examples of open practices including crowdsourcing, open online conferencing, open proposals, and sharing outputs such as presentations and publications. Building on these concepts, and Wiley's "5Rs of Openness" (Wiley, 2014, p. 1), the ROER4D Network Hub has formulated the following definition of Open Research:

> Open research is the process of conducting and sharing research in which a selection of research pro-posals, work-process documents, literature reviews, methodologies, research instruments, analytical frameworks, findings and/or data are intentionally shared on publically-accessible platforms in order for others to freely access, use, modify, and share them subject to measures that preserve ethical practice and legal provenance (Hodgkinson-Williams & King, 2015, p. 5)

The development of a shared, open *ideology* as a guiding principle for a particular research project carries with it a set of *legal*, *technical* and *operational* imperatives.

Ideological openness

The set of practices that characterise Open Research rest on a foundation of beliefs about the purpose and value of openness in research: an 'ideology of openness' (Gibbs, Rozaidi & Eisenberg, 2013). While the concept of 'ideological openness' is employed in the literature, it is not always clearly defined (Chandra & Patkar, 2013), or is sometimes used to describe broader 'ideological self-disclosure' (Klein 2011)—disclosing one's ideological commitments and judgments.

Tapscott and Williams (2013) popularised the idea of 'radical openness': the belief that reducing insularity, bureaucracy and secrecy in government, industry and research leads to better, faster innovation and development. However, Resnik (2006) considers that while openness may be essential to the scientific endeavour, there are many reasons for maintaining secrecy and protections.

Indeed, the ideology of openness interacts with other ideologies of practice that exert in research, such as discourses around ethical practice, responsible research conduct, and what constitutes 'good' or 'quality' research. While openness is believed by many (Munthe & Welin, 1996; Poynder, 2015; Resnik, 2006) to serve the mandate of producing quality research, a commitment to Open

Research may conflict with established doctrine in certain research cultures and with traditionally closed parts of the research practice, such as data production and early release of findings.

Our use of the term 'ideological openness' is centred on the belief that Open Research adds value to the research process, which is made more transparent, accountable and verifiable to a wide scholarly and/or public audience through persistent and barrier-free access to the research outputs.

Towards ideological openness in the ROER4D project

Developing and explicating a coherent ideology of openness is an important foundational step towards Open Research practice. We found that before open research practices could be operationalised, we needed to develop a shared understanding and vocabulary of what openness was in the context of our project. In multilingual and cross-regional projects, the development of a shared vocabulary or understanding can be difficult to negotiate. The dominance of English in scholarly and scientific communication may lead to erroneous assumptions that the terminology employed when discussing Open Research (such as Wiley's 5 Rs) is universally translatable and comprehensible. We found that language issues complicated attempts to build a shared research lexicon, due in part to the use of largely common-language terms (open, share, reuse, etc.) as key concepts within OER research; yet these English terms do not necessarily have equivalents in other languages. Furthermore, key concepts (such as "reuse" or "revise") are used inconsistently across languages. Despite considerable effort to standardise terms across languages by OER advocates such as David Wiley (2014), the aspiration for a comprehensive shared set of descriptions in multiple languages for key concepts has not been entirely successful.

Such 'on-the-ground' understandings of openness in the research process influenced how the project's ideological openness was conceptualised and how it changed over time. Reflecting on how ROER4D's ideological openness, expressed in various presentations and public interactions, such as OCWC 2014 (the annual conference of the OpenCourseWare Consortium) and the Open Education 2014 conference, indicates not only the intention to share early and often but also an evolving critical approach, in which the commitment to sharing openly by default is on condition that the sharing is valuable, legal and ethical.

This condition refined the initial implicit and simpler open ideology expressed in the project proposal and scoping documents in which the alignment between OER and Open Research was alluded to but not explicitly defined; nor was there a precise strategy explaining how we intended to enact Open Research principles. The refinement came about as a result of reflection on the interplay (and misaligments) between a desire to conduct Open Research, the limited time and resources of the Network Hub ('if it adds value'), and the need to protect researchers and research subjects ('if it is ethical' and 'if it is legal'). Even though to 'make open by default' remained as the core principle, awareness of these misalignments began to emerge as a result of the self-evaluatory practices adopted by the Network Hub (Goodier, King & Hodgkinson-Williams, 2015).

Negotiating ideological openness has been an iterative process, and one in which understanding power relations between and the need for capacity development amongst research participants is particularly important. This is especially important in network-based or geographically dispersed projects where researchers pursue their own objectives, partly or largely in isolation from their project peers. While we argue that a strategic approach to openness is advisable, researchers will need to revise the overall strategy as their research progresses, particularly when engaging at-risk or vulnerable groups who may be uneasy about the release of interim research outputs or open data.

Within this framework of ongoing negotiation, ideological commitment is enacted through the three other domains: legal openness, technical openness and operational openness.

Legal openness

Open licensing—such as the use of Creative Commons licences—provides the legal framework for Open Access, OER and Open Research. The ROER4D Network Hub's commitment to sharing research outputs and data was enacted in the sub-grant agreements signed with sub-projects, which stipulated that (where possible) all outputs and findings would be made available under a Creative Commons licence to ensure the greatest possible development impact.

The initial licensing terms allowed for a fairly generous interpretation of legal sharing in order not to compel researchers to contribute their research outputs and data openly, but rather to encourage a spirit of openness and responsible research conduct. This consideration regarding the level of openness and the readiness of the associated research community in the contracting process means that legal openness needs to be considered not only by project researchers, but also by institutional lawyers and senior authorities who endorse these agreements.

A critical approach to legal openness allowed the project to determine which legal permissions would be feasible given the subject matter of the research, what was valuable for both the producers and users of the research, and what was practical given the levels of legal expertise and resources available internally or externally. The ROER4D Network Hub drew on prior documentation (Hodgkinson-Williams & Gray, 2009) and experience from other 'Open' projects at UCT—e.g. Opening Scholarship and OERUCT (Czerniewicz, Cox, Hodgkinson-Williams & Willmers, 2015)—to inform decisions.

Towards legal openness in project documentation, research data and project outputs

Publishing a selection of ROER4D research data in line with open principles proved to be more challenging than originally anticipated. From nascent initial plans to share research data in principle there emerged a nuanced and complex data publication strategy following the employment of a full-time Curation and Dissemination Manager to address the widely acknowledged challenges of Open Data (Floca, 2014; Pampel & Dallmeier-Tiessen, 2014).

The project recognised early on that openness as pertains to data sharing and legal permissions needs to be considered carefully in order to abide by ethical principles and protect research participants. A core ROER4D contractual provision stipulates that at no point will raw data (i.e. data still containing disclosive information that could be used to identify individuals) be shared, including exchanges between the sub-projects and the Network Hub. Subsequently, the project entered into a publishing agreement with DataFirst, an internationally recognised data service, whose expertise in data preparation and verification has supplemented the Network Hub's data-sharing efforts.

Open licensing of internal reporting documents has also presented a challenge, especially in the licensing of technical reports (i.e. those reports describing details of project implementation) by the Network Hub for the project funder. Although our contractual commitment expressed the desire to license outputs as openly as possible, in the case of technical documents of this nature we applied a Creative Commons Attribution No-Derivatives (CC BY-ND) 4.0 International licence as we felt the information needed to be stand as a complete record and that adaptation or derivation would compromise the intergrity of the information.

While a critical and flexible approach to licensing of research outputs was possible in the project, research projects in the future may be constrained by funder mandates regarding licensing which are more prescriptive. This may limit options for flexibility. Therefore, early awareness of this at the contracting is beneficial as it has ramifications for implementing a contextually appropriate approach to legal openness.

Technical openness

Technical openness refers to the use of open file formats and open software development standards to ensure equitable access and discoverability of research. Depending on their technical format and/or mode of publication, outputs can manifest varying degrees of openness not necessarily aligned with their licensing provisions or the ideological commitments of their creators. The PDF format, for example, while ubiquitous, does not allow for easy revision or remixing unless the user possesses the necessary proprietary software, while outputs placed in obscure or inaccessible locations have minimal chance of being used, reused or revised regardless of their creators' intentions.

Towards technical openess for collaboration, availability, revisability and verification

ROER4D's approach to technical openness revolves around four elements that facilitate Open Research practice:

1. Collaboration: ensuring that, where appropriate, project documents can be written, edited and commented upon collaboratively within and beyond the ROER4D network.
2. Availability: ensuring that outputs are hosted on stable, secure platforms that facilitate open licensing and provide adequate metadata according to recognised international standards, thereby maximising their discoverability and no-cost accessibility.
3. Revisability/remixability: utilising open file formats (supported by open licensing) to facilitate access in a non-proprietary software context, allowing users to make changes, extract text or images, or otherwise alter the content.
4. Verification: the tools and instruments that support the analysis are freely available and facilitate interrogation of the research results.

At the start of the project, we explicitly intended to address two key elements—availability and verification—while issues of collaboration and revisability emerged as a result of internal critical examination of our research processes. Our growing understanding of the importance of technical openness and a need to adhere to all four elements prompted the elevation of curation and dissemination from an ambition to a core project objective in order to address these issues systematically.

Affordances of technical openness for collaboration

One of the principal intentions of Open Research is to enable and support collaboration (Maurer, Rai & Salie, 2004; Woelfle, Olliaro & Todd, 2011). To this end, the ROER4D Network Hub has used the cloud-based authoring tool Google Drive as its main research collaboration platform. This enables ROER4D researchers and mentors to create, review, edit and comment on shared project documents asynchronously across 16 time zones. As the Network Hub develops project documents, we open these up via Google Drive for input.

While the use of Google Drive has been valuable where researchers are comfortable with the technology and have good Internet connectivity, researchers with limited connectivity or insufficient expertise have not always been able to use Google Drive effectively. The primary users of the document authoring features have been the Network Hub team, but Google Drive remains useful as an open storage space accessible by our researchers to monitor and comment on documents in progress. We maintain an agile approach to technical openness for collaboration and have on occasion used less technically open tools (such as Microsoft Word) if it aids collaboration with a particular researcher.

Affordances of technical openness for discoverability

Utilisation of stable curatorial platforms for sharing project outputs is vital in order to ensure that research outputs remain accessible and discoverable after the project ends. There are several online, publically accessible, open repository platforms (such as FigShare, Zenodo and Slideshare) which support different output types and disciplines, and can be adapted for a range of curatorial and publishing activities. We evaluated various repositories to determine the best fit for the project according to the following criteria:

1. Affordances for supporting open licensing.
2. Ability to accommodate multiple content types and genres.
3. Assurance of long-term stability.
4. Zero cost associated with deposit or access.
5. Use of an international metadata standards.

While institutional platforms such as UCT's open institutional repository (OpenUCT) were investigated, the ROER4D Network Hub has chosen to use Zenodo as the public curatorial space for its outputs, due to its stability, comprehensive licensing and metadata features, and capacity to accommodate a wide range of outputs from a cross-institutional group of researchers (institutional repositories such as OpenUCT only accept outputs from UCT-affiliated authors). As the ROER4D project is a grant-funded (and therefore time-bound) initiative, we needed to pursue options that enable long-term, free access to the materials under open licensing provisions without interrupted access.

Affordances of technical openness for remixing

File formats exist on a spectrum of technical openness, which impacts upon their accessibility, revisability and remixability. While certain, more 'closed' formats (e.g. PDF, EPUB) can usually be viewed with free software, it can be difficult to extract components of documents in these formats for revising and remixing without proprietary software. Open formats, such as ODT, ODS, HTML, XML and SVG, usually allow for access and remixing of constituent elements using open source software; while Microsoft Word is a popular choice for reuse and revision due to its ubiquitous use and familiarity, but requires proprietory software.

Initially, the choice of ROER4D output formats was opportunistic, using what we had at hand and what we were familiar with. We become aware of the tension between our choice of document formats and the kinds of reuse we wanted to encourage, with a particular tension between PDF format and the ability to remix outputs. Due to lack of familiarity and the technical skills required to utilise open formats in the broader research community, we have decided not to default to the use of open formats while producing project documents, although we have committed to releasing final outputs under a range of formats to maximise revisability and remixability. Our approach to technical openness is informed by the ambition to provide end-users with affordances for revision and remixability of the outputs.

Affordances of technical openness for verification

Open research facilitates a value-added component to the research process: the verification of research through interrogation of open data. This means that access to the data that underpins the analysis and conclusions of the research process will also be shared openly where possible, enabling third-party analysis of the results and facilitates longitudinal and latitudinal studies without needing to contact the researcher to gain access to the data.

We faced numerous challenging decisions around what data to make available (both quantitative and qualitative), how to best de-identify the data, which platforms to use, and which metadata to provide in order to optimise visibility and reusability. To guide decision-making a set of Data Publication Guidelines was devised (Willmers, 2015) as part of the ROER4D Open Data Initiative.

Sharing data openly opens the research to in-depth scrutiny, and requires that data not only be comprehensive and accurate, but also that ethical procedures be conducted rigorously. As this area of activity is novel and potentially intimidating for researchers, the ROER4D project has not mandated that all sub-projects release their data openly, but supports those who do wish to do so.

Operational openness

For the ROER4D Network Hub, operational openness entails the enactment of the ideological, legal and technical principles in the course of conducting research. This can take many forms, including: early and frequent communication about the the project; sharing bibliographies, literature reviews, conceptual frameworks, and interim and preliminary findings; and actively developing networks of interested readers, colleagues and potential collaborators prior to the final publication of research outputs. Operational openness therefore refers to the openness practice that emerges as a result of critical reflection on when to be more or less open as the specific context dictates. To this end, the phrase 'if it adds value' has been a touchstone as we grappled with how and when to enact our commitment to ideological openness and where a more critical and nuanced approach towards openness was required.

Towards operational openness in project activities and sharing outputs

Within the Network Hub, we have adopted an agile approach to operational openness in order to support the research management process. An early activity was to make our weekly project administration meeting minutes available as a Google Document to which both partnering universities and the project funders had access. This small research management activity set the tone for our open practice and provided a platform to explore the experience of writing about research activities while others read and comment upon them dynamically. This process increased the rigour of our discussions as well as the accountability of our decisions, and highlighted the many sensitive decisions required when enacting ideological openness in research. The ROER4D Network Hub openly shares a range of outputs, including project proposal documents and technical reports (with summaries of individual sub-project reports) or extracts from technical reports that provide insights into the project without disclosing financial or contract details.

In line with the guiding principle of 'adding value' while not unwittingly exposing researchers, we tried to model our operational openness through the activities of the ROER4D Network Hub, but did not require the same level of operational openness from others in the network For example, we created and maintained a publically shared ROER4D Bibliography[1], in which the references used in the project were categorised, but did not require that sub-project researchers share their own bibliographies. An unexpected benefit of this activity came from outside the project in the form of an offer from John Hilton III, an OER researcher in the United States, to incorporate his 1 000-item OER bibliography with our then 450-itemed list. In this case, our operational openness resonated beyond the project before it resonated within the ROER4D community. Subsequently, one of the sub-projects has released their project's annotated bibliography as a public document.

Early and sustained communications about ROER4D was an attempt to operationalise open communications as part of Open Research practice. The project appointed a Communications Consultant to develop a communication strategy and engage with audiences through strategic use

of social media, the ROER4D website, newsletters, weekly emails and SlideShare. Outward-facing stakeholder engagement and internal networking was further facilitated by the ROER4D Network Hub team's attendance at conferences. This process of engagement was initiated well before interim outputs were scheduled for release in order to develop links with stakeholders and build a network of Global South OER scholars. The ROER4D communications strategy was therefore designed to be 'dialogic' rather than 'transmissive', in that the purpose of the communication is to develop an interested and interactive community of stakeholders whose commentary feeds back into the research process, rather than a one-way process of information delivery.

Whether engaging in open research practices internally within the network or externally with potential research recipients, operational openness requires flexibility to account for possible changes in the methodology and refinements to the research process. Strategic decisions need to be made with regards to which open practices will be practical for the project given fluctuations in research formulation and progress.

We found that a significant complicating factor in adopting operational openness is about timing and the difficulties associated with sharing interim data and analysis,. Releasing initial analyses may be misrepresentative of later analyses due to their partial nature, meaning that decision-making around the optimum time for data sharing is not straightforward. Moreover, some of our researchers have expressed the desire to 'mine' their own data before releasing it publically. The ROER4D Network Hub does, however, endeavour to release data and accompanying research instruments as soon as possible. An example of a ROER4D sub-project dataset (incorporating micro-data, instruments and extensive metadata) published via DataFirst is shown in Figure 1.

Figure 1: Example of a ROER4D dataset[2] published on the DataFirst Data Portal

Discussion

Criticality in research can provide a self-reflexive lens for researchers and managers of research projects to examine how their practice aligns with their goals, surfacing areas in which there are tensions or contradictions in their Open Research practice and providing indicators for how to advance their openness in a way that is appropriate to their project context. Initially, aspects of the ROER4D Network Hub's practice did not fully align with our ideology, a problem which only became visible after attempting to put our commitment to openness into practice. While this prompted changes in our practice, it also required a re-examination and subsequent refinement of our ideological position to one that adequately reconciled our belief in the value of openness with our commitment to quality, ethical research. In this sense, the interrelationship between the four domains was (and continues to be) iterative and coherent to various degrees at different stages of the project.

Coherence is a worthy aspiration, but it may be elusive. As a new research orientation, Open Research ambitions are tempered by other priorities such ethical protection and quality assurance, and against the reality of limited resources. Individual researchers' awareness and acceptance of Open Research also differ. Attempting to align all 86 researchers from different regions and across contexts to a single vision of Open Research seemed impractical and a distraction from the primary project deliverables. In ROER4D, the Network Hub acknowledged the difficulty of building consensus on appropriate Open Research practice amongst the broader researcher community, and so aimed to demonstrate our vision of Open Research practice and inspire the sub-projects to enact those aspects appropriate to their contexts and capabilities.

We acknowledge that our context—operating under the auspices of a well-resourced institutional host, with human resources specifically allocated for expansive Open Research activity, and a focus on coordinating and supporting research—has allowed us to interrogate and develop our own practices in a way that less well-resourced projects or individuals may struggle to do.

Conclusion

ROER4D's critical approach to openness is informed by the principle that research is only valuable if it is used. While some aspects of Open Research may seem like a departure from traditional methods, much of it speaks to the foundational aspiration to increase rigour and better communicate findings to maximise uptake and use—increasingly reflected in the growth of funder mandates that tend towards (mainly legal) openness. The ROER4D Network Hub's experience suggests that adopting an Open Research strategy may be a way to improve the transparency and reach of research while simultaneously increasing rigour and building research capacity.

Although a comprehensive Open Research plan is valuable, research contexts frequently change. An agile, iterative and strategic approach to openness is likely to better serve researchers than a rigid strategy, allowing researchers the freedom to adjust their ideological, legal, technical and operational approaches to improve their congruency. We term this approach 'critical openness' as a thinking tool to enable iterative strategic planning.

Finally, we would argue against a single correct way of conducting Open Research. Contexts vary too widely and other pressures in the research process exert too strongly to support a prescriptive approach. Rather than a radical open approach, we argue for the importance of striving for congruency between the different domains of openness that researchers identify for themselves as valuable in their context. We encourage researchers to engage in Open Research not for the sake of openness, but as a tool for enhancing transparency and rigour and expanding the impact of their work.

Acknowledgements

Endnotes

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2   https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/555

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A Framework for the Ethics of Open Education

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Abstract

What difference does openness make to the ethics of teaching and research? This paper approaches this question both from the perspective of research into the use of open educational resources (OER) in teaching and learning. An outline of the nature and importance of ethics in education research is provided before the basic principles of research ethics are examined through a discussion of traditional guidance provided by three UK research governance bodies: the Economics and Social Research Council; the British Education Research Association; and the British Psychological Society. The importance and foundation of institutional approval for research activities is analysed with several examples of the differences made by openness. It is argued that openness by its nature provokes particular issues for education researchers. A framework for understanding openness in education is then proposed based on basic meta-ethical positions (deontological; consequentialist; virtue). Used as a tool, the framework attempts to retain relevance in a variety of scenarios without requiring a dogmatic vision of openness (e.g. an insistence on open licensing). This framework is then evaluated in the context of the OER Research Hub project, which developed guidance for others in the form of an 'ethics manual' and online learning provided through the OER Research Hub's 'Open Research' course hosted on P2PU's School of Open. Use of the framework is intended to contribute to a better understanding of professional ethics for open practitioners.

Keywords: open education, research ethics, professionalism, data, pedagogy, MOOC, OER

The Emerging Open Paradigm

There is widespread recognition that the move to digitized, online and freely accessible learning resources brings profound ethical challenges. New information technologies continue to change the way we teach and interact. The philosopher of technology Luciano Floridi has suggested that "the information society has been brought about by the fastest growing technology in history [...] No previous generation has ever been exposed to such an extraordinary acceleration of technical power over reality, with corresponding social changes and ethical responsibilities" (Floridi, 2011, p. 4). New technologies bring new forms of human interaction, requiring fresh engagement with their ethical import.

This paper proposes a framework that focuses on the ethical significance of a particular group of educational technologies usually referred to as open education. A range of cultures, behaviours, practices and technologies from educational contexts may be described as 'open', including access to education or published research, policies, teaching methods, software, data sets and other educational resources. Open universities, now commonly found all around the world, have massively expanded access to education. Over the last decade—primarily in the form of Massive Open Online Courses (MOOC) and Open Educational Resources (OER)—the open education movement has expanded opportunities for education worldwide.

> "OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge." (Hewlett Foundation, *undated*.)

OER and MOOC encourage the production and sharing of high-quality educational materials at minimal cost. They represent a potential solution to many issues facing educators around the world and have attracted significant media interest around the world. In a time of austerity and fiscal uncertainty, openness has re-entered the popular consciousness and universities take steps towards integration of the 'open' model of education or learners take individual initiative to use them as an alternative to accruing debt through formal education. Open education has always identified with a strong ethical impulse, with many advocates directly inspired by what they see as a moral mission.

> "When educational materials can be electronically copied and transferred around the world at almost no cost, we have a greater ethical obligation than ever before to increase the reach of opportunity. When people can connect with others nearby or in distant lands at almost no cost to ask questions, give answers, and exchange ideas, the moral imperative to meaningfully enable these opportunities weighs profoundly. We cannot in good conscience allow this poverty of educational opportunity to continue when educational provisions are so plentiful, and when their duplication and distribution costs so little." (Caswell, Henson, Jensen & Wiley, 2008)

The moral mission of open education has also found a touchstone in international human rights legislation. The Paris Declaration on OER (UNESCO, 2012) builds on the previous ten years of OER advocacy as well as article 26 of the United Nations Universal Declaration on Human Rights (United Nations, 1948) and article 13.1 of The International Covenant on Economic, Social and Cultural Rights (United Nations, 1966) in recognition of "the right of everyone to education".

While there are also prudential rather than explicitly moral motivations for adopting openness—an educator might move to using open textbooks with their students for purely pragmatic reasons, for instance—for many practitioners the ethical dimensions of open education are crucial because of a commitment to expanding access to education. Given this, there is remarkably little written about the ethics of open education. A review of sixty-eight empirical studies, systematic reviews and reports on MOOC (Rolfe, 2015) suggests there is "a paucity of literature" addressing the socio-ethical dimensions, noting that "many of the articles published provide empirical evidence showing that both forms of MOOC offer opportunities to learn and connect across geographical boundaries, yet we are at a point where social inclusion is polarised toward the more privileged" (Rolfe, 2015, p. 65).

Open education often does not live up to its own vision: in practice, unequal access to communications technology, unequal distribution of basic study skills, and unavailability of resources in certain languages mean that open approaches can act as a force for exclusion rather than inclusion (Emmanuel, 2013; Laurillard, 2014; Perryman, 2013). As openness increasingly enters the mainstream there is concern that the more radical ethical aspirations of the open movement are becoming secondary. Wiley (2015) for instance argues for a 'deeper' understanding of open ethics as a form of being with an ethic of care and sharing rather than a set of duties (such as a requirement to use open licensing). This paper claims to define neither a professional ethics of open nor a 'deeper' ethics of open. Rather, the intention is to provide a framework that will make it easier to build and identify these.

Professional ethics in education research

Ethics is now a fundamental part of institutional research practice, but this is a relatively recent state of affairs. Before World War II there were no internationally recognized standards for research involving human subjects. As is well known, physicians working for the Nazi regime performed acts of experimentation on many human beings including forced sterilization, hypothermia, trauma, the ingestion and topical application of noxious substances, pathological infections, and amputations,

among others. These experiments are all the more horrific because of the lack of any free consent given by those experimented upon. At the military tribunal for war crimes known as the "Doctors' Trial" (United States Adjutant General's Department, 1947) several of the defendants argued that the experiments carried out differed little from those carried out by other countries, and in any case the lack of international legislation distinguishing legal and illegal research meant that there was no grounds for disputing the legitimacy of their actions. In 1947, in the aftermath of war crimes trials, the Nuremberg Code (HHS, 2005) was produced to describe the conditions under which research involving human subjects could be considered ethical by setting out key principles that should inform research activity. Foremost among these principles is the idea of the informed consent of participants being fundamental to ethical practice. But also conveyed is the idea that experiments should be oriented towards the good of society; that harm and risk should be minimized; that researchers should be scientifically qualified; and that any party has the right to terminate the experiment at any point (*ibid.*).

Despite being very close to contemporary legislation governing research, the Nuremberg Code was never made legally binding. Further examples of unethical research emerged in the 20th century, some of which remain quite contentious. For instance, the notorious Tuskagee experiments continued in the USA until 1972, where physicians withheld treatment of more than 600 syphilitic African American men in order to study the progression and spread of the disease (CDC, 2013). Others are less clear-cut, such as the "Tearoom Trade" ethnographic study that involved a sympathetic researcher posing a voyeur in public toilets in order to gather data on illicit homosexual activity without the consent of the participants (Humphreys, 1970). The 1970s saw much debate on expected standards in research, and by the end of the decade the Belmont Report (1979) set out the principles of ethical research that still acts as the basis for ethical experimental research.[1]

In practice, ethics matters across the entirety of the research process, including design of the process and instruments; sampling; data collection; through to dissemination. All ethical guidance offered to researchers is predicated on the assumption that the researcher is in a position to exercise control over the research process as well as any smaller interventions that take place as part of the research. The responsibilities of researchers are also not limited only to their own actions, since we also expect a reasonable assessment of anticipated risk and consequences that might follow from an intervention. Researchers can also be thought to have ethical obligations for situations that are entirely out of their control.

The ethical guidelines for research involving human subjects offered by different professional bodies share the common origin outlined above. This can be illustrated by comparing advice from different professional bodies that advise researchers. Taking the example of the United Kingdom: the main bodies providing such advice are the UK Economic and Social Research Council (ESRC, 2015), the British Educational Research Association (BERA, 2014), and the British Psychological Society (BPS, 2010). Table 1 categorises some of the advice given according to the underlying key principles.

Table 1: Comparison of ethical research advice, UK professional bodies (categorized according to underlying principle)

Principle	ESRC (2015)	BERA (2014)	BPS (2010)
Respect for participant autonomy	Research participants should take part voluntarily, free from any coercion or undue influence, and their rights, dignity and (when possible) autonomy should be respected and appropriately protected. (ESRC, 2015, p. 4)	Individuals should be treated fairly, sensitively, with dignity, and within an ethic of respect and freedom from prejudice regardless of age, gender, sexuality, race, ethnicity, class, nationality, cultural identity, partnership status, faith, disability, political belief or any other significant difference. (BERA, 2011, §9)	Adherence to the concept of moral rights is an essential component of respect for the dignity of persons. Rights to privacy, self-determination, personal liberty and natural justice are of particular importance to psychologists, and they have a responsibility to protect and promote these rights in their research activities. (BPS, 2010 p. 8)
Avoid harm / minimize risk	Research should be worthwhile and provide value that outweighs any risk or harm. Researchers should aim to maximise the benefit of the research and minimise potential risk of harm to participants and researchers. All potential risk and harm should be mitigated by robust precautions. (ESRC, 2015, p. 4)	Researchers must recognize that participants may experience distress or discomfort in the research process and must take all necessary steps to reduce the sense of intrusion and to put them at their ease. They must desist immediately from any actions, ensuing from the research process, that cause emotional or other harm. (BERA, 2011, §20)	Harm to research participants must be avoided. Where risks arise as an unavoidable and integral element of the research, robust risk assessment and management protocols should be developed and complied with. Normally, the risk of harm must be no greater than that encountered in ordinary life, i.e. participants should not be exposed to risks greater than or additional to those to which they are exposed in their normal lifestyles. (BPS, 2010, p. 11)
Full disclosure	Research staff and participants should be given appropriate information about the purpose, methods and intended uses of the research, what their participation in the research entails and what risks and benefits, if any, are involved. (ESRC, 2015, p. 4)	Researchers who judge that the effect of the agreements they have made with participants, on confidentiality and anonymity, will allow the continuation of illegal behaviour, which has come to light in the course of the research, must carefully consider making disclosure to the appropriate authorities. (BERA, 2011, §29)	This Code expects all psychologists to seek to supply as full information as possible to those taking part in their research, recognising that if providing all of that information at the start of a person's participation may not be possible for methodological reasons [. . .] If a proposed research study involves deception, it should be designed in such a way that it protects the dignity and autonomy of the participants. (BPS, 2010, p. 24)

Principle	ESRC (2015)	BERA (2014)	BPS (2010)
Privacy & Data Security	Individual research participant and group preferences regarding anonymity should be respected and participant requirements concerning the confidential nature of information and personal data should be respected. (ESRC, 2015, p. 4)	The confidential and anonymous treatment of participants' data is considered the norm for the conduct of research. [. . .] Researchers must comply with the legal requirements in relation to the storage and use of personal data as set down by the Data Protection Act (1998) and any subsequent similar acts. (BERA, 2011, §26)	All records of consent, including audio-recordings, should be stored in the same secure conditions as research data, with due regard to the confidentiality and anonymity protocols of the research which will often involve the storage of personal identity data in a location separate from the linked data. (BPS, 2010, p. 20)
Integrity	Research should be designed, reviewed and undertaken to ensure recognised standards of integrity are met, and quality and transparency are assured. (ESRC, 2015, p. 4)	Subject to any limitations imposed by agreements to protect confidentiality and anonymity, researchers must make their data and methods amenable to reasonable external scrutiny. The assessment of the quality of the evidence supporting any inferences is an especially important feature of any research and must be open to scrutiny. (BERA, 2011, §46)	Research should be designed, reviewed and conducted in a way that ensures its quality, integrity and contribution to the development of knowledge and understanding. Research that is judged within a research community to be poorly designed or conducted wastes resources and devalues the contribution of the participants. At worst it can lead to misleading information being promulgated and can have the potential to cause harm. (BPS, 2010, p. 9)
Independence	The independence of research should be clear, and any conflicts of interest or partiality should be explicit. (ESRC, 2015, p. 4)	The right of researchers independently to publish the findings of their research [is] linked to the obligation on researchers to ensure that their findings are placed in the public domain and within reasonable reach of educational practitioners and policy makers, parents, pupils and the wider public. (BERA, 2011, §40)	The ethics review process should be independent of the research itself [. . .] this principle highlights the need to avoid conflicts of interest between researchers and those reviewing the ethics protocol, and between reviewers and organisational governance structures. (BPS, 2010, p. 27)

Principle	ESRC (2015)	BERA (2014)	BPS (2010)
Informed Consent	Informed consent entails giving sufficient information about the research and ensuring that there is no explicit or implicit coercion . . . so that prospective participants can make an informed and free decision on their possible involvement [. . .] The consent forms should be signed off by the research participants to indicate consent. (ESRC, 2015, p. 4)	Researchers must take the steps necessary to ensure that all participants in the research understand the process in which they are to be engaged, including why their participation is necessary, how it will be used and how and to whom it will be reported. Social networking and other on-line activities, including their video-based environments, present challenges for consideration of consent issues and the participants must be clearly informed that their participation and interactions are being monitored and analysed for research. (BERA, 2011, §11)	The consent of participants in research, whatever their age or competence, should always be sought, by means appropriate to their age and competence level. For children under 16 years of age and for other persons where capacity to consent may be impaired the additional consent of parents or those with legal responsibility for the individual should normally also be sought. (BPS, 2010, p. 16)

While not a full systematic review, this comparison makes clear the great deal of overlap between the underlying principles. Similar guidance is given by other bodies around the world, including the federal regulations concerning the protection of human research subjects published by the USA Department of Human and Health Services (HHS, 2009). These similarities are best understood as resulting from a shared genealogy influenced by Nuremberg and Belmont. Researchers working in the USA must typically comply with these principles, and obtain the approval of an Institutional Review Board (IRB) for research involving human subjects. The processes for institutional approval of research involving human subjects are standardised, typically involving some form of risk assessment checklist, which shows that the advice outlined above, has been considered and appropriate actions taken.

Because these principles have a shared genealogy (as outlined above) they are extremely similar at institutions throughout the world: to comply with institutional rules researchers need to have their proposal approved by an expert panel who consider the same key principles. All international signatories to the Declaration of Helsinki (World Medical Association, 2013) subscribe to a similar process for all research involving human subjects, and the Declaration acts as the basis for human research ethics worldwide.[2]

Since these are principles rather than specific acts of guidance, they have often been interpreted in accord with new technological advances. For instance, the Association of Internet Research (AOIR, 2012) has published ethical recommendations regarding the use of the internet in research which reflects the affordances of working with large data sets, scraping information, curating and sharing information online, and so on. But even in this recent advice there is no mention of the importance of openness as an approach.

Research Beyond the Institution

The processes and principles described above are typically applied in institutional contexts through the mechanisms by which approval is offered to research activities such as collecting information through surveys; interviews; using data about individuals or groups; acceptable professional standards for analysis; and strategies for dissemination. However, research activities are increasingly taking place outside institutions using open, publicly available data and technologies to collect and analyze data as well as disseminate findings. Following Weller (2013), I will characterize extra-institutional open research as 'guerrilla research'. For activities of this type, no further permissions are usually needed from research participants, as data used is already publically available and openly licensed. 'Guerrilla' researchers do not typically collect primary data. Rather, their contribution is in the application of new methods to legacy data, or combining existing data sets in novel ways. Research of this type may be characterized as agile and quick to initiate and complete with a minimal business case. Unfettered by institutional or disciplinary rules, guerrilla researchers can explore alterative funding models (such as crowdsourcing) and alternative forms of dissemination (such as through blogs, social media, infographics and data visualizations). Examples of research of this type include:

- Jordan (2014) used openly available and crowd-sourced data on MOOC enrolment and completion to perform a trends analysis using linear regression. This study showed that the average completion rate for MOOC was 10%, and that the massive enrolment seen in some early MOOC was falling as more courses became available. The data from the study was made openly available to others to corroborate results or perform alternative analyses. A blog post about the work went viral and became the *de facto* citation for MOOC completion rates (Weller, 2014, p. 14).

- In the United Kingdom, the Freedom of Information Act (2000) provides for public access to information held by public authorities on the basis that "[o]penness is fundamental to the political health of a modern state" (Cabinet Office, 1997). Open data about government can form the basis of research enquiry. In 2009, Tony Hirst—a lecturer at The Open University, UK—created a Google Map which cross referenced open data about the expenses claims of Members of Parliament (MPs) with information about the distance of their constituency to London. The map highlighted MPs who claimed disproportionately more than others in a similar location and was picked up by national newspaper *The Guardian* (Arthur, 2009) leading to further maps and explorations of data. This work had a high impact despite being quick to initiate.

- Another example is provided by Coal Run, Ohio. A mapping mash-up which cross-referenced city boundaries, water supply lines, and house occupancy by race showed that almost all the white households in Coal Run had water service while all but a few black homes did not. On the basis of this study residents successfully sued Zanesville and Muskingham County for $11 million in 2008 (Burtman, 2009).

- In 2013, social network Facebook carried out a study into 'emotional contagion'. To find out whether the psychological states of its users can be manipulated showed 689,003 users either only 'positive' or 'negative' status updates to ascertain whether this would affect their mood. The researchers found experimental evidence that emotional contagion occurs without direct interaction between people and without cues (Kramer, Guillory & Hancock, 2014). The experiment remains controversial because no consent was sought from the unwitting

participants: it was argued that anyone who holds a Facebook account signs up to the terms and conditions of using Facebook and thus has given implied consent. This threshold would be unlikely to be high enough for most institutional review boards—especially given (i) the intention to cause psychological stress, and (ii) the impossibility of a small research team knowing what impact the study would have on such a large sample. Indeed, though the study involved researchers from Cornell University their IRB covered only the analysis of data and not its collection. Furthermore, because the work was for a private company it was believed that different ethical expectations apply: "[b]ecause this experiment was conducted by Facebook, Inc. for internal purposes, the Cornell University IRB determined that the project did not fall under Cornell's Human Research Protection Program" (Verma, 2014).

While the dependence of such activities on open tools and technologies might be thought of as the emergence of a distinctive new discipline, the distinction between institutional and 'guerrilla' research should be thought of as a spectrum rather than a binary. Many institutional researchers work with open data sets, for example. But the correct balance between traditional and 'guerrilla' research activities has not been established, and these activities are often not recognized as valid by institutions. It should also be noted that openness extends research opportunities beyond the academy to people who may not have had a formal training in research ethics.

What these examples show is that quite powerful insights can be generated by making different or creative use of available data; but also that the insights they provide can be charged with ethical significance. Given that 'guerrilla research' can uncover socially important information, a case could be made that research of this type should be supported through, for instance, facilitating data mining and widely teaching the skills needed to curate, clean and analyze information. However, the examples given are rather selective and there remain several issues around this kind of research. Whether conducted in public or private institutions, unconventional research activities (and their outputs) are often not institutionally recognized. This can lead to a lack of institutional guidance or an unwillingness to endorse such activities, and a subsequent reluctance for faculty to engage with them. Furthermore, it can be unclear who owns the intellectual produced in 'guerrilla research' and this can also pose a barrier (though open licensing could potentially help by clarifying permissions).

While openly licensed data can be legally used according to the license provided, it should not be assumed that everything that can be done with the data is also ethically justified. When using data beyond its original study consent might not qualify as 'informed' and it becomes especially important to explain open licensing and open dissemination to ensure that consent is informed. Another risk with the use of third party datasets is the lack of connection between the researcher and the original context that produced the data and the risk of misinterpretation or misunderstanding of context. Longo & Drazen (2016, p. 276) express concern that "people who had nothing to do with the design and execution of the study but use another group's data for their own ends" could be seen as "research parasites" who try to subvert or appropriate the activities of others. This could potentially act as a barrier to openly sharing, or encourage researchers not to release data unless they believe it has no more potential value.

These examples demonstrate that clearer guidance is needed for educators and researchers working within open education. Yet, by the very nature of openness, it is extremely difficult to prescribe appropriate actions because of the diverse contexts of open educational practices. What is required, then, is a framework which can accommodate diverse elements, identify ethical elements and present them in a way that aids understanding, reflection, and practical decision-making. The proposed framework proceeds by delineating three key areas from moral philosophy.

A Framework for the Ethics of Open Education

Ethics is the attempt to arrive at understandings of human behavior and values that are both systematic and action-guiding. Moral philosophers typically distinguish the study of different elements of ethics into three subdomains: *normative ethics; applied ethics;* and *meta-ethics.* 'Normative ethics' is concerned with actions and their moral value, and is prescriptive in the sense that it attempts to establish how people should behave, which rules they should follow, and which beliefs and values one should have. Normative ethics attempts to guide actions according to some standard, rule or principle. Note that this is not guided by empirical norms, or social mores: 'normative' here does not refer to 'the norm' in terms of what is held socially acceptable but rather to some standard of correctness that can be used to judge the rightness of an action. Another way to put this is to say that, unlike an ethnographic description, normative ethics is concerned with what *should be* the case rather than what *is*. Three main normative theories—deontological, consequentialist and virtue—are further discussed below.

'Applied ethics' is used to denote those studies that attempt the practical application of a normative theory, i.e. how can we apply the moral principles that have been identified consistently and concretely. Because applied ethics is concerned with real world problems a great deal of specificity is typical of the enquiries. Research ethics, professional ethics, business ethics, environmental ethics, the ethics of biotechnology and medical ethics, among others, fall under this category. It may be feasible that open education develops a professional code of ethics. However, as shown in the preceding discussion of 'guerrilla' research and the contextual qualities of openness, there are reasons not to expect this in the short-term as the contexts of open practices are so diverse and unpredictable.

The third area of moral philosophy is *meta-ethics.* Whereas the first two were concerned with the rightness (or wrongness) of specific actions, meta-ethics is concerned instead with the meaning, use and significance of moral language like 'good', 'bad', 'right', 'wrong' and so forth. Meta-ethical questions are more wide-ranging than they might first seem, and meta-ethics overlaps with a number of different aspects of philosophy, including epistemology and metaphysics. In addition, meta-ethics include wider theoretical questions like whether moral judgements should be considered subjective or objective, or whether ethical judgements result from ultimately selfish or altruistic motives. It is important to note that meta-ethical theories do not attempt to guide actions; they are not normative. Rather, they are attempts to reconstruct and make sense of our experience of morality and moral intuition by analysing our moral experiences.

The framework is oriented towards normative ethics in order to focus on bringing out normative conclusions in relation to open education research.

- *Deontological* theories emphasize moral obligation and the rule-based nature of morality. Religious ethics are typically deontological, for example, with clear rules about acceptable and unacceptable behavior. There are also many important non-religious deontological theories which endorse respect for individuals and their rational autonomy. In open research this is most closely identified with the need to respect participants, learners, and colleagues. Informed consent is related to respect for persons.
- *Consequentialist* theories (notably, Utilitarianism) understand morality as a matter of bringing about the right consequences; to do what is objectively 'right' in terms of the wider context rather than what is necessarily best for oneself. There are differing theories within consequentialism about which outcomes should be thought desirable. Avoiding harm and minimizing risk is a clear example of a consequentialist consideration, but acting to bring about good consequences—such as through learning and dissemination—is equally important.

- *Virtue* theories (derived from Plato and Aristotle) emphasize the importance of virtue, character and experience in acting ethically and in accordance with one's nature. Virtue theorists hold that good judgment and excellence in ethics is a matter of practical wisdom (*phronêsis*). Integrity and independence can be understood as virtues in this sense. 'Openness' itself could also be understood as a virtue (minimally in the sense of 'full disclosure' but perhaps as a wider 'ethic of open').

These theories are compared in Table 2.

Table 2: Summary of main normative ethical theories

Normative Theory	Definition of 'good'	Focus	Strengths	Weaknesses
Deontological	Fulfillment or discharge of moral obligations	Responsibility, intention & duty	• Avoids overly demanding aspects of consequentialism • Accounting for cross-cultural moral intuitions • Reflects our moral intuitions and captures the sense in which morality 'binds' us like a law • Clear moral boundaries	• Possible conflicts between different duties and rights • Outcome 'blindness' • Inflexibility: rules do not change according to context
Consequentialist	Acting to promote best outcomes	Consequences and outcomes	• Captures 'objective' sense of morality • Can incorporate multiple perspectives • A practical approach to ethical problems	• Endorsement of counter-intuitive or objectionable outcomes • Issues surrounding metrics • No necessary link with intention behind actions (which seem in themselves to be significant)
Virtue Ethics	Flourishing (*eudemonia*)	Individual character and 'well-being' Developing practical wisdom (*phronêsis*)	• No complex procedure of decision-making. It trusts that a 'virtuous' person will make good moral choices. • Recognises morality as an holistic, developmental process • Emphasis on enjoying life and it being good to live virtuously • Considers life experiences as a whole • Linked to personal development	• Disagreement: 'virtuous' people may not agree on the right thing to do • Problems with proposed link between virtue and flourishing • Struggles to accommodate value plurality • Promotes self-centredness or egoism

This paper proposes that these three theories can act as a useful anchor for thinking through ethical issues 'in the open'; that is, contexts where openness is emphasized and/or without institutional support. For the purposes of this framework we will focus on the three positions, here described in everyday language.

Table 3: Uncompleted Framework

	Duties & Responsibilities (deontological)	Outcomes (consequentialist)	Personal Development (virtue)
Respect for participant autonomy			
Avoid harm / minimize risk			
Full disclosure			
Privacy & data security			
Integrity			
Independence			
Informed Consent			

Applying the Framework: OER Research Hub

By way of illustration, the framework (table 3) will be examined through consideration of ethical issues in the OER Research Hub project. OER Research Hub (2015) was a research project funded by The William and Flora Hewlett Foundation to provide and aggregate leading research into the impact of open educational resources across higher education, further education, schooling and informal learning. In OER Research Hub a broad view of potential impact was taken so as avoid prescription about the possible direct or indirect results of OER implementation. The project methodology involved a collaboration program with high profile OER projects provided opportunities to reach out to a targeted international OER community engaged in establishing new OER practice and dissemination activities. In order to provide a universal structure for researching diverse contexts of OER application a series of eleven hypotheses about OER were addressed across the project. Evidence was then gathered for and against the hypotheses throughout the research. Headline findings from the project are summarized in the evidence report (de los Arcos *et al.*, 2014) and the data report (de los Arcos *et al.*, 2015). Each hypothesis reflected claims commonly made about the impact of OER. Supplementary to the evidence acquired from these targeted collaborations the project also curated secondary evidence from research literature. The data was used to generate a number of visualizations, and to map evidence (OER Impact Map, 2014) as well as writing more traditional quantitative and qualitative scientific papers.

There are several reasons why this project is interesting from the perspective of ethics and openness. OER Research Hub was committed to exploring openness in practice and endeavored to be as open as possible. The goal of the project was to research open education through open methods while also determining what kind of methods might be considered 'open'. There are several aspects of this project that are important from the perspective of an open ethics:

- Although most of the research was conducted in the USA, the project worked with more than 7,000 research participants over 150 countries. This required sensitivity to a wide range of cultural norms and expectations;

- As a university research project involving human subjects, OER Research Hub was subject to the regulations of The Open University, UK. This necessitated ethical considerations in line with traditional expectations: compliance with UK Data Protection Act (1998) as well as relevant codes in other countries, such as and the USA's Protection of Human Subjects (HHS, 2009). In addition, all data collection activities complied with The Open University's 'Ethics Principles for Research Involving Human Participants' and 'Code of Practice';
- Risk assessments were carried out for the project as a whole and for individual collaborations where appropriate;
- An open, collaborative research methodology (where questions were sometimes reworded or reordered according to the research needs of collaborators) meant that the epistemological integrity of the research could be called into question;
- Use of third-party data respected the original consent given at the time;
- Because of the 'open' approach to data collection special care must be taken with respect to statistical claims made on the basis of the data set;
- While OER Research Hub was a project at a higher education institution, its outputs (instruments, data, etc.) could be used in a 'guerrilla' context and this was considered throughout their construction and dissemination;
- Sharing results through the project website, blog and social media accounts helped to raise the profile of the work but meant that less polished work was presented to the world;
- Open release of research data, open access publication and digital scholarship were nonetheless key elements of an open dissemination strategy;
- The (redacted) research dataset was made openly available and with commentary (Farrow *et al.*, 2015);
- The experiences of the research team informed the production of a free open course with Peer 2 Peer University (Pitt *et al*., 2014) on the relevance of openness for research.

Table 4 shows the (retrospectively) completed framework, summarizing some of the ethical concerns and considerations from the project. Each element of the grid identifies ethical aspects of the project that were affected by openness.

Table 4: Completed framework for OER Research Hub project

	Duties & Responsibilities	Outcomes	Personal Development
Respect for participant autonomy	Unforced and un-incentivized participation; no compulsory questions; translation of survey into local languages for field work	Some gaps in data due to unanswered questions	Encouraged reflection on how to encourage participation through effective research design
Avoid harm / minimize risk	Follow all relevant institutional review board requirements, especially important in unfamiliar national contexts with different cultural expectations	All names, contact details and identifiable information removed from open data

Collaboration model meant dozens of separate IRB applications; often extremely impractical | The research team developed a stronger sense of how open sharing could introduce new and unforeseen possibilities for harm and acted accordingly

Open research involving institutions should allow extra time for review board |

	Duties & Responsibilities	**Outcomes**	**Personal Development**
Full disclosure	Explained nature of open licensed dissemination to participants and give participants (e.g. interviewees) option to add criteria to their recordings being released in open	Completed institutional ethical reviews for all collaboration partners and individual institutions Some concerns over whether participants would be as forthcoming if they thought their responses might not be anonymous	Raising openness with participants helped clarify expectations for future work Developing an 'ethic of open' as expected practice
Privacy & Data Security	Data was collected and stored securely according to relevant institutional policies Research instruments were designed to only collect personal information relevant to hypotheses (e.g. gender, disability were included but sexual orientation was not).	Some countries, states and provinces exhibit differences in legal expectations around cloud storage of data. It was important to comply with the local expectations Open dissemination strategy required redacting survey data sets of information, which arguably diminishes their value for re-use	Practical experience of conducting research in different contexts makes it easier to prepare subsequent interventions Participants may become more used to sharing data openly
Integrity	As instruments and data were released openly it was important to ensure that the work could be followed and reproduced	OER Hub is producing a 'researcher pack' which will encourage intended re-use of instruments. An annual survey will provide a set of comparative data points for those re-using questions, etc. High quality research into OER impact is needed by developing OER movement for planning and advocacy	Researchers were required to engage closely with validity of the research Improved sense of awareness of the challenges of using open and mixed methodologies
Independence	Research team had a duty both to be independent and to act responsively to actually existing research needs of diverse organisations	Collaborative research model involved some compromises over research methodology but in return large data sets were acquired Occasionally a fine line between research objectivity and advocacy	Use of the framework encourages authentic reflection and ownership rather than 'box-ticking' risk assessment Importance of projecting a clear and independent research identity; this was partly achieved through social media

	Duties & Responsibilities	Outcomes	Personal Development
Informed Consent	A duty to ensure that all participants understood the intention to openly disseminate results and redacted data; custom consent form	Information collected from more than 7,000 participants has been disseminated without incident	Encouraged deeper reflection on meaning of 'informed consent' in an open world where data can be repurposed indefinitely and in unforeseen ways

Conclusion

It should be noted that the proposed framework cannot replace existing processes of institutional approval for research work, and should be thought of as complementary. 'Guerrilla' researchers working outside institutions with open data must effectively act as their own review board by behaving in a manner that is consistent with institutional excellence. The framework facilitates this by (i) encouraging reflection on areas of potential moral significance; (ii) encouraging the same ethical standards as one would expect to find adhered to in institutional settings, while (iii) noting that even institutional guidance may not reflect what is now possible with open technologies. The framework does not endorse any particular moral philosophy or vision of open education, focusing on the explanatory rather than the normative force of any particular viewpoint (though of course using of the tool could lead to substantive normative conclusions).

It is not presently possible to prescribe all contexts where openness might make an ethical difference and, in any case, it is important for practitioners to continue to reflect on issues themselves and practice their own autonomy and *phronêsis* as researchers and educators. This contribution has shown that the principles underlying traditional research ethics can be applied in open contexts but special consideration must be given to the consequences of open dissemination practices. A tool for those working as open researchers or those researching open education has been proposed and evaluated through the example of OER Research Hub. The framework is designed to facilitate identification of ethically significant features of a particular context and aid reflection on how different ethical consideration might be in tension with one another. Further guidance on ethics in open education can be found in the OER Research Hub Ethics Manual (Farrow, 2013) and in the P2Pu course 'Open Research' which was written by members of the OER Research Hub team (Pitt *et al*., 2014). Free online training in research ethics is also available from the National Institutes of Health (2014).

Acknowledgement

Notes

[1]   Though ubiquitous, the principles advocated in Belmont have been criticized by some (e.g. Shore, 2006) for treating participants alike and failing to recognize important differences between subjects such as gender, ethnicity, culture, or geography.

2   Although the principles subscribed to in each country are the same, some studies have found they are not always applied consistently. For instance, Hearnshaw (2004) finds that many countries eschew the review board for un-contentious experiments while the UK "has an arduous process for gaining ethical approval for a non-invasive intervention study" (*Ibid.*)

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The Best of Two Open Worlds at the National Open University of Nigeria

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Abstract

It will be wise for educational institutions, from primary to tertiary level, globally, to reflect on their position and profile with respect to the new concepts of Open Educational Resources (OER) and Massive Open Online Courses (MOOCs). Responses will be diverse of course but the potential is so manifest that many institutions probably will consider the benefits to outweigh the barriers. The National Open University of Nigeria (NOUN) has decided to combine its 'classical' openness with the new digital openness by fully embracing the OER approach and converting its complete course base into OER. Step-by-step, NOUN is currently implementing its strategy towards becoming an OER-based Open University with a special niche for MOOCs. During a launch event in December 2015, the first 40 OER-based courses were presented as well as the first 3 OER-based MOOCs. This paper therefore presents NOUN's OER strategy with insight on lessons learned. To the authors' knowledge NOUN is the first Open University in the world with such a full-fledged OER (& MOOCs) implementation route.

Keywords: Open, classical openness, digital openness, OER, MOOCs, Nigeria, NOUN

Introduction

The paper starts with discussing the 'classical' openness in education as utilized in the long-standing tradition of the Open Universities (OUs). We then move to the new kind of openness that emerged about 15 years ago, the digital openness, which gave rise to new approaches to open up education (OER, MOOCs), and brought new competitive players into the field. In the next section we consider the response of the OUs around the world to these challenging developments, which can be characterized as a paradoxical combination of being inspired by its tempting opportunities and staying reserved for a variety of reasons. It was because of the MOOCs that the sense of urgency to take a clear stand in this new world of digital openness significantly grew. Next, the paper presents the NOUN case in terms of the why, the what, and the how of developing itself steadily into an all-inclusive OER-based Open University with a measured share for MOOCs. The paper concludes with a few final remarks.

Open Education in perspective

Traditionally the Open Universities are offering a model of open learning or open education. Frontrunners in the early 'distance learning' mode were the University of London in the nineteenth century and the University of South Africa (UNISA) in the mid twentieth century. The start of a very successful OU in the UK around 1970 marked an expansive movement towards many successors in a full range of countries in Europe and around the world. These OUs represent major operations for a wide and vast population of learners not being served by the regular university system. Quite a few are so-called mega-universities enrolling millions of students (Daniel, 1998; Mulder, 2010, 2015).

The qualifier 'Open' in the name 'Open University' refers to the following set of possible features: (1) open entry (no formal requirements); (2) freedom of time; (3) freedom of place; (4) freedom of pace; (5) open programming (i.e., curriculum variety in size and composition); and (6) open to all people and target groups (i.e., a heterogeneous population, of all ages, and in different contexts; generally involving some type of combination of study with a job or domestic or care tasks). Not a single OU in the world is fully open in all these six aspects of openness, and what we actually see is a large diversity in the OU's institutional profiles. But, derived from their missions, OUs definitely score much higher than regular universities on these 'classical' notions of openness (Mulder 2010, 2015).

In the case of NOUN, which was founded in 2002, it can be observed that the institution is on its way to becoming a mega-university with enrolment of 455.837 students as at April 2016 (data facilitated by NOUN). NOUN has a particular focus on four out of the six open features, namely freedom of time, freedom of place, freedom of pace, and open to all people and target groups. For the other features of 'open'—open entry and open programming-, NOUN currently requires five basic credits in most of its entry requirements, while open programming is not really an option for students.

Digital openness flanking the 'classical' openness

Meanwhile, the term 'Open Education' is also being used in relation to the digital openness that has emerged and flanked the classical notions of openness in education. This was initiated by the 2001 OpenCourseWare (OCW) initiative of MIT, making available all its courses for use by anyone at no cost via the Internet. The term 'Open Educational Resources' (OER) was coined in 2002 when UNESCO underlined the enormous potential of this concept for its 'Education for All' ambition. Simply put, OER stands for learning materials that are online and available at no cost to anybody: learners, teachers, and institutions (Mulder, 2006, 2015; Weller, 2014). OER can be (re)used, revised, remixed, redistributed, and retained (Wiley, 2007, 2014). This sharing tenet is facilitated by the legal use of open licenses that work with copyright to give users certain automatic rights, such as those previously cited (provided for example, by Creative Commons).

Another push towards digital openness came in 2011 when the first Massive Open Online Courses (MOOCs) were offered. Since then MOOCs have boomed with top American universities as the first movers, financed with venture capital, hyped media attention, and favourable interest from politicians. Expectations of the potential of MOOCs as an educational tool were extremely high in the beginning, accompanied with claims that they would disrupt higher education. Currently we are witnessing a normalization of the MOOC movement, which meanwhile has extended substantially outside the US into Europe and other parts of the world. MOOCs typically are courses that offer online learning services, including learning communities, automated self-testing, peer review, and certificates of different kinds (although mostly not for credit). Quite often MOOCs are based on video lectures.

With the rapid expansion in the number of MOOCs, the number of students enrolling in each course is significantly less than enrolments in the initial offerings. Generally, MOOCs apply the classical open features 1 (open entry), 3 (freedom of place), and 6 (open to all people and target groups), but not 2 (freedom of time), 4 (freedom of pace), and 5 (open programming). Like OER, they are available on the Internet at no cost, but unlike OER, MOOCs are rarely openly licensed, therefore they lack the principle of sharing of the learning materials with anyone at any time (Weller, 2014; Mulder, 2015).

The emergence of OER and MOOCs mark relevant change agents in higher education. New and highly innovative players have entered the field of Open Education while traditional players still struggle with strategic dilemmas associated with OER and MOOCs (Mulder, 2015).

Response of the Open Universities worldwide

In 2006 the Open Universities in the UK and in the Netherlands were the first OUs in the world to launch their OER initiatives through OpenLearn and OpenER respectively. Both related to a small fraction of the full course base, targeted lifelong learners, offered a new easily accessible portal to higher education, and aimed to widen participation in higher education (Mulder, 2006; Schuwer & Mulder, 2009). The example set by OU UK and OUNL, both members of the European Association of Distance Teaching Universities (EADTU), was quickly followed by an EADTU project called MORIL (Multilingual Open Resources for Independent Learning), which was led by OUNL. An important output of this project was the growing awareness among all European partnering OUs of the opportunities of OER but also of the challenges and possible threats. Moreover, with most of the partners it resulted in limited OER pilots or considerations to develop an OER strategy.

In 2008–2009 EADTU organized three follow-up OER Seminars, two within the European context and one with a global scope (Africa, Asia, and Latin America). The global Seminar was organized in close collaboration with UNESCO in its Headquarters in Paris and explored the theme of OER capacity building. The intentions were promising and the spirit was stimulating (Mulder, 2010). The African delegation, for example, came to the conclusion that *'Africa intends to boost educational capacity with OER so as to suffice the large demand for education.'* In 2008 the global organization of OUs and similar operations, the International Council for Open and Distance Education (ICDE), published a report of its OER Taskforce chaired by OUNL. The title of the report, *'A Golden Combi?! —OER and Open, Flexible and Distance Learning'*, actually is a most concise summary of its major line-of-thought, emphasizing the exciting and challenging opportunities for OUs with OER (Mulder & Rikers 2008). In 2009 at the combined ICDE/EADTU Conference, the resulting Maastricht Message stated:

> It is evident that the increasing—and increasingly diversified—demand for higher education cannot be met through traditional means within traditional institutions. OER offer an unprecedented opportunity to advance both the international commitment to Education for All and to building inclusive knowledge societies.

The Maastricht Message has been presented in the closing session of the 2009 UNESCO World Conference on Higher Education in Paris. This has contributed to the inclusion of item 13 in the resulting UNESCO Communiqué: *'ODL approaches and ICTs present opportunities to widen access to quality education, particularly when OER are readily shared by many countries and higher education institutions'.* Three years later, at the 2012 EADTU Conference, it was concluded in an alerting keynote that *'OUs should consider to become (the) European OER Universities'* (Mulder, 2012a). Another keynote, at the 2012 ICDE Leadership Meeting, expressed this recommendation in other words: *'OER is fundamental to the OUs'* (Mulder, 2012b).

Despite all these promising intentions, initiatives, explorations and recommendations (given the perceived benefits of OER), the OU world is more or less stuck in doubt, hesitation or caution with respect to a full conversion to OER. One reason is fear of negative effects for the enrolments, although this seems to be based more on sentiment than on evidence (Carson, Kanchanaraksa, Gooding, Mulder & Schuwer, 2012; Janssen, Schuwer & Mulder, 2012). A second reason is the awaiting attitude of the institutions, in continuing expectation of a governmental policy supporting and incentivizing OER. And a third reason is the lack of consensus among academic staff on the need to embrace OER, partly infused by normal human behaviour, implying overall not to be in favour of change.

This combined attitude of concern, anticipation, and complacency was seriously challenged by the MOOCs movement. The competitive potential of the MOOCs from a new world of innovative players generated a stronger feeling of urgency to act in the traditional OU world. At the 2012 EADTU Conference previously referenced there was an emphatic proposal: *'Let's enter the MOOCs world with EU-OU style MOOCs with clearly more added value for learners than the US-based MOOCs'*. Which was widely applauded and followed up with an express call at the 2012 ICDE Leadership Meeting (quoted above) to extend this idea beyond Europe to the OUs at other continents. EADTU went remarkably fast and launched its MOOCs initiative called OpenupEd in April 2013, together with the European Commission. 11 partners from Europe and beyond (including Russia, Turkey, and Israel), almost all EADTU members, founded OpenupEd with 40 courses in a wide variety of subjects and levels and using 12 languages. OpenupEd applies a set of 8 distinct features: (a) openness to the learners (in the OU tradition); (b) digital openness (e.g. OER-based); (c) a learner-centred approach; (d) independent learning; (e) media-supported interaction; (f) recognition options; (g) focus on quality; and (h) a spectrum of diversity. OpenupEd is operating in a decentralized model where the institutions themselves are leading, and it is providing a central communication portal (rather than a platform). It is driven by service to the learners and societies (rather than by revenue) and is positioned in the public domain (rather than in the private sector). OpenupEd is open to partner with any university prepared to endorse the 8 common features and meeting the requirements for the OpenupEd quality label (Mulder & Jansen, 2015). Currently OpenupEd is one of the major MOOC providers in the world, but with a distinct brand, offering almost 200 courses, and engaged in a growing partnership, also outside Europe. Interestingly, what we so far have not seen happen around OER, did occur with the MOOCs: combine the best of the OU world and its classical openness with the new and innovative world of digital openness.

Following the 2013 ICDE Conference in China, where the question was raised: *'Will OUs be disrupted by the MOOCs movement or rediscover their mission and fully utilize the new power of OPEN?'*, UNESCO/Paris and the UNESCO Chair in OER at OUNL initiated to organize two explorative high-level Executive Workshops in 2014. One was for the leadership of the African OUs in collaboration with ACDE (African Council for Distance Education) in Victoria Falls, Zimbabwe (UNESCO 2015a). The other one was for the leadership of the Asian OUs in collaboration with AAOU (Asian Association of Open Universities) in Hong Kong (UNESCO 2015b). The idea was to inspire the African and Asian OUs and their collective bodies to start MOOCs initiatives similar to OpenupEd but with their own flavour and profile, and to link them to OpenupEd in a global network. Follow-up activities have been arranged and a firm and concrete result is the NOUN case, which will be described in the next sections.

NOUN's strategic response

Although more and more institutions are embracing OER, the concept is still pretty alien to many, especially institutions in West Africa. The OER journey at the National Open University of Nigeria

is a fairly young one. Specifically, on 6th December 2013, during the closing remarks for the 7th Pan Commonwealth Forum held in Abuja, Nigeria, NOUN's former Vice Chancellor Prof Vincent Ado Tenebe, declared his university's intention to embrace OER by opening up its course base into OER. That was a remarkable move, given the general reservations in the OU world to date to go that far, as described in the previous section. In 2014 NOUN actively participated in the UNESCO/ ACDE high-level Executive Workshop on OER and MOOCs with the sole aim of sensitizing institutions in Africa on the need to embrace and practice these concepts.

Embracing OER is quite a natural response for NOUN given its mission and vision statement that seeks to

> provide highly accessible and enhanced quality education anchored by social justice, equity, equality and national cohesion through a comprehensive reach that transcends all barriers and. . . to provide cost-effective, flexible learning which adds life-long value to quality education for all who seek knowledge (NOUN strategic plan 2013–2017).

The 'aha' moment for NOUN was triggered by the 2012 Paris OER Declaration (UNESCO/COL, 2012). This declaration recommends that States, within their capacities and authority: foster awareness and use of OER; facilitate enabling environments for use of ICT (bridging the digital divide); reinforce the development of strategies and policies on OER; promote the understanding and use of open licensing frameworks; and support capacity building for the sustainable development of quality learning materials. Moreover, it is recommended that States foster strategic alliances for OER; encourage the development and adaptation of OER in a variety of languages and cultural contexts; encourage research on OER; facilitate finding, retrieving and sharing OER; and encourage the open licensing of educational materials produced with public funds. Being aware of its position as a publicly funded university with a huge body of course materials which were also funded by the government, NOUN has concluded that it could—in line with its vision and mission—stimulate access, social justice, and equity in knowledge by opening up content through the use of open licenses.

Thus, in a bid to properly key into OER, NOUN decided to establish an OER unit in August 2014 and has since then continually dedicated itself to learning and understanding the tenets of OER. With its OER and MOOCs approach, which entail raising awareness, technical training, conversion of existing course materials into OER, and collaborating with institutions and organizations in OER and MOOCs, NOUN is addressing two main target groups: students and academics. Its current and potential students can legally access up-to-date course materials through online services with computers and smartphones. Moreover, it is beneficial for them as they are less dependent on the official printed course materials that are available in the NOUN study centres or on the existing illegal distribution channels with scans of printed course materials. The target group of academics first of all is located within NOUN but also extends beyond NOUN to the other universities in Nigeria. NOUN's academic staff, for example, is guided in writing courses that primarily use existing OER materials, while the leadership and academics of other universities are invited to join NOUN's initiatives to build a Nigerian open educational ecosystem. This ecosystem is characterized by a fruitful collaboration on the development of university courses based on shared resources that are being improved during their use in teaching and learning practices. Furthermore, MOOCs are to be used as a vehicle for widely taught subjects in foundation courses, currently offered in isolation by the universities. In the NOUN approach, the MOOCs are OER-based, so they are available for re-use and improvement by academics of other universities in Nigeria or elsewhere.

In December 2015, in a high-level Seminar aimed at presenting NOUN's OER strategy to Nigerian government and other stakeholders from both the public and the private sector, it was confirmed

that NOUN had entered the road towards becoming an OER-based Open University with a special niche for MOOCs. It seems fair to say that NOUN is the first OU in the world implementing such an 'all-inclusive' strategy and profile. It presented its first 40 OER-ized courses and its first 3 courses proposed to be MOOC-ified, as well as a new portal housing the courses and connected services (NOUN OER Portal). Moreover, it was announced that NOUN has become the first OpenupEd's associate partner from Africa and Asia (OpenupEd, 2015).

A very important specific target group for the NOUN MOOCs is to be found among the large group of young people who have completed secondary school but are unable to gain access to a university in Nigeria, as shown in figure 1.
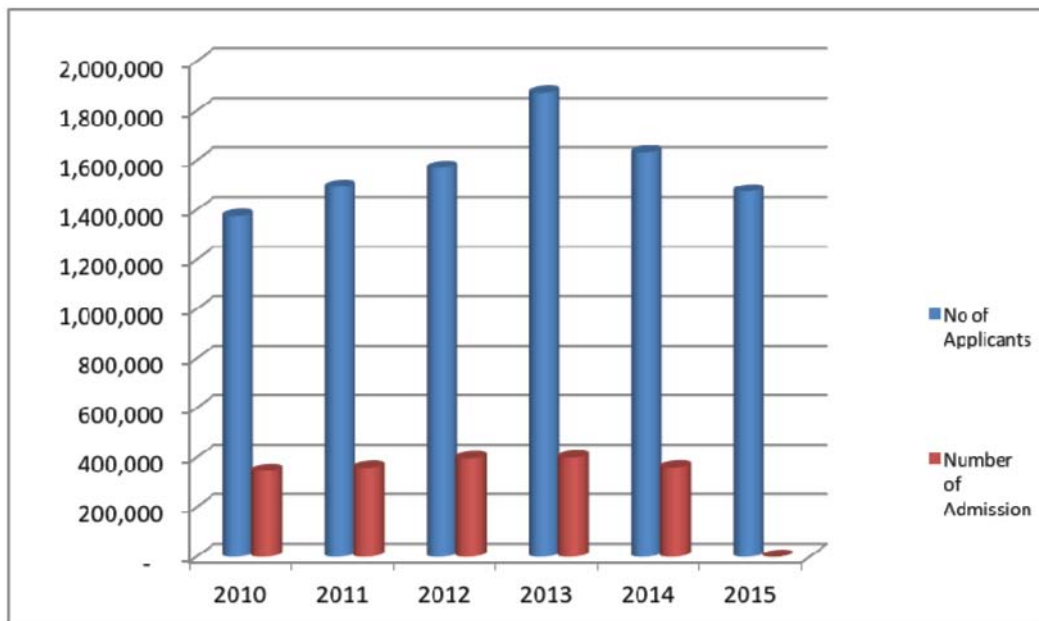
Figure 1: University applicants and admission statistics (JAMB 2010–2015)
Retrieved from http://jamb.org.ng/ (2015)

Statistics show that every year from the approximately 1.4 million qualified young Nigerians who pass the mandatory Joint Admission and Matriculation Board Exam (JAMB), not more than 400.000 can be placed at a Nigerian university. Imagine the frustration and feelings of unfairness among such a vast group of unplaced students who have to wait a whole year for a second chance to be admitted with no certainty at all. In fact, the accumulation of potential students who are not admitted year over year due to this process makes it even worse and therefore is giving ground to a serious societal problem. MOOCs could alleviate this to a certain extent since they offer this large group of non-admitted potential students an opportunity to use their idle time to update their knowledge and skills on relevant subjects. Two of the first NOUN MOOCs (*History and Philosophy of Science*, and *Information Literacy and Study Skills*) can serve well in this respect, and clearly future MOOCs for this specific target group will be developed and provided only if they are highly relevant to the group. As a consequence, part of this group of MOOC participants will, depending on their learning experience, enrol in regular NOUN educational programs. NOUN, growing towards becoming a mega-university, is relatively well equipped to accommodate such large groups of students which overall also is a service to Nigerian society.

A recent OECD report (Orr, Rimini & van Damme, 2015) emphasizes the role of OER as a catalyst for innovation but also identifies the contribution of OER to various key educational challenges. From the executive summary we quote: "The challenges concern teaching and learning, cost containment, the distribution of high-quality educational resources and reducing the barriers to learning opportunities, which together can improve the quality and accessibility of teaching and learning provision". This points exactly to where NOUN sees great potential benefits of OER and OER-based MOOCs, namely in widening access to and in raising quality of higher education in Nigeria. Nigerian academics should embrace OER when composing and compiling their courses and as a consequence they can collectively improve the quality of university education. University leadership is needed to encourage staff to generously share (that is give and take), thereby contributing to the Nigerian educational ecosystem.

NOUN's step-by-step initial stages of implementation

For the implementation of NOUN's OER strategy in August 2014, a new unit was created that reports directly to the Vice Chancellor. The NOUN-OER Unit currently houses three professional staff members, the head of unit, an instructional designer and an IT specialist, and is supported by a few external experts. The main task of the unit is to encourage integration of OER in all levels of teaching and learning of NOUN, addressing the academics in the schools as well as the staff of the departments responsible for instructional design, course publishing, library support, and IT. The OER unit has operated from August 2014 through three stages: sensitization, instrumentation and dissemination.

In September 2014 and February 2015, sensitization workshops were organized in which the concept of OER was explained and discussed. This included worldwide developments on OER and new forms of open education, worldwide standardized licenses like Creative Commons, (im)proper re-use, raising quality by sharing and re-use, etcetera. The workshops effectively generated deeper knowledge about OER among NOUN staff and tackled apparent misconceptions.

In July 2015 and November 2015, design workshops were organized in which concrete action plans were made for the adaptation of existing courses to OER, all to be published with a Creative Commons open licence (CC BY-SA 4.0). Tools were introduced for the delivery of self-print and mobile-ready versions of courses. The structuring and formatting of courses was considered, as well as proper re-use of and attribution to external resources and literature. Finally, the creation of podcasts was explored, and the navigation through instructional icons in the interactive versions for mobile devices. For students and academics, the published OER-based courses and MOOCs are shared in a dedicated repository (NOUN OER Portal: http://oer.nou.edu.ng/). Figure 2 gives an impression of the course materials of a MOOC downloaded as an electronic book on a smartphone.
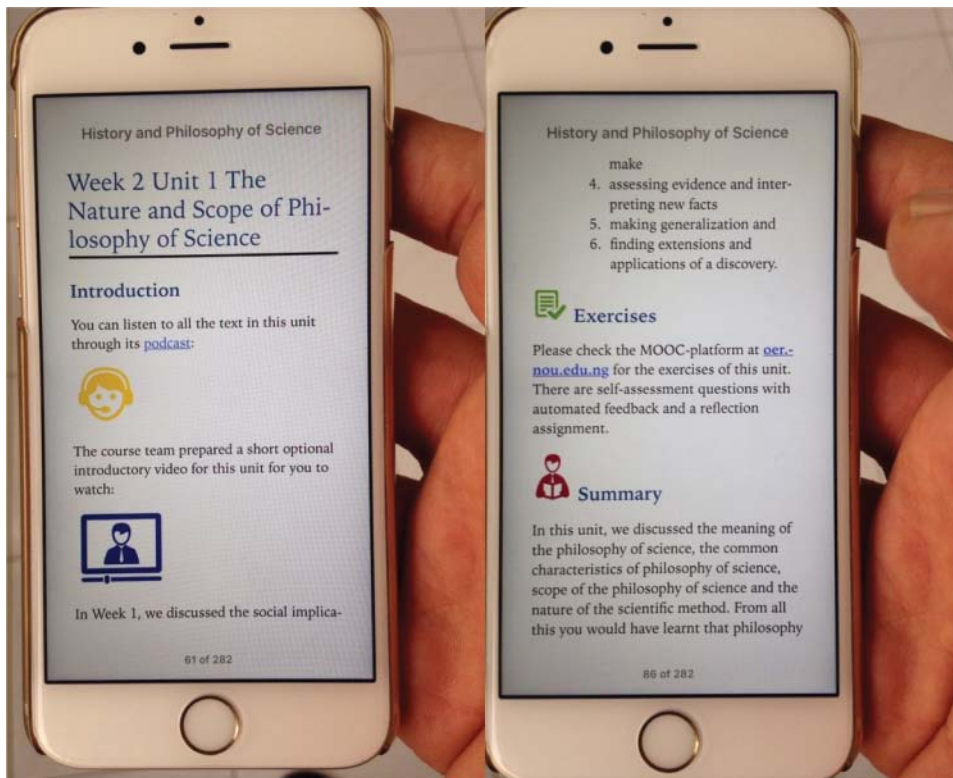
Figure 2: Snapshot of course material downloaded as an electronic book on a smartphone

The step-by-step creation of OER versions of course materials, to be published as regular courses or as MOOCs, is summarized in Table 1.

Table 1: Step-by-step creation of OER versions of course materials

Step	Description
Scan and OCR	Older courses that are only available in print are scanned, and Word versions are created using Optical Character Recognition
Apply template	A dedicated template is applied for self-print in PDF and use as an electronic book in ePub format for mobile phones and tablets
Check references and proper re-use	References and proper re-use are checked; when non-OER material is found, this is to be replaced by the academics
Create metadata	Metadata, including the CC BY-SA 4.0 license, are associated to make the course easy to find in repositories and with metadata crawlers
Recreate tables	Tables are recreated to fit small screens of smartphones and tablets
Recreate images	Images are recreated as needed depending on quality and resolution
Utilize navigation icons	Icons and hyperlinks are added for navigation in the document
Check the content	The course team checks the final version of the course content before publication
Convert to ODT	The Word files are converted to Open Document Text for re-use by other academics

Step	Description
Convert to PDF	The Word files are converted to Portable Document Format for self-print by students
Convert to ePub	The Word files are converted to electronic book in the ePub 3 format and checked for navigation and hyperlinks using different types of smartphones and tablets
Create podcasts	For some courses an audio mode is created through podcasts, using restructured versions of the original course and text-to-speech software linked to the ePub and PDF versions as an MP3 file
Publish the OER-based course on the portal	Course modules are published in their editable format (ODT), printable format (PDF) and mobile format (ePub) on the portal; the original Word files and images are kept for internal use at NOUN

Further …

The December 2015 launching Seminar marked the beginning of the dissemination to other universities, training institutes, quality agencies, interested individuals, and the Ministry of Education, thereby promoting the re-use of NOUN's OER-based courses and MOOCs in Nigeria and—why not?—beyond. The NOUN-OER Unit is dedicated to serve this development, sharing its newly built expertise through workshops and presentations, by giving support and advice, and by composing and providing a handbook with guidelines. NOUN is prepared to collaborate with institutions and organizations in OER-related activities leading to further innovations in online Higher Education in Nigeria and in a broader international context.

NOUN's OER strategy effectively requires the publication of all new and revised courses as OER. So the production of OER and MOOCs is becoming a regular operation for many more academics, instructional designers, librarians and IT specialists. All these staff are to be trained and advised by the NOUN-OER Unit. In the production of the OER-based courses a specific template will be provided in order to professionally print books as a whole or in part to be made available on a needs-basis to the students in the study centres.

NOUN has become involved in the Global OER Graduate Network (GO-GN 2013–2016) which connects PhD researchers and their supervisors from different parts of the world in the area of OER, MOOCs and Opening up Education. GO-GN was initiated by the Dutch OER UNESCO Chair in 2013 and now encompasses more than 35 PhD researchers, one of them being from NOUN. In 2016 NOUN will increase its volume of PhD research, in order to better underpin, monitor, and evaluate its activities.

NOUN's OER agenda is very ambitious. By the end of 2017, 50% of NOUN's complete course base should have been made available as OER and about 20 MOOCs should have been developed on the most pressing learning needs in Nigeria. And indeed the distinct invitation to other Nigerian universities to partner with NOUN in OER can further accelerate the development of OER in the country.

Conclusion

Since 2002, with the conception of the term OER, UNESCO has been an active and strong global player in the OER movement through its persistent and influential advocacy for OER. A decade later this was marked at the World OER Congress in Paris, organized by UNESCO in collaboration

with the Commonwealth of Learning, with the 2012 Paris OER Declaration (UNESCO/COL, 2012). In the follow-up of this declaration, UNESCO has operated an OER program of which one of the action lines was to reach out with OER (and OER-based MOOCs) to the Global South. This initiative included the organization of the two 2014 Executive Workshops for the leadership of the African and the Asian OUs as previously mentioned. NOUN's strong interest and determination quickly led to a dedicated track with intensive UNESCO involvement and guidance, and with expert support from the Dutch OER UNESCO Chair team.

Meanwhile NOUN is growing into a real OER-based Open University, providing great benefits for many learners, in particular in Nigeria, and for Nigerian society at large. This may indicate a fruitful and manageable route towards mainstreaming OER in Higher Education. And in combining the best of two Open Worlds NOUN will hopefully be considered as an inspiring and promising exemplar for its colleague OUs around the globe.

Acknowledgments

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Creating Open Textbooks: a unique partnership between Oregon State University Libraries and Press and Open Oregon State

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Abstract

This article presents Oregon State University's experience launching an innovative Open Textbook initiative in spring 2014. The partners, Open Oregon State and the Oregon State University Libraries and Press, aimed to reduce the cost of course materials for students while ensuring the content created was peer-reviewed and employed multimedia capabilities. This initiative sought to showcase existing and emerging disciplinary strengths of the University thus creating unique course content that could be shared globally. This article briefly describes the U.S. landscape for open textbook creation and adoption. It demonstrates how this unique partnership has developed, covering barriers and benefits, and what the future could hold for new projects.

Key Words: Open textbooks, University Press, Publishing Partnership

Introduction

Open education "encompasses resources, tools, and practices that are free of legal, financial and technical barriers and can be fully used, shared and adapted in the digital environment" (Scholarly Publishing and Academic Resources Coalition, 2015). Open educational resources may include textbooks, DVDs/videos, software, journals, audio recordings, collections of digital objects, and other types of course materials. Typically such resources are licensed for free sharing or adaptation or in the public domain, for example, digitized holdings from libraries or museums. Open textbooks are an important component of the open education movement in large part because they offer an alternative to high cost textbooks and allow professors to customize the content. Most often the format for open textbooks is digital. The digital format supports the expanding growth of distance education or learning where students are not physically located on campus as well as hybrid or blended education for courses that are offered on campus and from a distance.

   In the spring of 2014, Open Oregon State launched an innovative partnership with Oregon State University (OSU) Libraries and Press to create an Open Textbook initiative. Open Oregon State collaborates with OSU's world-class faculty and OSU Extension professionals to develop online educational resources. It is a part of the Division of University Outreach and Engagement and falls under the umbrella of Extended Campus. OSU's Extended Campus is regularly ranked among the top ten U.S. online education programs. Oregon State University Libraries and Press represent the second largest research library in the state of Oregon and the longest running university press. There are eight units within OSU Libraries and Press. Established in 1961, OSU Press has been reporting to the Library since 2007 as a distinct unit. It is one of 20 presses among more than 130 members of the Association of American University Presses that reports to the university library in some capacity.

The pilot partnership sought to address the impact that rising costs of textbooks has had on OSU students and students across the national landscape. On average U.S. college students can expect to spend $1,200 per year on textbooks and supplies (College Board, 2013, p. 11). An updated survey conducted in 2014 by the United States Public Interest Research Group found that 65% of students choose not to buy a textbook because of the price (Senack, 2014). As a result, students are avoiding buying textbooks, even with the awareness that their grades and learning may be compromised. Information from OSU's on-campus food pantry, which supports students experiencing poverty and food insecurity, shows that visitation rates rise directly after the time when students must purchase textbook along with paying their living expenses (typically all due at the start of a term) (Cady, 2016).

While some Open Textbook publishers such as Rice University's OpenStax are attempting to address the issue by creating open texts in those high-enrollment, lower-division lecture hall courses, we proposed to do so by highlighting those subject areas where Oregon State University has a reputation—horticulture, animal sciences and geosciences—and where they may relate to publishing strengths of OSU Press. The Press' publishing niche is Oregon and the Pacific Northwest with a strong focus on natural resources and the landscape as well as environmental, cultural, social, literary, and historical aspects of the region.

The landscape of U.S. Open Textbook Publishing

The movement to create and adopt Open Textbooks has gained considerable momentum in the United States, leading to federal and state legislative efforts to reduce the overall costs of higher education. Notable Open Textbook efforts have included:

- Open SUNY Textbooks—a pilot initiative established by State University of New York (SUNY) libraries. Open SUNY engages faculty in the SUNY system to create and peer review textbooks that are then produced via the libraries' publishing services and infrastructure.
- Florida's Orange Grove Texts Plus—a three-year initiative that sought to create a sustainable model for Florida and other U.S. states to discover, produce, and disseminate open textbooks. This three-year initiative was funded by a federal grant from the Fund for the Improvement of Postsecondary Education (FIPSE).
- Rice University's Open Stax (Texas)—a program that develops free, peer-reviewed textbooks to improve students' Access to readable, accurate, and high-quality course material.
- Kansas State University Libraries' Open/Alternative Textbook initiative—this ongoing initiative encourages faculty through a generous stipend to adopt or develop open textbooks that reduce textbook costs while improving student learning. Funds from student government with some support from the Libraries covered costs for the first two years.
- Additional projects are showcased by SPARC (the Scholarly Publishing and Academic Resources Coalition) at http://sparcopen.org/our-work/list-of-oer-policies-projects/

Academic libraries have certainly been at the forefront of these initiatives, partnering with university presses, other departments and units at their home institutions. Most of these initiatives have been funded on grants, gifts or other one-time monies but increasingly institutions are identifying ways to make these efforts sustainable, for example, by advocating for targeted programming money allocated from state government for the purpose of making higher education more affordable. OSU has committed positions to the creation of open educational resources specifically within Open Oregon State. OSU Libraries will consider its options and priorities as new FTE is available though

like many academic and research libraries, its digital publishing services is already dedicating support services related to creating and hosting open educational resources.

Several U.S. state governments have passed legislation supporting the adoption as well as the creation of open educational resources (Scholarly Publishing and Academic Resources Coalition, 2016). California passed two bills, SB 1052 and SB 1053, in 2012 to create a library of 50 open textbooks. In Washington, the State Board for Community and Technical Colleges launched the Open Course Library, aimed at providing high-quality and low cost course materials for the system's 81 highest-enrolled courses. The State of Georgia allocated funding for the University System in FY 2015 and 2016 to provide grant-supported opportunities for faculty, libraries, and institutions to adopt or create lower cost options through the transformation of textbooks and other learning materials. In 2015, the Oregon legislature passed the House Bill 2871, providing "legislative investment in the area of textbook affordability, with a specific focus on the development of Open Educational Resources (OERs)" (Higher Education Coordinating Commission, 2015).

Within U.S. higher education, community colleges and technical institutes have undertaken the most initiatives to change the landscape for the creation and adoption of open textbooks and other educational resources. These efforts are supported at the state and federal level and have expanded to proposed legislation such as the America's College Promise Act that would make community college free for low-income students. President Barack Obama characterized the aim of this legislation, stating: "Every American, whether they're young or just young at heart, should be able to earn the skills and education necessary to compete and win in the 21st century economy" (The White House, 2015).

Oregon State University Open Textbook Initiative

President Barack Obama's comments could easily describe the premise of arguments behind the establishment of land-grant universities in the United States in the 19th century. A land-grant university is a U.S. institution of higher education designated by a state to receive the benefits of the Morrill Acts of 1862 and 1890 (Committee on the Future of the Colleges of Agriculture in the Land Grant System, 1995, p. 1). A land grant university has a federal mandate to conduct instruction in agricultural and mechanical subject areas and conduct agricultural research; to deliver this practical knowledge to both farmers and the general public; and to extend access to education for all citizens regardless of social or economic status. Oregon State University is a land grant institution, having been established in 1868.

This land grant mission is at the foundation of the Oregon State University Open Textbook Initiative to reduce the costs of course materials for OSU students. The three major strategic goals for OSU have also influenced the direction of the partnership:

1. Provide a transformative educational experience for all learners;
2. Demonstrate leadership in research, scholarship and creativity while enhancing preeminence in the three signature areas of distinction: Advancing the Science of Sustainable Earth Ecosystems, Improving Human Health and Wellness and Promoting Economic Growth and Social Progress and
3. Strengthen impact and reach throughout Oregon and beyond (Oregon State University, 2014).

These goals provided a strong motivation for influencing the way in which the partnership chose to create and deliver course content. The strengths of the partnership and its specific aims also demonstrate what makes the partnership unique. The initiative combines the project management resources and services devoted to digital preservation within OSU Libraries, the book production

(peer review, editing, design, marketing) expertise of OSU Press, and the technological development skills of the Open Oregon State unit.

The major aims of the initiative were to reduce students' cost for course materials, exploit multimedia capability, and create content that fit the University's signature areas of emphasis. As a result, our partnership issued a call for proposals in mid-June 2013. We sought proposals from OSU faculty to develop open textbooks for multiple, high-enrollment undergraduate courses that would make use of extensive, original multi-media content. Preference was given to proposals in natural resources, geosciences, forestry, marine biology, agricultural sciences, and environmental sciences, especially since these aligned closely with the Press' publishing strengths. The project also sought to make the books available in four interactive formats—HTML, PDF, iBooks and ePub—thereby increasing the chances of course adoption on campus and from outside OSU. While it remains true that students' preference for digital textbooks over print textbooks is just beginning to increase, providing a choice in formats will allow students to use the device of their choice (Shepperd, Grace & Koch, 2008; deNoyelles, Raible & Seilhamer, 2015). There are approximately 20 formats for publishing ebooks as well as several types of available readers (Library of Congress, 2011). These are in addition to laptops or tablets, often the preferred devices for college students (deNoyelles et al., 2015). Not focusing on one format takes advantage of formats that are usable across several types of devices rather than being exclusive to a specific reader (i.e., AZW, the custom format for Kindle readers). Additionally, not all ebook formats support interactive features that were an important feature planned for OSU's textbooks.

As another condition, completed textbooks needed to be issued with Creative Commons (CC) licenses, CC-BY-NC recommended. This CC license allows others to build upon the content non-commercially while providing appropriate attribution to the original work of the OSU faculty authors. Furthermore, a PDF version of the textbook would be deposited in ScholarsArchive@OSU, the University's institutional repository that is managed by the Libraries' Center for Digital Scholarship and Services.

While seeking proposals, the project team also began work on a prototype to gain insight into possible production, design, and format issues. We selected an existing work, *Living With Earthquakes in the Pacific Northwest* by Robert S. Yeats. This work was originally published by OSU Press in 1998 and has been used widely in college courses throughout the Northwest. However, the author and the Press agreed to publish the book with an open license. Working with the author, the Open Oregon State unit updated the manuscript to include feature video clips of earthquakes where still photos once resided. They animated graphs and illustrations and replaced line drawings with animated pictures depicting the movement of tectonic plates. Also, the author and the Press agreed to publish the book with an open license. This work and our planned textbooks feature interactive content because the planning group perceived that students would perform better and comprehend more if they were provided interesting and enjoyable features rather than just text. Some studies show there is no significant difference in course performance for those students reading a print textbook vs. reading a digital textbook (Taylor, 2011; Shepperd et al., 2008). However, other studies show that online textbooks and course materials with interactive content have the potential to enhance learning (Smith, 2013). Especially when they are carefully designed and well organized so as to engage and inspire students. It is clear that more research and assessment needs to be conducted in this area.

The group's collaboration in creating the prototype (http://openoregonstate.pressbooks.pub/earthquakes/) yielded multiple beneficial outcomes:

1. Experience creating interactive content from an existing text;

2. Knowledge about creating different formats of an electronic textbook (i.e., html, ePub);
3. Evidence for participating authors that the partnership could yield a valuable resource transcending a print format.
4. Improved understanding of workflow issues and experience developing and gaining workflow efficiencies;
5. Improved communication between OSU Press and Open Oregon State staff to identify and solidify roles;
6. Increased communication with the author to understand their needs and aspirations for the textbook product.

Since its launch, the Yeats' prototype has been updated several times. The process for creating the prototype textbook has worked and has emphasized the importance of flexible approaches and planning. *Living with Earthquakes* has been adopted by *Geosciences 380*, an upper level course at Oregon State University, and in 2016, a group of faculty at Portland Community College began creating companion materials on plate tectonics and volcanoes.

Successful open textbook publishing relies on faculty participation. Our project deployed or implied multiple incentives to engage faculty in participating. These incentives match incentives used by other U.S. open textbook programs. They also addressed some of the misconceptions that faculty authors have about the creation and use of open textbooks. Successful authors could expect to be compensated up to $15,000 to produce their manuscript. On average our authors received $5,000. Such monetary incentives simulate 'buying' a professor's time for overload teaching or teaching outside her or his principal department. They recognize the substantial work involved in writing a textbook, especially when authoring a textbook may not be recognized as having as much impact for promotion and tenure purposes as other professorial activities. Some interested faculty questioned why authors would want to relinquish potential royalties. Offering upfront monetary incentives compensated for this loss somewhat. The option to offer print on demand versions also promised the production of some royalties, albeit likely in small amounts.

Each partner in the project provides unique strengths and thus they assumed specific responsibilities that capitalized on those strengths. Projects were not acquired via the normal acquisition path of the Press. However, OSU Press' inclusion in the project ensured that the materials created would be of high quality—peer reviewed and vetted through a rigorous editing process. The Press coordinates the peer-reviewing and editing process and is able to take advantage of its existing network of reviewers and editors to identify areas of improvement for each manuscript. Often the author is already working with the highly skilled technicians within Open Oregon State while writing the manuscript to develop interactive elements that highlight, expand, or explain the textbook's narrative. After the manuscript and the interactive elements are completed, the manuscript is reviewed again. Open Oregon State facilitate the creation of the necessary e-book versions while OSU Press assumes responsibility for ensuring a textbook is available for print on demand through several POD vendors. Because of the Libraries experience managing digital collections and institutional repositories, it is well positioned to develop and implement strategies to facilitate adoption of the textbooks through placement in national and global open educational resource (OER) repositories. The Libraries are also responsible for hosting and preserving a version of record in the University's institutional repository, ScholarsArchive@OSU although the multiple versions of each book are also available via the Open Oregon and OSU Press websites. ScholarsArchive provides universal access to the resource so that anyone across the globe with a web browser and an Internet connection can freely read the textbook. The Libraries are also responsable for enhancing discoverability and thus adoption. The full text of the work as well as its metadata is searchable

through Google, Google Scholar, other large search engines and library search tools. All three partners have communications and marketing personnel to promote the textbooks broadly. The marketing departments of the Press and Extended Campus have connections to the University's marketing division which regularly distributes press releases to hundreds of news organizations and outlets.

This new partnership also provided benefits for the various partners, not the least of these being greater understanding of each other's mission, operations, and personnel. For OSU Press, the partnership yielded the opportunity to become more engaged directly with campus programs that benefit students as opposed to being a stand-alone publishing unit with looser connections to OSU's mission and strategic initiatives. Some of the implied incentives for authors included greater visibility for faculty authors and their work through adoption outside the University. For example, ScholarsARchive@OSU is regularly ranked by Webometrics among the top twenty single institution digital repositories in the United States.The Webometrics ranking is produced by the Cybermetrics Lab of the Spanish National Research Council (CSIC) located in Madrid and is based on indicators such as the number, visibility and impact of repository holdings. Faculty who participate in the program would also be perceived as open access proponents on campus, a factor that might draw some students toward enrollment in a course. We also emphasized the advantages of 1) developing textbook content as modules so to improve shareability with other courses; 2) using multimedia elements to enhance a student's experience with content and perhaps improve learning outcomes.

As result of the RFP (Request for Proposals), several different projects were chosen by the planning committee and outlined for possible books. We received nine proposals and four were selected for funding. The four successful proposals covered animal nutrition, biochemistry, biocomputing and ecological management. At present, collaboration between the authors and the Open Oregon State unit is ongoing as the faculty authors research and compose their text while developing interactive multimedia content with Open Oregon personnel.

Future directions

Phase two of the open textbook initiative has already been launched. In this phase, OSU faculty have been solicited to submit "publication ready" manuscripts that could be used in OSU courses. These "pub-ready" book projects are projects in need of a publishing platform and distribution assistance and they will likely be published under a separate OSULP/Open Oregon State imprint; the OSU Press will serve as a consultant rather than the publisher. This change acknowledges that creating a textbook from scratch, while valuable, is also an enormous commitment of time and resources from all involved, particularly the author. It also makes it possible for the project to gather and distribute more content, especially content that faculty had already been using in their courses. With the Press in the role as consultant, the Libraries will assume responsibility for coordinating peer reviewing and editing most likely by outsourcing these services. A third phase is forthcoming and this phase will focus on soliciting proposals from departments and programs not just individual faculty members and the proposal will be to adopt or to create open textbooks. The call for proposals will still emphasize replacing high cost textbooks used in high enrollment courses.

As stated earlier, in 2015, the Oregon legislature provided support for the development of OERs by investing $700,000 in textbook affordability. A portion of these funds will be used to hire a resource specialist working within the state's Higher Education Coordinating Commission (HEEC). OER advocates across Oregon higher education institutions, like those behind the OSU Open Textbook Initiative, expect to be able to apply for grants for OER adoption or development that are sourced

from the remaining funds as part of HEEC's OER Grant Program. Even before the passage of this legislation, representatives from across higher education were discussing ways to collaborate on open textbook projects to reduce duplication of effort by developing resources that could be used for various courses across multiple institutions.

Also on the horizon is Oregon State University's participation in Unizin. Unizin is a digital learning consortium that makes use of cloud-based services to support digital learning offerings of its 11 members, including the entire State University System of Florida. A significant feature under development for Unizin members is a content relay system, basically a search engine, that would allow faculty from member institutions to more easily discover and enable access to learning objects and educational resources such as available open textbooks. This level of collaboration opens the possibility for leveraging resources across the Unizin members to enable coordinated or intentional adoption, reuse, and creation of open textbooks.

Acknowledgements

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Atolls, Islands, and Archipelagos: The California OER Council and the New Landscape for Open Education in California

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Abstract

California's three public higher education systems (University of California, California State University, the California Community College System) enroll nearly 3 million undergraduate students and employ almost 100 thousand faculty. In 2012, the California State Legislature directed the three systems to create an online library of open educational resources to encourage the use of free or affordable textbooks and other materials throughout California's public higher education system. Composed of faculty representatives from each of the three systems, the California Open Educational Resources Council (CAOERC) was formed and charged in January, 2014, with collecting, peer-reviewing, helping to curate, publicizing, and cultivating the adoption of these open educational resources. As we end the first phase of this massive effort, our paper will: 1) outline what we've learned about scale and collaboration among California's three distinct higher education systems; 2) present the results of CAOERC's ongoing research (via surveys and focus groups) about open textbook use and adoption; 3) briefly discuss issues of OER sustainability in the context of cooperation among state, university, and non-profit sectors.

Key words: OER, sustainability, OER research, California, university, open textbooks

Introduction

California public higher education's three systems—or segments—enroll nearly 3 million undergraduate students and employ almost 100,000 faculty. Together, the University of California (UC), the California State University (CSU), and the California Community College (CCC) systems span 140 campuses and account for a total budget of $40 billion dollars. Nationally, California public higher education is roughly double the size—in terms of student enrollment—of its closest peers in Texas, Florida, and New York. California's community colleges account for one in five of all U.S. community college students (California Community Colleges Chancellor's Office, 2015). In broader terms, California's undergraduate student body is twice as large as that of our neighbor, Canada (Universities Canada, n.d.), a third larger than France's tertiary education sector and comparable to the total student enrollment in all German universities (Eurostat, n.d.). Together, the three California segments conferred 322,000 undergraduate degrees and certificates in 2013–14. In addition to sheer size, public universities and colleges in California represent one of the most diverse—racially, ethnically, and economically—student bodies in the nation: Latinos account for one-third of CSU's undergraduates, while the state's community colleges harbor an even more diverse, predominantly working-class student body (Bay Area Council Economic Institute, n.d.). Over the past half-century, the growth and development of public higher education in California has outstripped even the lofty ambitions enshrined in the state's Master Plan for Higher Education, crafted and signed into law in 1960.

Lately, however, California public higher education has experienced significant strain. State budget shortfalls caused by the latest recession exacerbated a deeper, secular trend of underfunding and plunged California's tertiary system into its worst financial crisis since the Great Depression. In

2011–12, the state cut a fifth of the CSU budget ($650 million), and the UC system lost $750 million in state funding (California State University, n.d.). "I'd be lying," declared Timothy White, then chancellor of UC Riverside and soon to become chancellor of the entire CSU system, "if I said what we offer students hasn't been changed and there hasn't been a degradation of the learning environment" (Medina, 2012). College and university administrators turned to tuition hikes to make up for cuts to state funding: over the ten-year period from 2004 to 2014, tuition rates at UC and CSU nearly doubled (Pickoff-White, 2014). As the state shifted higher education funding to students and their families, already struggling with recession-induced unemployment, growing debt, and an imploding housing market, the California public higher education system was rapidly swept into the "affordability crisis" that has come to define U.S. higher education over the past decade (Heller, 2014; Delta Cost Project, 2012).

This was the immediate context, then, for passage of California Senate Bills 1052 and SB1053 (Steinberg) in 2012, legislation that aimed to reduce the "skyrocket[ing]" costs of attending California's public colleges and universities through provision of open textbooks (California State Senate, 2012a, 2012b). SB 1052 established both the California Open Educational Resources Council (CAOERC)—composed of three faculty members from each of California's three higher education segments—and SB 1053 established the California Digital Open Source Library (COOL4ED), a statewide online repository for Open Educational Resources (OERs). The CAOERC was charged with locating, reviewing, and curating a collection of open textbooks for the 50 most highly-enrolled courses across the UC, CSU, and CCC systems. The Council's work was overseen by a joint committee of the academic senates of each system (ICAS). SB 1052 also dedicated $5 million to support the effort for three years. This budget was supplemented by grants (secured by the CSU administration) from the Hewlett and Gates foundations. The Council first met in January, 2013, and subsequently convened—in person or via the web—once every two weeks for the next three years.

A full documentary report of the Council's activities is publically available. As the report testifies, the enabling legislation and CAOERC's work represent a major step forward for the OER movement within California. Since 2013, the Council has: determined the 50 most highly-enrolled courses across the three systems, identified 160 open textbooks suitable for these courses, solicited more than 450 open textbook reviews based on a rigorous peer-review system, curated our collection, produced case studies, conducted surveys of OER awareness and use among CSU, CCC, and UC faculty and students, and launched other investigations into open textbook adoption and use. Based on our experience as members of CAOERC, this paper focuses on three areas of possible interest to others in the OER movement: scale and complexity; our preliminary findings on open textbook adoption and use; and, finally, sustainability. By exploring these issues, we hope to offer a map for similar, massive OER initiatives and to invite others to help us chart the next leg of our journey to contribute to a global open knowledge ecosystem.

Scale, complexity, and collaboration

Typically, terms like scale and "scalability" circumscribe thinking about size and growth to a relation between inputs and outputs. Borrowed from the world of software development, "scaling up" has become a term-of-art in contemporary business lingo, for instance, because it promises that incremental inputs will result in exponential, rather than linear, outputs (Fundable, 2014). Since its creation under the 1960 Master Plan, California public higher education has indeed educated students and produced degrees on a huge scale. At the same time, each of the three segments described by the Master Plan has developed particular, indigenous curricula, cultures, and faculty roles. In other words, the distance between inputs and outputs—the black box of

scalability—conceals a dense, rich world of institutional complexity. Despite the simpler, implicit logic of scale in SB 1052, where the investment of resources in an administrative structure like CAOERC produces massive OER adoption, one of the Council's first major tasks was to recognize, understand, and bridge the differences among three distinct higher educational systems.

At the curricular level, student transfer between the three systems, especially from community colleges to the four-year universities of CSU and UC, has been a fundamental principle of California public higher education. Responding to state legislation in 2006 and hoping to improve transfers among segments by articulating curricula, California community colleges began developing a C-ID [Course Identification Numbering System], a common numbering system to identify similar courses across the three systems. In its quest to find the 50 most highly-enrolled courses, the CAOERC quickly discovered that maps don't always match the territory. For example, accounting is widely taught in the CCC system and fairly common in the CSU, though often under different guises. However, accounting courses and curricula are largely absent within the UC system. Even where common courses could be identified across the three systems, particular classes may not roost in the same curricular location. A lower division music appreciation course in the CCC or UC might reside in the upper division requirements for music majors at the CSU. While these disjunctures complicated the mandates in the state legislation, they also complicated the selection and evaluation of appropriate open textbooks.

The Council also confronted different professional cultures spawned by the differing missions of the three systems. Faculty roles vary among the UC, CSU, and CCC, and the faculty workload mix of teaching and scholarly activity is segment-dependent. Teaching is the exclusive professional work at community colleges; scholarship is the primary professional distinction within the UC. In our experience, this familiar hierarchy between, to borrow Burton R. Clark's terms, "discipline-focused" and "institution-centered" professional identities (Clark, 1987), profoundly affects the "scalability" of OER: CCC and CSU faculty who define themselves primarily as "teachers" rather than "scholars" tend to be more engaged with OER. The complexities of academic labor generate further differences. As state funding has declined, all three systems have increasingly turned to contingent faculty (Lambert & Reese, 2015; Strope 2015; Asimov, 2011). Within the CCC and CSU systems, this means that much classroom teaching is now done by part-time or contractual faculty. Within the UC, the teaching of lower division courses depends on graduate student labor. In either case, looser and more variable ties between academic workforce and institutions challenge traditional routes of communication and coordination. Widespread OER adoption within California public higher education will require that we cultivate new networks of influence and dissemination adequate to the increasingly fragmented landscape of academic employment and professional identity.

Different governance structures pose another challenge to massive efforts like the CAOERC's. With 113 colleges distributed across 72 local districts, California's community college system is more decentralized than the CSU or UC. The role of a central administration appears to be stronger in the CSU than in either the UC or CCC. More centralized structures may facilitate easier outreach and communication, and this feature may explain CSU's role in securing outside grants to supplement state monies and its key role in administrative support for the Council. On the other hand, the decentralized and more autonomous governance structures found in the community college and UC systems may foster stronger institutional identities, making OER adoption and use a more valued mark of local distinction. Several California community colleges and districts, for instance, can boast distinctive and active OER initiatives that predate SB 1052 and the CAOERC. These include the OER Center for California sponsored by the Foothill-De Anza Community College District as well as robust campus OER programs at College of the Canyons, Santa Ana College, Foothill College and elsewhere (Foothill College, 2010). Different governance structures also shape the particular
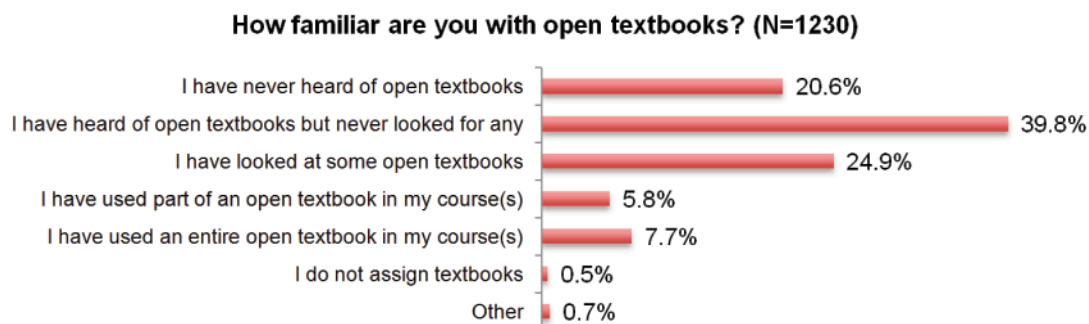
ways that each segment communicates internally, and these different pathways entail different ways of transmitting messages—in the form of surveys, solicitations for reviewers, outreach materials—from an intersegmental body like the CAOERC to local departments and faculty. This diversity has added an additional layer of careful, informed consultation with all stakeholders to the CAOERC's agenda for OER diffusion.

These are only a few examples of the complexities that have confronted our ambition to launch and scale up OER use within California public higher education. In a sense, locating and curating open textbooks has been a relatively smooth process. The differences among and within the three segments have however posed significant challenges—of communication, coordination, and participation. Much of the Council's primary time has been spent recognizing, understanding, and engaging with these differences. However, this experience underscores the importance of faculty or stakeholders as the drivers of massive OER efforts. Drawing on the institutional expertise and tacit knowledge of its nine faculty members, the Council drew and redrew maps of the variable network of people, policies, and local practices that connected inputs (legislation, money, and materials) to outputs (OER adoption). In addition, this experience has shifted the Council's thinking about OER, from a focus on production to a focus on consumption (or prosumption), from OER collection to OER community, and from OER as artifact to OER as process. Rather than accepting California's complex higher education landscape as a barrier, the Council now aims to leverage local cultures and communities to cultivate a statewide infrastructure of people, programs, and platforms for OER use.

Research and knowledge

The research projects that were pursued by the CAOERC seek to understand factors related to the adoption of open textbooks specific to the faculty and students of the state of California. These research activities included a survey on faculty awareness, perceptions, and willingness to use and create open educational resources, a series of focus groups with faculty and students principally aimed at understanding the impact of different media (electronic versus print) on the use of open textbooks, and a pilot project seeking to ascertain workload, performance, usability, and policy-related factors resulting from the adoption of open material in our universities.

1230 faculty members answered our survey, which was distributed among faculty across the 3 segments in a nonrandomized fashion. The participating faculty represented a wide variety of disciplines, from science, technology, engineering, and math (STEM disciplines) to liberal arts disciplines like the social sciences and the humanities. From the total number of responses, 20.6% of respondents had never heard of open textbooks, 64.7% had never been exposed to OERs, and only 13.5% had used an open textbook or parts of one (Figure 1).

How familiar are you with open textbooks? (N=1230)

I have never heard of open textbooks	20.6%
I have heard of open textbooks but never looked for any	39.8%
I have looked at some open textbooks	24.9%
I have used part of an open textbook in my course(s)	5.8%
I have used an entire open textbook in my course(s)	7.7%
I do not assign textbooks	0.5%
Other	0.7%

Figure 1: Familiarity with open textbooks

Figure 1 offers a cross-sectional snapshot describing the diffusion of open textbooks in California's higher education. Despite the large volume of open material available in repositories like MERLOT at the time of the survey, most of the respondents rely on instructional materials that are not open. About 60% of the faculty sampled has had no direct exposure to open textbooks, and their understanding of these resources is not shaped by direct experiences. Answers to this question also indicate that the remaining responses could be shaped by the information about open textbooks that was included in the survey itself.

The survey asked faculty about the impact of 9 different factors in the possible adoption of open textbooks for their courses (Figure 2). The most important factors among respondents were: academic quality, pertinence of the content to the objectives of the course, and currency of information; these factors are directly related to the open educational resources. Nonetheless, the amount of effort needed to find, review, and select open textbooks, was considered important or very important by 68% of the faculty. These types of faculty workload-related factors were explored further in the pilot program.
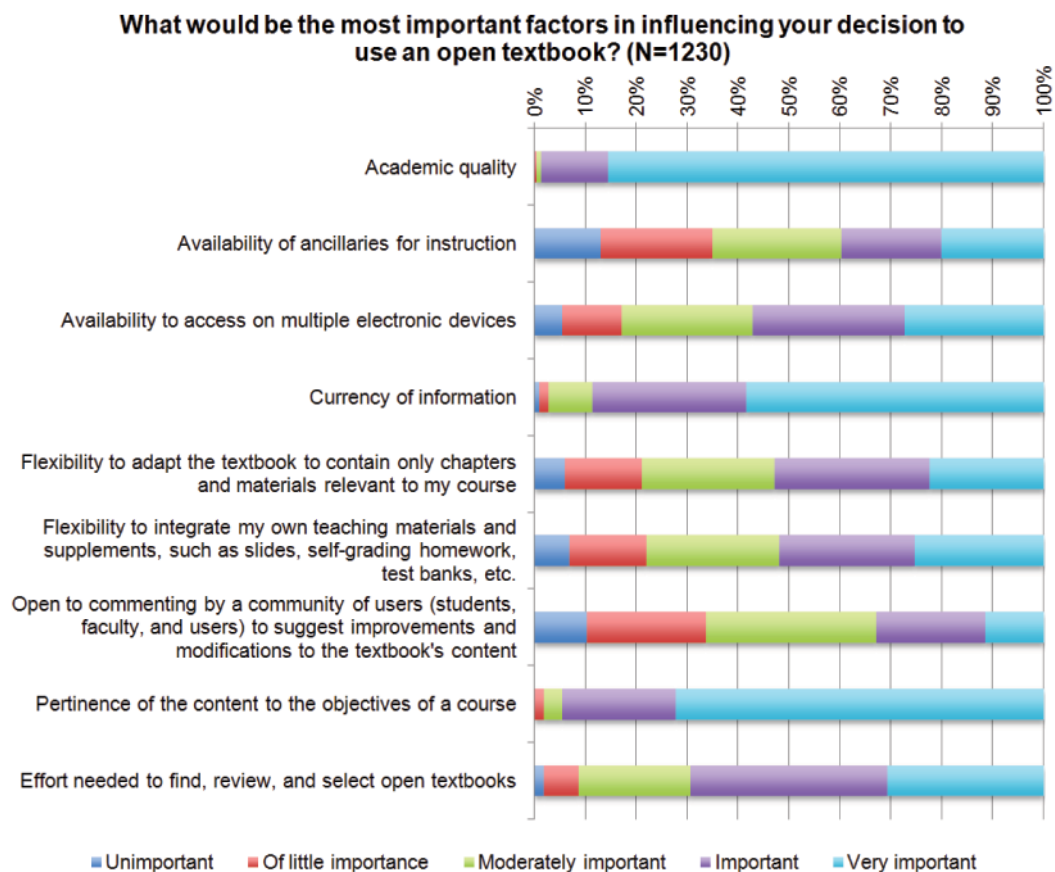
Figure 2: Factors for using open textbooks

Approximately, 58% of faculty surveyed indicated that the availability to access an open textbook on multiple electronic devices was important or very important. This specific factor, pertaining mostly to the experiencing of the digital content, is further explored in the focus groups research. Additionally, the survey asked faculty about their likelihood of adopting an open textbook, or parts of an open textbook, for their courses. Approximately 73% of the respondents stated that it was likely or very

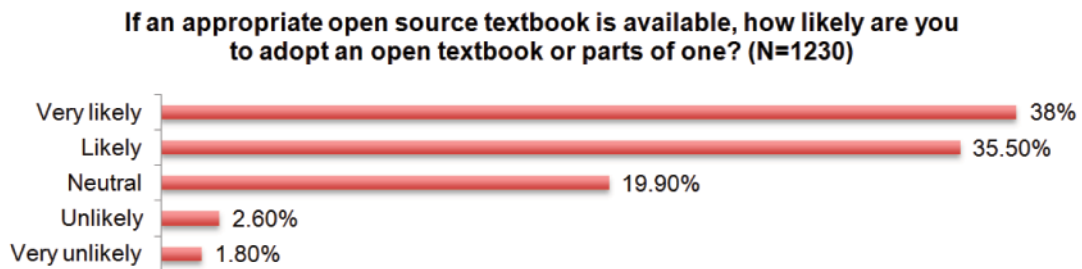likely (Figure 3). This datum contrasts the 64.7% of respondents who indicated a lack of direct exposure.

If an appropriate open source textbook is available, how likely are you to adopt an open textbook or parts of one? (N=1230)

Very likely	38%
Likely	35.50%
Neutral	19.90%
Unlikely	2.60%
Very unlikely	1.80%

Figure 3: Open textbook adoption likelihood

Considering that the faculty surveyed have not had exposure to OERs, the high likelihood of open textbook adoption could be explained by an awareness of the price inflation of commercial textbooks in the United States has had in the last 3 decades.[1] This rationale is supported by the next set of responses in the survey, which pertained to the factors that would influence faculty members to make self-created instructional materials open (Figure 4). Approximately 88% of the respondents indicated that a desire to reduce costs to students is important or very important as a main driver to making their publications open. 53.2% of the respondents stated that a negative impact to their universities bookstores, which normally offer commercial textbooks to students, is unimportant or of little importance.

Among the factors cited to make self-authored instructional material open, more than 75% of the faculty surveyed stated that support from the administration, the availability of technical support, and the assurance that the publication would be professionally edited were important or very important.
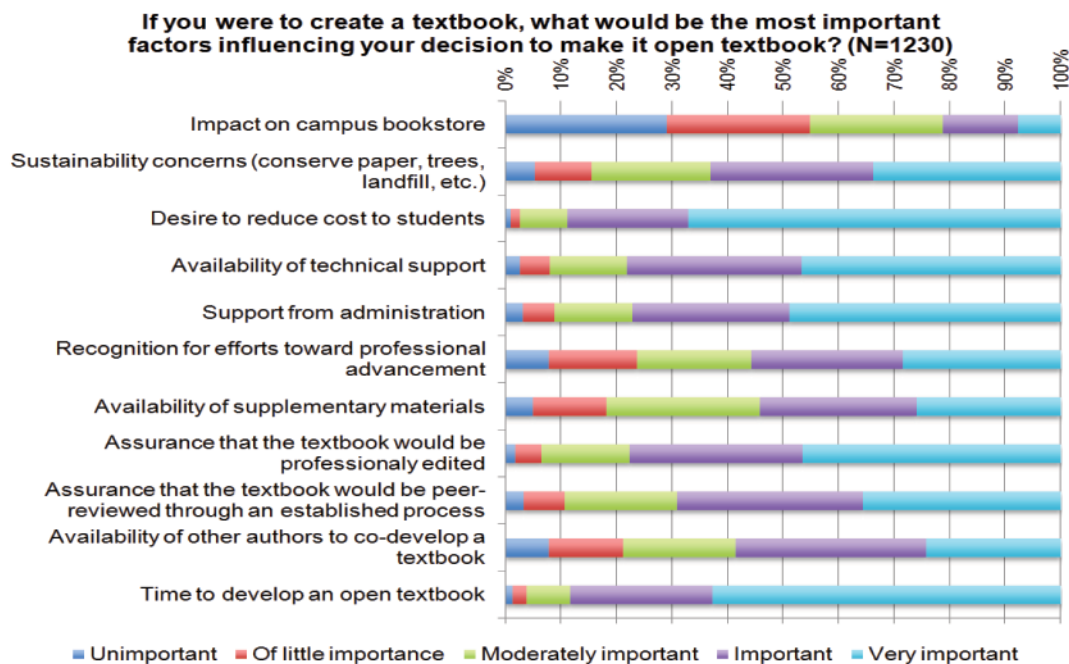
If you were to create a textbook, what would be the most important factors influencing your decision to make it open textbook? (N=1230)

- Unimportant
- Of little importance
- Moderately important
- Important
- Very important

Figure 4: Factors for creating open textbooks

Current OER movements around the world are fostered by the generalized use of computers and the Internet. A digital publication can be easily duplicated and distributed at mass scales at negligible costs. Nonetheless, the experiencing of instructional materials is different when these are in digital form than when they are in print form. A literature review of electronic books (ebooks) studies from 2006 to 2011 found differences between ebooks and print publications, stating that electronic books are mostly used as information databases since the medium is appropriate for finding "relevant information that will support an argument in a research paper" (Staiger, 2012). One of the major conclusions of this study is that the use of ebooks "seem[s] to entail the dissolution of the idea of book as a rhetorical unit [. . .] dematerializing the book and making its wholeness invisible and intangible". Ebooks were found to be inadequate for longer periods of time reading (fatigue due to eye-straining) and difficult to use due to navigational problems derived from a lack of physicality. In an electronic book study performed at the University of Kansas, more than 60% of faculty and students in STEM disciplines preferred print books to ebooks (Waters, Roach, Emde, McEathron & Russell, 2014). Some of the factors cited for this preference are the difficulty of reading from a screen, difficulty annotating and highlighting, and inability to flip pages or to download the digital publications. This study also found it more probable that participants read a whole book on a tablet device than on a laptop/desktop computer. While Staiger's literature review found that there were no significant differences in use among different disciplines, the University of Kansas study found differences in the use of electronic textbooks just among STEM disciplines. Another study (Daniel & Woody, 2012) found that students take longer times reading in electronic format than in print format.

The literature review regarding the use of ebooks for educational purposes indicates that while digital formats allow for endless duplication and distribution of educational resources, the digital format per se may not be appropriate for the processes of teaching and learning in all situations.

The focus groups that the Council conducted sought to verify if the literature review reflected the experiences of faculty and students in the three California higher education segments were having. Three focus groups were conducted: One with faculty experienced in the use of open educational resources, one with faculty without open educational resources experiences, and one with students. Our results reflect the findings in the literature review and can be divided into the 3 overall categories: 1) The role of digital media and information literacy in facilitating the use of electronic books, 2) the varied use of textbooks by different professors in different subjects, and 3) convenience factors and the permanency of digital publications.

We found evidence in the focus groups that open textbooks in electronic format are not as appropriate for deep reading, or reading for long periods of time, than print publications. There were stated differences between reading electronic books and using electronic books for studying purposes. Reading a book in a linear fashion is not the same as using a textbook in a non-linear fashion for the purpose of studying. Electronic textbooks provide means to annotate and highlight content just as print publications do. Nonetheless, the ways in which annotations and highlighting take place in digital publications, and the ways in which the annotations and highlighted text are retrieved later on, could vary significantly from one application to another. On the other hand, in the case of print books, writing and highlighting content happens in fairly standardized way. Our findings indicate that knowledge about how to operate an electronic reading application could facilitate and improve the use of digital publications. However, as Woody, Daniel and Baker (2010) found, previous use of electronic books is not necessarily correlated with a preference for this format. Differences in use were also reported when it comes to the repagination that takes place in electronic books when the size of the font is altered. For example, if a professor refers to a specific page in an electronic publication, this page would not be the same if students opted to alter the layout of the

content. As is stated by Muir & Hawes (2013) in "The case for e-Book literacy," our findings indicate that training faculty and students on how to appropriately use reading applications would improve their educational experiences.

The focus groups also provided evidence of the many different uses of textbooks in instructional environments; not only differences in use were mentioned based on discipline, as Waters et al. (2014) found, but also different uses of a textbook were based on instructors teaching styles. From our results, similarly to Staiger's (2012) findings, it appears that in the sciences the ability to search within a digital publication is more important than in other disciplines. In some instances, textbooks are used to retrieve very specific content rather than to gain in-depth knowledge. In regards to instructor-based differences, a textbook could be used as the main means to acquire content knowledge in a course, but it could also be used only for its end of chapter exercises. As previously noted, reading is different than studying from an electronic textbook. While reading is mostly a linear endeavor, studying is often a non-linear activity in which students flip back and forth quickly from one "page" or unit of content to another.

The focus groups also related that convenience factors were important for the use of electronic textbooks instead of print publications. For example, instead of carrying several physical books, it is possible to load them all onto a single electronic reading device. Also, without explaining why print textbooks were any different, the ability to access their ebooks 24/7 was mentioned as important convenience factor. Students however expressed frustration at not being able to keep a copy of the textbook they used in a course, which sometimes happened due to technological changes or a lack of access due to digital rights management.

The pilot project is still in progress and the conclusion of this third research effort is not available for publication yet. The pilot project was designed to provide insights specific to the adoption of open textbooks in California's universities and colleges. For example, even though the CAOERC conducted a rigorous peer evaluation of the publications in COOL4ED, their quality might still be verified once more by their actual successful implementation in a course. In student performance-related matters, it is necessary to understand not only how the use of textbooks takes place, but also if this use leads to the attainment of the same learning objectives. Furthermore, while changing a textbook for a course could be beneficial for students, it is a labor-intensive process for the instructor. The pilot project seeks to understand how difficult it is for instructors to implement open textbooks under their current workload. This would help to assess whether the implementation of OERs requires investments in faculty development programs. Along the same lines, the pilot project seeks to understand if individual campuses policies could interfere, or aid, in the implementation of OERs.

Sustainability

As the CAOERC approaches the sunset of its enabling legislation and funding, Council members have gradually confronted the "Field of Dreams" problem: now that we have created a repository of peer-reviewed open textbooks, garnered new knowledge about OER, and established rudimentary education and outreach programs, can California's OER effort thrive without direct State and foundation funding? As part of an initiative to increase the use of open textbooks, the CAOERC's benchmarks for OER sustainability include: maintaining the currency of our open textbook collection, ensuring the curricular and pedagogical relevance of open textbooks, and broadening faculty awareness of and participation in the OER process. The recognition of sustainability as a critical issue is widely shared across the OER movement, and the fate of previous episodes in the history

of open education (from the "Open Admissions" movement of the 60s and 70s to "learning objects" and MOOCs) warrants this concern.

A variety of models for OER sustainability have been proposed over the past decade, most notably by Stephen Downes (2007) and Dholakia, King and Baraniuk (2006). These models focus on funding the production side of OER, and the emerging gold standard for OER sustainability appears to be the "Wikipedia" or "community" model, in which OER users "fund" projects by donating materials, time, and money (Hylen, 2006; Friesen, 2009). These discussions are important because they underscore the difference between price and cost; open textbooks may be free to students and faculty, but behind every free textbook lays a frequently invisible economy of labor and resources (Jones, 2015). Additionally, even the "community" model may underestimate, for instance, the elaborate governance and technical structures underlying the simplest Wikipedia page and overestimate the autonomy of Wikipedia and other "crowdsourced" platforms from wider social and economic realities (Selwyn, 2014; Taylor 2014). In any case, while these various options may help to guide OER projects through the quandary of funding, they won't help us to avoid the "Field of Dreams" problem. If the "battle for open" has been won, as Martin Weller (2014) argues, it has largely been won in terms of producing OER; but if winning doesn't "feel like victory," to continue the tagline for Weller's recent monograph, this is because OER production is only half the battle.

To phrase this problem in one set of familiar OER terms: of the five R's (retain copyright, reuse, revise, remix, and redistribute) that define openness (Wiley, 2014), production-centered approaches to sustainability tend to focus on the provision of open-licensed artifacts (the first R) and defer the question of whether or how these artifacts are taken up in practice (the remaining R's). From our perspective, the critical issue in OER sustainability is now less about supplying open textbooks than about empowering faculty and students to use these artifacts in order to make and share new knowledge, adapt learning to local contexts, and produce "creative readers" (Emerson, 1837). This shift from artifacts to relations and from objects to uses was also, for instance, a persistent theme of OpenEd 2015 (Bali, 2015). ("I don't want to be part of a movement that is focused on replacing static, over-priced textbooks with static, free textbooks," as Robin DeRosa blogged from the conference (DeRosa, 2015).) And, it has become a major focus of the European Commission's recent OER efforts (ExplOERer, n.d.). There are many models for this exploitation of openness— including "edupunk" (Groom, 2008; Farrow, 2015), teacher as DJ (Clow, 2010) or "bricoleur" (Hanley, 2011), Mark Sample's "deformed humanities" (Sample, 2012), and others. Each of these entails different degrees of institutional and cultural change, ranging from new ways of thinking about teaching to rethinking textbooks as just "another service that the public expects" of higher education (Wiley, 2007), but each shares a focus on open-licensing as a protocol for integrating resources into educational practices. This dimension of sustainability, in other words, requires investing resources to build local communities of practice rather than just building and curating OER collections.

From our perspective, after three years of experience with a massive open textbook initiative, the sustainability of the Council's work depends on two fundamental shifts in thinking about the relation among OER materials, institutions, and resources. First, the enabling legislation behind the CAOERC envisioned an extremely compressed time frame of three years; however, like other deep educational changes, the authentic integration of OER materials and practices into curricula, courses, and classrooms will require a much longer period of time. Second, while the CAOERC's initial labors revolved around the provision of high-quality, accessible open textbooks, thanks to our experience we are now grappling with the question of how the value of OER results from *both* the provision of artifacts (like textbooks) *and* the nurture of an open education culture of people, practices, and values. Thus, as California's massive OER initiative moves into a new phase, these shifts are reflected in two new, primary projects: The creation of an OER Campus Ambassador program and

a new round of legislation (AB 798 Bonilla) that funds campus-based, faculty-driven OER initiatives. Both projects direct resources to the development of campus-based, faculty-driven OER activities; Campus Ambassadors will advocate, organize, and advise faculty in OER adoption, use, and re-use, while AB 798 Bonilla (California State Assembly, 2015) dedicates $3 million in state monies to fund campus-based, faculty-organized OER adoption programs. Both projects hope to address the sustainability issue by bolstering the more-neglected 4 R's (reuse, revise, remix, and redistribute), integrating openness into teaching and learning, and leveraging local cultures and communities to create a dispersed but statewide infrastructure of people, resources, and expertise.

Acknowledgment

Notes

[1]   While the price of goods and services doubled in 3 decades, the price of textbooks had a 6-fold price increase in the same period of time. http://www.bu.edu/today/2015/save-money-on-textbooks/

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OPEN PRAXIS

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Ten years of open practice: a reflection on the impact of OpenLearn

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Abstract

The Open University (OU) makes a proportion of all its taught modules available to the public via OpenLearn each year. This process involves the modification, of module excerpts, showcasing subject matter and teaching approach. This activity serves both the University's social and business missions through the delivery of free courses to the public, but increasingly its students are using it to inform module choice, to augment their studies and to boost confidence. In a year that celebrates 10 years of OpenLearn, this paper reports on the growth and impact of the platform as a vast open, learning resource and how a new study underlines how this is also serving the OU's own students in terms of supporting motivation for learning and impact on achievements. The paper also discusses how the OU is mainstreaming open practice via module production in releasing content on OpenLearn from its paid-for modules in order to improve student module choice and preparedness and in doing so, is providing a richer learning experience for informal learners.

Keywords: open educational practices, MOOCs, open educational resources, OER, informal learning, OpenLearn

Introduction

The Open University (OU) has been providing free learning via its OpenLearn platform (http://www.open.edu/openlearn) since 2006. Originally supported by a grant from the William and Flora Hewlett Foundation, the platform is now key to the success of the University's ongoing strategy of Informal to Formal Learning and hosts over 800 free online courses developed from excerpts of its paid-for modules, issued openly with a Creative Commons licence. With around five million learners visiting the platform each year, 150,000 of which are the University's own students, it has come to represent a potentially rich seam of data for anyone interested in the motivations, demographics and successes or otherwise, of non-formal learners.

OpenLearn also serves as the platform through which the OU promotes its partnership with the BBC and the related free courses and articles that are created to support its co-productions with them. Since its launch, OpenLearn has received 40 million unique visitors and has developed from being a website that hosts module excerpts from its paid-for undergraduate and postgraduate curriculum to one which also delivers short pieces of learning in the form of learning activities and tools, videos and free online courses, including perpetually open adaptations of all of its MOOCs previously presented on FutureLearn. OpenLearn is a Moodle-based platform where its courses are developed using structured authoring tools and then made available online in multiple formats such as Microsoft Word, various ePub formats and PDF. Through the delivery of free courses to the public, this approach serves both the University's social mission (a commitment to widening participation declared in its Royal charter) and business mission (13% of OpenLearn learners go on to make a formal enquiry at the OU). Since providing recognition for informal learning through the issuing of OU-branded digital badges and certificates, this percentage has risen to over 26% on some courses (Law, 2015).

During its 10th anniversary year, the OU is demanding that all module specifications are designed from the start with two learning design outputs: the OU module (for its students); and the open course (for delivery via OpenLearn). This is a cultural shift for the University inasmuch as all module teams will be required to engage with openness from module inception. Previously, their involvement may have been simply to identify existing content and to allow subject specialists to modify it for them. These new learning requirements for the OpenLearn course will draw on what has been learnt from the most impactful module excerpts, MOOCs and Badged Open Courses (BOCs) that have been developed over the past 10 years and to find the balance between the needs of underserved informal learners more widely and its own student body.

Approaches to delivering non-formal learning

Eraut (2000, p. 114) discusses the levels of intention used to describe learning, and describes informal learning as ". . .a residual category to describe any kind of learning which does not take place within, or follow from, a formally organised learning programme or event". In addition, Eraut discusses the ranges of learning modes that are embraced by the term 'non-formal learning' in differentiating it from informal learning, by explaining that it is understood that some deliberate intention to learn has taken place.

We can make judgements about how learners interact with OpenLearn through the choice they have made of the type of learning they are engaging with. For example, by enrolling on and studying a full OpenLearn course that makes its learning outcomes, structure and commitment required of the learner explicit, a learner could be said to be non-formal. However, OpenLearn also provides short pieces of learning (1–2 minutes long) through articles, learning activities, videos and blogs, often produced to support trends and changes to the OU taught curriculum or in response to international events. To put this variety of learning modes further into context for OpenLearn, internal data show that ninety per cent of learners entering the platform do so via Internet search and hence could be said to be approaching it:

- informally i.e. they arrived there because they were looking for general information; or
- non-formally i.e. they may have searched under the term 'free course'.

The percentage of learners arriving on the platform via Internet search has doubled since the first analytics evaluation of OpenLearn that took place in 2009, which noted that 45% of visitors came to the platform via this means, another 45% from referral sites and the rest from typing in a direct URL (McAndrew et al., 2009). This is likely to reflect trends in the way users approach finding information and a reliance on good search engine optimisation to find a website versus having to know a website address up front.

OpenLearn learners can create a free online learning profile which provides the means to track their progress through a course, view and publish their achievements. With a proportion of OpenLearn visitors going on to make a formal enquiry to study at the University, the platform therefore provides a mechanism to deliver a learning journey from informal to non-formal through both the range of content types provided and by the approach taken by the learner; and so on, to a formal learning journey.

Whilst McAndrew et al. (2009, p. 35) report that "the original design considered a division between learners and educators" in their evaluation of the platform, Perryman, Law and Law (2013) report that only 15% of OpenLearn learners are educators. With 74% of these indicating that they are using OpenLearn for professional development and 35% for teaching purposes, the University continues to support educators who choose to use the OU's OER in the following ways:

- By providing multiple formats of OpenLearn courses for use and adaptation offline,
- By issuing content using a Creative Commons licence to enable reuse and repurposing, and
- By continuing to provide the OpenLearn Works platform (www.open.edu/openlearnworks) (formally called LabSpace) for copying, pasting, reworking and republishing its (and others') new and existing materials as OER.

Recognition for non-formal learners

Studies undertaken in 2013 analysed and compared the demographics of the OU's informal and non-formal learners, students and educators using OpenLearn and the University's free learning on content iTunes U and YouTube (Law, Perryman & Law, 2013; Perryman, Law & Law, 2013; Law, Perryman & Law, 2015; and Law & Perryman, 2015). Much was learnt from these studies about users of OpenLearn including how they were using the platform (their journey) and how they were progressing to formal education or more non-formal learning (their motivations). The studies provided recommendations for the University around the delivery of learning material on OpenLearn. These were to:

1. Improve the usability of OpenLearn around the user experience of studying an unsupported course, and
2. Create an entire Badged Open Course (BOC) curriculum aimed at widening participation and for student preparedness.

Understanding the usability challenges of learners using OpenLearn as a course environment has required the OU to make modifications to the platform, based on the understanding of learners' interactions with it and with each other, modifications which will result in a complete redesign and representation of content during 2016.

However, the platform remains a sandpit for the development of courses delivered online via Moodle and a rapid means by which to test new approaches to, and tools for, elearning. One of these approaches developed in response to recommendations for the platform, has been around the recognition of non-formal learning, specifically the issuing of open digital badges and statements of participation (non-accredited certificates) for participating in and completing OpenLearn courses.

The growing interest in micro-credentialising and digital badging has been identified over recent years, notably by Grant and Shawgo (2013) and highlights that learners want recognition for informal study. This challenges the notion of informal learning described by Cross (2007) as one where ". . . no one assigns grades. . ." and ". . .no one takes attendance." Whilst we recognise that learning is still taking place as a supplement to formal learning there is a growing demand and expectation that non-formal learners want recognition for their achievements and engagement. This builds on, and concurs with, work by Miligan, Littlejohn and Margaryan (2014) who describe how we learn from each other in informal personal networks and how social networking tools augment this practice. They report that "These [social networking] tools are inherently open, encouraging the learner to make the evidence of their learning public and freely accessible to all by default. In this way, one individual's learning becomes available to their peers, and to future learners" (Miligan, Littlejohn & Margaryan, 2014, p. 7).

Key findings and initial impact of the project to develop and publish media-rich, OU-branded BOCs on OpenLearn has been reported (Law, 2015) most notably to show that this recognition for learning through the issuing of OU-branded digital badges and certificates, raises the percentage of those making a formal enquiry with the University from 13% to over 26%. In addition, these non-formal

learners who engage with BOCs are less well qualified than OpenLearn learners overall. Earlier OpenLearn evaluation showed that 23% of learners using the platform perceived themselves as having a disability; for those undertaking a BOC, this ranges from 15% (for *English: skills for learning*) to 37% (for *Succeed with Learning*). Where the lower percentage is seen on *English: skills for learning*, it may be explained by the fact that the majority of learners are not in the UK, compared to the other BOCs where over 70% are UK-based. Outside of the UK, descriptions of disability vary compared to those we have grown used to in the UK and hence may not be as readily declared. In order to explain the very high proportion of disabled learners in *Succeed with Learning*, this could be due to an older and less qualified demographic overall or the desire to test if it is possible to succeed in an educational environment. This evaluation also showed that the majority studying BOCs declared that it gave them a sense of achievement (84%) and that it helped keep them motivated (58%) (Law, 2015).

When comparing the MOOCs developed initially for use on FutureLearn as adapted, open courses for OpenLearn, a high click-through rate to make an enquiry with the OU can also be seen (~23% overall), although this is slightly lower than BOCs (internal University data). Internal data analytics and these data gathered to date provide key information that will directly influence the improvement of the elearning approach and use of media for all OpenLearn courses.

Clearly this use of the platform as a test bed for innovation in elearning has provided some surprising data with positive implications for both the social and business mission of OpenLearn. In addition, understanding media mix of what makes an impactful and engaging OpenLearn course will have positive financial implications and enable better planning and development in an environment where around 60 new courses are being produced each year. In addition, the awarding of a digital badge will also be relevant to the OU's formal students, who will see this University recognition for non-formal study on their student record.

OU students' use of free learning

With the success of the BOCs in mind, OpenLearn research projects have recently been refocused onto the University's own students who are using the platform. Internal data analytics, show that around 150,000 OU students use OpenLearn annually, identified through their log-in credentials. Whilst it has been possible to track year on year, the number of OpenLearn learners going on to make a formal enquiry to study, the University's systems have only recently been able to follow that journey beyond any enquiry; too early to draw any data from it regarding journey or progress. Hence a study was undertaken in 2015 whereby 10,000 OU formal students across the full curriculum were surveyed to see whether they had used OpenLearn to augment their studies, or indeed were aware of its existence at all.

Mixed method surveys were issued by email to 10,000 OU students, across a range of undergraduate and postgraduate qualifications, who had recently completed a formal module with the OU. The surveys were delivered using the SurveyMonkey platform comprising a combination of Likert scale, multiple choice and open questions. The aim of the survey was:

- to ascertain what proportion of OU students had an awareness of the OpenLearn platform and other free (non OU) learning sources;
- what the impact of using OpenLearn had on them in terms of preparedness and confidence; and
- what types of learning they had made use of on the platform (e.g. whole courses, videos, short activities etc.)

Of the 1,127 respondents, 48% had used OpenLearn, the majority of which (72%) had viewed free courses, over videos, activities or other short pieces of learning. Of those who had used OpenLearn, 48% declared increase in confidence in their studies as a result. Qualitative data gathered in the survey showed four main themes as to the opportunity that using OpenLearn affords:

- To **improve confidence** and/or re-assure students they have the ability to study at HE level;
- To **see what study at the OU is like** before making a commitment;
- To help students **choose the right module** through the provision of taster courses as they move through a programme of study; and
- To use OpenLearn materials as an additional resource to **augment their learning**.

A selection of open comments reflecting these four themes are given below:

When I first enrolled it was a great place to visit and brush up on essay skills or simple mathematics just to provide a bit of confidence when, for those that had not studied for quite sometime, just needed a little boost:)

I did the "business of football" course, and it enabled me to understand how the OU works and what to expect

Open learn provided a feel for the learning material that is used in the study module. Some of the material I liked and understood while a few I did not like. So extracts from certain modules made me disregard them as possibles for me. This was very helpful when it came to choosing modules

It helped me summarise some of the more complex subject areas of the module whilst I was studying it.

Of those students who had declared that they had used OpenLearn it was further investigated, using internal analytics, as to whether they were more likely to pass the module that they were currently studying than those who had not used OpenLearn. Data showed that OU students using OpenLearn were 5% more likely to pass and progress to their next module, than those who did not.

Conclusion

During its 10th anniversary year, a project to review and enhance the presentation of OpenLearn courses is being developed which will draw on all of these data and will communicate and recommend the guiding principles of open course design. All OU module specifications will be designed from the start with two learning design outputs: the OU module (for its students); and the open course (for delivery via OpenLearn). This is a cultural shift for the University inasmuch as all module teams will be required to engage with openness from module inception. Previously, their involvement may have been simply to identify existing content and to allow subject specialists to modify it for them.

The development of OpenLearn courses and open educational practice amongst academics and course designers at the University will become an integral and strategic practice, key to the success of the organisation in a time of falling student numbers in UK HE.

By taking what we have learnt from MOOC production, evaluating the pedagogical features that boost confidence, learning and course engagement in an open, unsupported environment, we are able to positively influence module production at the specification stage to also produce meaningful and engaging open courses containing rich media and formative assessment.

To augment the guiding principles of good OpenLearn course design therefore, OU modules teams are required now to think of these uses when designing for the open i.e. that excerpts for adaptation should be more highly considered. Bearing in mind that these are unsupported courses (i.e. no tutor is present) guiding principles for the learning design of OpenLearn courses adapted from OU modules will be:

- That learners value the recognition for their achievement (free Statement of Participation and/or digital badge) through passing tests or completing a course of study,
- Learners most value quizzes with associated feedback,
- That closed environments with a start and finish date i.e. MOOCs, have lower completion rates than open courses with no start and finish date,
- The use of activities and video (especially that of a tutor, or 'face' of a course) are especially valued,
- That forced social activity encourages high drop-out,
- To select the most engaging and enticing content within a module, making a key topic accessible to new and existing learners,
- Courses can be designed specifically to support induction; the OU loses many thousands of learners who have a long wait from registration to module start each year. A targeted OpenLearn course with recognition from the OU, will prepare a learner with key skills across a qualification as a whole, keeping them motivated while they wait for module start,
- That the development of an OpenLearn course should be carefully scheduled such that it is live on the platform many months before the module begins, and
- That new assets, such as videos, animations and quizzes, developed specifically for an OpenLearn course can be as useful to augment learning for formal students.

This coming together of data on the growth and impact of the platform as a vast open, learning resource and how this is influencing the OU's own students, is a cause for celebration and also for reflection. By mainstreaming open educational practice via module production to improve student module choice and student preparedness we are able to provide a richer learning experience for all learners, informal, non-formal and formal alike.

Acknowledgement

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Localizing OER in Afghanistan:
Developing a Multilingual Digital Library for Afghan Teachers

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Abstract

The Darakht-e Danesh ('knowledge tree') Online Library is the first open educational resource (OER) initiative in Afghanistan, established to enhance teacher subject-area knowledge, access and use of learning materials, and to foster more diverse teaching methodologies in order to improve learning outcomes in Afghan classrooms. This paper describes our experience developing this local language digital library, buildings its responsiveness to our audience of users as we progressed, customizing both the interface and the resources for Afghanistan's education environment. We innovated methods to devise relevant local content, localized usability, developed different access models to reach different populations of users, integrated impact measurement, and opted to openly license material in the library's collection. By making digital educational content open from the first introduction of digital repositories of learning objects in Afghan languages, we have an opportunity to establish the principle of openness and to promote open practices in teacher professional development in Afghanistan. The paper aims to share lessons on how OER can be customized for multilingual, resource-scarce contexts drawing from our experience to date in Afghanistan, and seeking to contribute to the literature on localization and multilingual OER.

Key Words: Localization, digital library, Afghanistan, OER, teacher education, educational resources, multilingual materials

Introduction

In developing the Darakht-e Danesh ('knowledge tree') Library for Educators in Afghanistan (DD Library)[1] we hypothesized that the OER approach offered a potential solution to some of the education quality challenges in Afghanistan, if OER could be rendered into the languages in which teachers speak and teach, and if the technology to deliver it was localized to respond to conditions in Afghanistan. Our Afghan OER repository uses an interactive, multilingual content management system currently housing OER in 20 subjects, in the three languages taught in the Afghan public school system: Dari, Pashto and English. The theory of change we are testing is that use of OER --> more exposure and use of educational content --> increased knowledge of subject knowledge and increased use of a variety of teaching methods and materials.

This paper describes our experience developing this local language digital library using the "software as hypothesis" (Leinonen, Purma, Poldoja & Toikkanen, 2010) conceptualization that characterized the development of the LeMill multilingual digital library. This approach allowed for the continual development of an OER collection and the initiation of a community of practice among teachers using the OER by using the architecture of the digital library to lead teachers to use it in a way that will enable meaningful use of the system. In other words, the software evolves as people use it, and the initiators systematically observe how it is being used, adapting the software to be more responsive to the users. Software as hypothesis puts the emphasis on the design of the library and the extent to which it supports users to integrate the resources into their teaching and learning, and to share their own resources with the community of users. As usage is observed, we continuously

improve how we organize, structure and enable access to, creation of, sharing of OERs for Afghan teachers.

Multilingual digital libraries are understudied "and remain a bit of an enigma" (Diekema, 2012, p. 10), and this is particularly the case for multilingual digital libraries in the developing world, despite the recognition by researchers "that beyond accessibility, digital libraries have enormous potential for empowerment and building community, especially in developing countries" (Hutchinson, Rose, Bederson, Weeks & Druin, 2005, p. 5). While our digital library remains in the early stages of rollout, the iterative process of developing a tool responsive to the distinctive environment facing Afghan educators is worth sharing at this stage as we believe it offers valuable lessons on how OER can be customized for multilingual, resource-scarce contexts. In this paper, we have described our approach to localization, and the steps we have taken on our path to building a tool that would make OERs relevant to, and useful for Afghan teachers.

Context: teaching and education in Afghanistan

With millions of girls back in school, new teacher colleges opened in every province of Afghanistan, and ongoing curricular reform, the education system in Afghanistan is experiencing a rebirth. Yet significant challenges remain. Four decades of war and an ongoing insurgency that has singled out the education sector for attack makes this a difficult environment in which to teach and to learn. Afghan teachers contend with a daunting lack of resources: most schools do not have libraries or science labs, many students go without textbooks, and teachers have little material to help them work through a new curriculum that many struggle to understand. At the secondary level in particular, there are extreme textbook shortages, and no teachers' guides, resulting in minimal support with learning materials from the government. Despite greatly increased enrollment and thousands of schools rehabilitated, the majority of Afghan teachers are unqualified (do not have the minimum requirement of two years of teachers' college) or underqualified, and outdated teaching methods like rote memorization still predominate. Minimal instructional time (classes are typically 30 minutes in length) and weak teaching capacity, among other challenges, have meant that many Afghan pupils can still not read by the time they enter upper primary.

The open educational resource (OER) movement has meant that huge collections of materials are made available to educators free of charge and without copyright restrictions, giving teachers direct access to sources of knowledge and teaching tools that can be adapted and repurposed for their classrooms, or simply used to enhance their knowledge of a subject. However, teachers in the developing world who speak languages other than English are largely excluded from taking advantage of this wealth of free information. A scan of the main OER collections online reveals that while some have modest multilingual collections, no indigenous Central Asian languages are currently included. The lack of multilingual interfaces and metadata restricts use of these sites in other languages (Amiel, 2013). In terms of print resources within the country, most books are imported from Iran or Pakistan and the domestic publishing industry is weak. There are almost no materials targeting teachers, and educational resources developed by NGOs are not typically shared externally, published online or openly licensed.

Background: the Darakht-e Danesh Library

In response to this situation, we created the Darakht-e Danesh Online Library, Afghanistan's first comprehensive digital educational resource collection.[2] We saw technology as offering a shortcut to building the quality of teaching and learning in Afghan schools. By giving teachers direct access

to knowledge resources in their own language, we can support an improved quality of teaching: enhancing teachers' subject-area knowledge and fostering more diverse teaching methodologies in order to improve learning outcomes in Afghan classrooms. The Darakht-e Danesh (which means 'knowledge tree' in Dari) Library uses an innovative interactive, multilingual custom-designed content management system, housing hundreds of resources for teachers in 20 subject categories, for both primary and secondary teachers in Afghanistan, and works in the three languages taught in the Afghan public school system: Dari, Pashto and English.

After registering, users can search the database by subject, resource type, language and level, or just browse the collection. For instance, a grade 10 biology teacher can search out water evaporation experiments, a teacher working with students with disabilities can find guidebooks with practical classroom strategies, or a geography teacher can download images of maps to print out for her classroom walls. Primary teachers can download full children's books for and by Afghans, and high school teachers can find full texts on subjects they are trying to better understand, like the Industrial Revolution, how to teach poetry, or strategies for reading.

Given our focus on access and our desire to encourage sharing of learning materials among educators, we opted to make the resources in the collection openly licensed, resulting in Afghanistan's first OER collection. There is no cost to access the resources, which may be freely shared: downloaded, printed, copied, and even repurposed. Afghan teachers can mix and mash resources to make them relevant for their classrooms, adapting them for local use. In adopting an OER approach to meet our objectives, our intent is twofold: to improve Afghan teachers' access to information sources from within and outside the country, but also, to draw in their participation to the knowledge commons, such that they are both users *and* shapers of knowledge resources in the information society.

Making OER for Afghanistan

The issue of language accessibility remains an under-supported and under-researched need in developing the OER movement. While the OER movement is centred around the notion of extending the knowledge commons, and is globally oriented in its aim to expand knowledge, in practice existing OER collections rarely support multiple languages, alphabets or scripts (West & Victor, 2011). The 2012 Paris Declaration on OER calls for the development and adaptation of OER in "local languages and diverse cultural contexts to ensure their relevance and accessibility" (UNESCO, 2012). Language accessibility has permeated every step of the development of the DD Library and was the most intensive draw on our software-as-hypothesis working model, wherein we are building and refining the software as it is used and as we track the user experience, continuously adapting the library to be a tool that is responsive to user needs and enables localization. This approach was relevant for us given that "affordances of the tools are realized only when they are used in the real world" (Leinonen et al., 2010, p. 117). In addition, we also needed to develop a sustainable means of generating content, to continuously adapt our design to enhance usability for our audience, and to innovate access models, a process which remains ongoing. These steps are described as follows.

Generating relevant quality content

In building the DD Library, our first task was to generate the content. As others have found, "dumping content onto a server isn't the most effective way to encourage fast learning" (Larson, 2014). Our objective was for the DD Library to be a source of high quality content usable within the Afghan curriculum. It thus should have materials that were novel and stimulating to educators, but which also integrate easily into the teaching and learning landscape of our specific population of users.

As Amiel (2013) notes, "an often-ignored barrier to remix and revision is the English-language and western bias of the Internet and particularly OER", noting that language revision "involves a substantial amount of thought into the process of localization" (p. 132). To provide relevant content, we opted to source content from three sources: 1) English language OER that we translate into Dari and Pashto, often with adaptations to better suit the Afghan context; 2) Educational resources created by others (NGOs, government, commercial publishers) that we acquire permission to freely share digitally; and 3) User submitted educational resources. This content is then searchable in the user's choice of language interface (Figure 1).

In selecting English OER to translate, we selected those that fell within the Afghan curriculum, and which 'travel well,' that is, they can be easily translated and recontextualized (Petrides, Jimes & Karaglani, 2008) so as to fit into one of the units of the Afghan curriculum around which we have structured the library. To translate the OER into Dari and Pashto, we tapped into Afghanistan's large diaspora community, recruiting bilingual Afghans with specific areas of expertise—such as health and medicine, or language and literature—to translate OERs, who were seeking a meaningful way to contribute to the development of education in the country, despite living in exile. The translators are volunteers and work remotely. Their translations are vetted by a professional, remunerated editor, and then are formatted and designed. At this stage, adaptations are often made to suit the local context, such as adding captions or definitions for terms that might be new for Afghan teachers. Working with volunteer translators, supported by professional editors, resulted in a viable means of efficiently and cost-effectively generating quality local language OER.
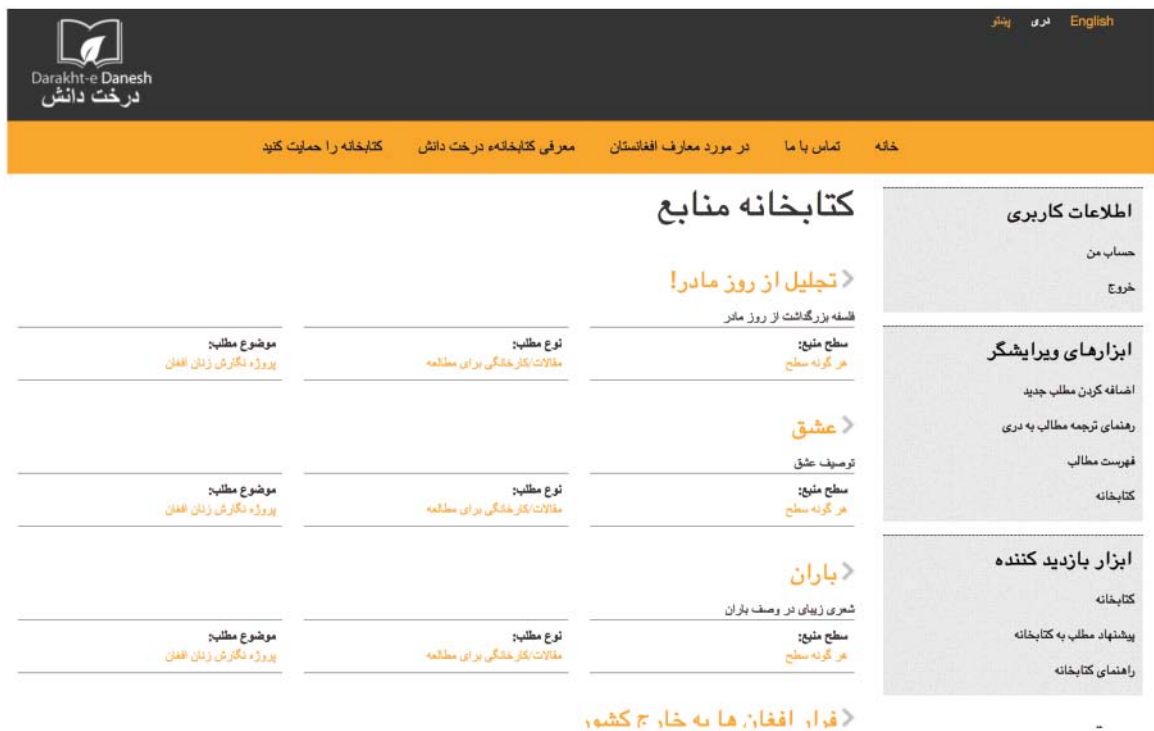

Figure 1: The Dari library interface

In selecting educational resources published by others, we asked organizations working in the education sector that had published materials that fit our criteria for permission to share the resources. Most provided us with digital copies of their materials and the requested permission, except in two

cases where organizations sold print copies of the materials and felt that making their publications available in the DD Library would compromise their ability to generate sales from the print versions. Collecting materials created by others presented us with the need to provide licensing options that assured the creators of the intended use of, and access to, the materials, an issue discussed further on in the Open Licensing section.

The third way we generated content was to open the collection to users to add their own materials. As others have found, "the best way to spread content is with locally created content" (Larson, 2014). We launched the library in 2014 when we felt satisfied that there was a critical mass of material to be of use to teachers. All of the OER at that time were our translations. After launch, we invited users to submit their own content. To facilitate this, a feature was added for users to submit a resource and metadata for the resource. Users have submitted materials as diverse as Dari translations of western philosophical works to ancient Persian poetry, to a simple health guide for rural villages. This feature not only aided the growth of the collection, but also promoted its 'ownership' by the Afghan users and encouraged the culture of sharing content. These efforts continue, as we added a "Want to translate this resource?" option to untranslated English resources, and in our planning of a national contest soliciting submissions of mini video lessons from Afghans, to diversify the content to include audio-visual materials.

Localizing usability

Localization is interface designed to be customized for a particular audience (Hutchinson et al., 2005). While OERs lend themselves to adaptation and repurposing, the localization of OERs within developing countries, where OERs could arguably make the greatest impact given the more acute learning materials access challenges teachers in such contexts face, has been less explored by the global OER community and less exploited in practice. Along with Teacher Education in Sub-Saharan Africa (TESSA) and Teacher Education Through School Based Support in India (TESS-India),[3] we aim to contribute to the "emerging framework for localisation to ensure more equitable and sustainable OER development and use" (Buckler, Perryman & Seal, 2014, p. 222)

We continuously adapted the DD Library in response to feedback from Afghan users, who are mainly teachers, including users of varying degrees of computer literacy, to maximize user friendliness. We aimed for site navigation to be intuitive. We often debated choices of terms to use, given the lack of consensus over appropriate technical terms in Pashto (i.e. "home page"), and our decision to generally avoid Iranian Farsi terms in favour of Afghan Dari terms, despite the dearth of technical terms in Dari. We are currently cross-linking resources that are available in different languages. For example, if a user is viewing a Dari physics experiment, an icon on the page indicates the resource is also available in Pashto and is hyperlinked to that resource (Figure 2).

Languages Available:

English

دری

پښتو

**Figure 2: User's View Showing Languages In Which a Resource Is Available**

As use of the tool expands, our intent is to build in more interactive features to the site. In the case of the multilingual LeMill digital library, computer supported collaborative learning in knowledge

building communities led to "the emergence of national communities, peer learning among teachers, extracognitive mechanisms, social presence, and the importance of coevolutionary methods in the development of LeMill" (Leinonen et al., 2010, p. 126). This was facilitated by design features such as teachers' building portfolios, having discussions, forming groups, reusing and remixing, mixing languages and making metadata creation implicit, among others. In the case of Afghanistan such features can be especially relevant, nurturing teachers' competency building and creativity (i.e. through remixing, or in being part of a community of practice), and even as a way of building national identity as teachers (i.e. through use and adapting of knowledge resources in the local languages, for the Afghan curriculum).

Open licensing

Educational materials in the DD Library could be subject to copyright law in several jurisdictions, including Afghanistan, and the source country of resources. In the English collection, we selected OER from external sources such as Curriki, and our Dari and Pashto translated materials were licensed under the Creative Commons BY 4.0 international license, which requires attribution of the copyright holder but allows for adaptation and redistribution. After an assessment of our licensing practices against best practice in OER repositories, we made several changes to the DD Library, including adding a licenses menu (Figure 3) for users to select the appropriate license when submitting a new resource to be added to the publication, with the following options:
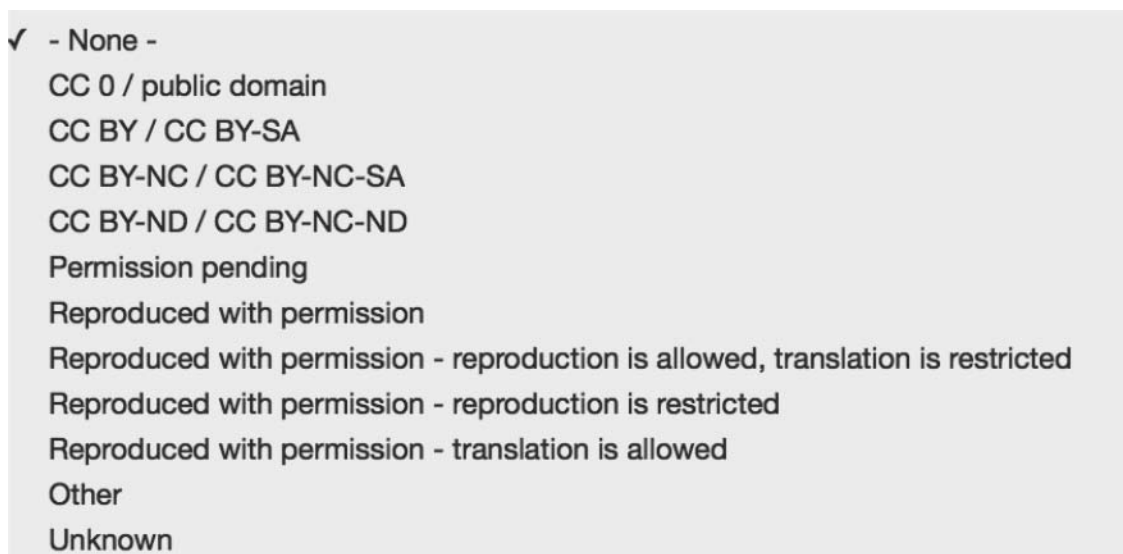
Figure 3: English version of Licenses Menu

It is here that we believe significant potential lies, in that we can make digital educational content open from the very beginning in Afghanistan. As there are few repositories of educational content specifically for Afghans, we have an opportunity to set the stage for promoting openness, by opting for open licensing and open practices in our collection. This, however, requires providing our users with education about open licensing, which in turn requires educating users about the concept of intellectual property and its various models including traditional copyright. We do this in several ways. We explain copyright law, open licensing, and specifically, Creative Commons licensing, when we do demos of the DD Library for Afghan teachers. We stamp all our own publications with a CC license, and when users submit resources, they are asked to select a license from a menu, and

can find links to information about each license to aid their selection. Our intent is that these efforts will aide the potential for open source software and freely-licensed content to feed "a widespread culture of collaboration and the sharing of ideas" (Larson, 2014).

Innovating Access Models

The first phase of the DD Library was developing the system and the collection of resources. We are now in the second phase, which is focused on expanding access to the Library to reach as many different users as possible, from those in urban areas to teachers in remote, rural areas. The library currently has users representing all 34 provinces of Afghanistan, in addition to users from some two dozen countries, with an average of three new users registering per day. However, this population is limited to teachers who independently find and use the library online. We have conceptualized alternative access models for others, each designed for a different population of educators (Table 1).

Table 1: Access Models for the DD Library

Access Model	Method and Target Users	Status
DD Library website	The website reaches users who can independently access the internet, who are located in Afghanistan, or anywhere in the world.	Our current work includes continuing to improve usability, and increasing the size and scope of the collection, expanding the Pashto collection, diversifying media to include video and audio files in the collection, and marketing the URL such as through billboards in Afghan cities and through social media.
e-Learning labs at teacher colleges	In this model, student teachers will access the DD library on site at their college and instructors will integrate the educational resources into their teacher education, and in some cases, in-service teachers will also access the lab.	To test this model, we equipped a teacher's college in a rural province near Kabul with the DD Library using a router and 3G network we installed at the lab that allows for access to the Library, given the college is not equipped with an internet connection.
Mobile technology-based apps	In this model, the library is made available via tablets and mobiles (compatible with both feature phones and smartphones) to reach educators in rural areas, using the 3G network. This involves adapting the Library interface for mobile use and deploying a tracking tool.	We install the library on teachers' personal phones, rather than distributing devices, in line with findings from elsewhere that suggest using the technology people already have is a more sustainable approach (Trucano, 2013) than distributing free devices. In participating schools, we provide 5–10 tablets to the school library, managed by the librarian and signed out like books.

Measuring impact

Now that we have a functional multilingual interface and a modest collection of high quality localized OER, our attention is focused on measuring impact, and using performance data to continuously adapt the tool, in line with the software-as-hypothesis approach. We have anecdotal and observational evidence that teachers are using the library materials to plan lessons, improve their subject knowledge, or deliver new activities in their classroom, and teacher trainers use the resources in

teachers colleges. For example, a teacher in Nimruz, an isolated southern province, who also trains teachers, wrote to us to say, "the resources in the library help us a lot and we fully use them in our teaching in remote provinces such as Nimruz. I also use the library materials to solve other teachers' problems when they come to me for help." While such feedback is very encouraging, we are currently collecting data for an impact study that will tell us more precisely what the impact of the OER in the DD Library has been for the teachers who access it.

Part of a series of OER impact studies[4] in several countries, the DD Library is studying a group of 50 secondary teachers, including 25 female teachers and 25 male teachers, in a rural province who are accessing the library, using purposive sampling. We have interviewed teachers, administered a pre-test, and collected samples of their lessons plans prior to their exposure to the library. The teachers then participated in a workshop explaining how to register an account, search the library, save learning materials, and share their own learning materials. There is no specific instruction given on how to integrate the learning materials into teaching; we leave that to the teachers to

Table 2: Types of Impact To Be Measured

Expected Impact	Indicators	Tools	When	How
KNOWLEDGE Enhanced knowledge among teachers of subject content and teaching methods	• No. of educators (sex disagg.) who report using diverse teaching content, tools and methods, and report sources for this • No. of educators (sex disagg.) who report enhanced information and understanding of subject areas learned on DDL	Lesson plan—Pre training	After selecting the teachers	Will be administered same time
		Pre-Training questionnaire	After selecting the teachers	
		Lesson Plan—Post training	After training and after completing the preparation period (time period to study OER materials)	May inform the selected teacher well in advance through email/ phone/circular.
		Trainer observation	Any time after post-training lesson plan preparation	Will be administered same time
		Student observation		
		Post-Training questionnaire		
ACCESS Widespread use and growth of DD Library among Afghan users	• # of users in Afghanistan • # of resources downloaded • # Mins accessing content via app • types of resources most frequently downloaded	• User registration data • Generated traffic reports from site Reports from app usage	• Tabulation of registration data • Tabulation of traffic data (From Log data of website)	
OPENNESS Afghan educators participate in development of the resource collection	• # of resources uploaded by Afghan users • Knowledge of principles of openness	• Uploads • Included as question on post assessment for the teachers	• Tabulation of uploaded documents from Afghan users • post training questionnaire	Any time after post-training lesson plan preparation

determine, since the DD Library is intended to serve teachers' self-directed learning and professional development. The teachers are given access to the DD Library through several means, including three physical sites: computer labs in the local teachers' college computer lab and in two public schools, where we have installed the Darakht-e Danesh Library through an offline local network (there is no internet connection at the lab) in each lab. Teachers can also access the library from their mobile phones and from tablets onto which we loaded the offline DD Library and which were placed in the two schools' libraries, where they are signed out like books. We then observe teachers in the classroom after several weeks of using the DD Library noting observations in a rubric, and we interview their students. After two months of accessing the DD Library, we will once again collect lesson plans, administer a post-test, and interview the teachers, comparing the data to the pre-treatment interviews, tests and lesson plan assessments.

Acknowledging the challenges inherent in isolating causality of learning outcomes (Halai, 2004), we are collecting a variety of data, including lesson plan analyses, assessment, teacher interviews, and student focus groups, to understand what impact, if any, the OER will have on teacher practice, and/or in enhancing teachers' subject knowledge. In total, we will be analyzing eight data sets collected in the field, in addition to the data recorded by the library itself (demographic data including languages spoken and taught, teaching level, sex, subject(s) taught, age, location, server; and usage data including number of visits, sessions, views, downloads and cohort analysis). Usage data can be collected from the tablets and mobiles as well. Our instruments are intended to measure access, use and impact, as well as to capture how teachers engage with the OER, thus we are attentive to process, as much as to end results, seeing impact "as a process of change that is adaptive in nature, enabling those implementing new ideas or practices to interpret and adapt them" (Halai, 2004, p. 516). Data is collected in three stages: before teachers use the library, while they are using the library, and after they have been using the library regularly for two months. Table 2 shows the areas of impact we hope the data will illuminate.

Conclusion

In looking ahead at the ongoing development of the DD Library, we ask: can we use OER to structure access and help direct Afghan teachers to content that is quality, localized and linked to their curriculum? Will this raise learning outcomes in Afghan classrooms, improving the quality of education? The software as hypothesis lens can continue to serve us as we adapt and evolve the tool to ensure activity taking place within the library and among its community of users is leading us towards meeting these objectives. The DD Library is the first technology-powered collection of educational materials for teachers that is tailor-made for Afghanistan, addressing the distinctive challenges the country's education sector faces. As the content diversifies and expands at the hands of the community of users, we expect the library to move beyond an audience of educators, to become a rich collection of knowledge resources for and by Afghans. It is well used by non-educators, including university students, NGOs, and members of the public. Our future plans include adding more Afghan languages such as Uzbeki and Turkmeni, adding full courses, and including audio-visual content created by Afghan users.

We are convinced that the availability of educational resources in local languages through readily accessible technology can profoundly improve the quality of education in Afghanistan, provided that the design of both the container for those educational resources and the means of accessing them are developed in a way that is responsive to Afghanistan's unique, and acutely challenging, conditions. This means responding to the specific needs of its teacher population and allowing for the DD Library platform to evolve in response to data on how the learning materials are used in practice.

This requires systematic communication with teachers and analysis of data on their use, to scaffold the library's architecture to enable access, sharing, knowledge development, and openness.

The infrastructure to connect people with knowledge, across time and space, exists already. As Wiley (2006) asserts, "We cannot in good conscience allow this poverty of educational opportunity to continue when educational provisions are so plentiful, and when their duplication and distribution costs so little" (¶1). Exploiting the potential of the abundance of knowledge resources for the teachers who need them the most will demand deliberative thinking of how technology can be adapted and deployed in locally meaningful ways. To this end, it is our hope that ongoing experimentation with the DD Library will yield new strategies and insights that can improve teaching and learning in multilingual, resource-scarce environments.

Acknowledgment

Endnotes

[1] The library, and background information about its creation, can be viewed at www.darakhtdanesh.org or www.ddl.af

[2] The Darakht-e Danesh Library is a project within the Technology for Education Program, of Canadian Women for Women in Afghanistan (CW4WAfghan), a registered Canadian charity working to support education for Afghan women and girls, since 1996. Work to design the DD Library and develop the initial collection of local language learning materials began in 2010, and the library platform was launched formally in 2014.

[3] These two projects, of the Open University (UK), are among the few OER initiatives that have prioritized local language content creation, and which support users in country to create content, that is thus of greater relevance to their peers within the context of use.

[4] Awarded through a grant from the Wawasan Open University in Malaysia funded by the International Development and Research Centre (IDRC) and the Department for International Development (DFID). The impact studies, together with the series of OER adoption studies coordinated by the University of Cape Town, form the Research on OER for Development (ROER4D) programme.

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Women's empowerment through openness: OER, OEP and the Sustainable Development Goals

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Abstract

This paper explores the potential of open educational resources (OER) and open educational practices (OEP) in helping achieve women's empowerment in the developing world. Our evidence comprises the Open Education Research Hub open dataset, featuring survey responses from 7,700 educators, formal and informal learners from 175 countries concerning the use of OER, the barriers faced in respect of OER adoption and OEP engagement, and the perceived impact of OER on teaching practices. Our findings indicate that OER and OEP can give women a voice, access to information and education, and the opportunity to connect with peers and train others. However, they also highlight extreme inequalities in digital empowerment and extensive technological barriers to digital participation. We argue that while such technological barriers certainly need removing, the potential of openness can only fully be realised when 'offline' societal and economic barriers to women's empowerment are also minimised.

Keywords: Sustainable development goals, Women's empowerment, OER, open educational practices, gender, developing countries

Introduction: Conceptual framework and background

Women's empowerment has been a feature of development assistance since the 1990s. O'Neil, Domingo and Valters (2014, p. 2) note that "given the continued resistance to 'gender issues' in some parts of the development community, this alone is an achievement". In 2015 the pursuit of women's empowerment was given fresh momentum when, on 25 September, the 193 countries of the UN General Assembly adopted the 2030 Development Agenda, comprising an intergovernmental set of 17 aspirational Sustainable Development Goals (SDG) with 169 targets. Women's empowerment is the focus of Goal 5, which includes amongst its targets one of only 4 references to ICT amongst the SDG: "Enhance the use of enabling technology, in particular information and communications technology (ICTs), to promote the empowerment of women" (Target 5b). This paper builds on existing research around women's use (and non-use) of ICTs in the developing world, taking a detailed look at the implications for women's empowerment of a particular aspect of ICT—open educational resources (OER) and open educational practices (OEP).

A closer look at women's empowerment, and the relationship with ICTs

Empowerment can be defined as the "process by which those who have been denied the ability to make strategic life choices acquire such an ability" (Kabeer, 1999, p. 435). Kabeer's emphasis on process identifies three interrelated dimensions underpinning the ability to make choices: resources (material, human and social), agency and achievements (wellbeing outcomes). As such it parallels Amartya Sen's (1999) concept of development as a process of empowerment involving the removal of 'unfreedoms' that preclude choice and full participation in social and economic life. Gurumurthy and Chami (2014), researching women, local governance and ICTs, have developed a research framework (Figure 1) analysing how ICT contributes to women's empowerment through the expansion

of choice in three areas: informational power, communicative power and associational power. The framework also identifies structural and agency-related factors influencing women's empowerment through ICT and has informed our own study.
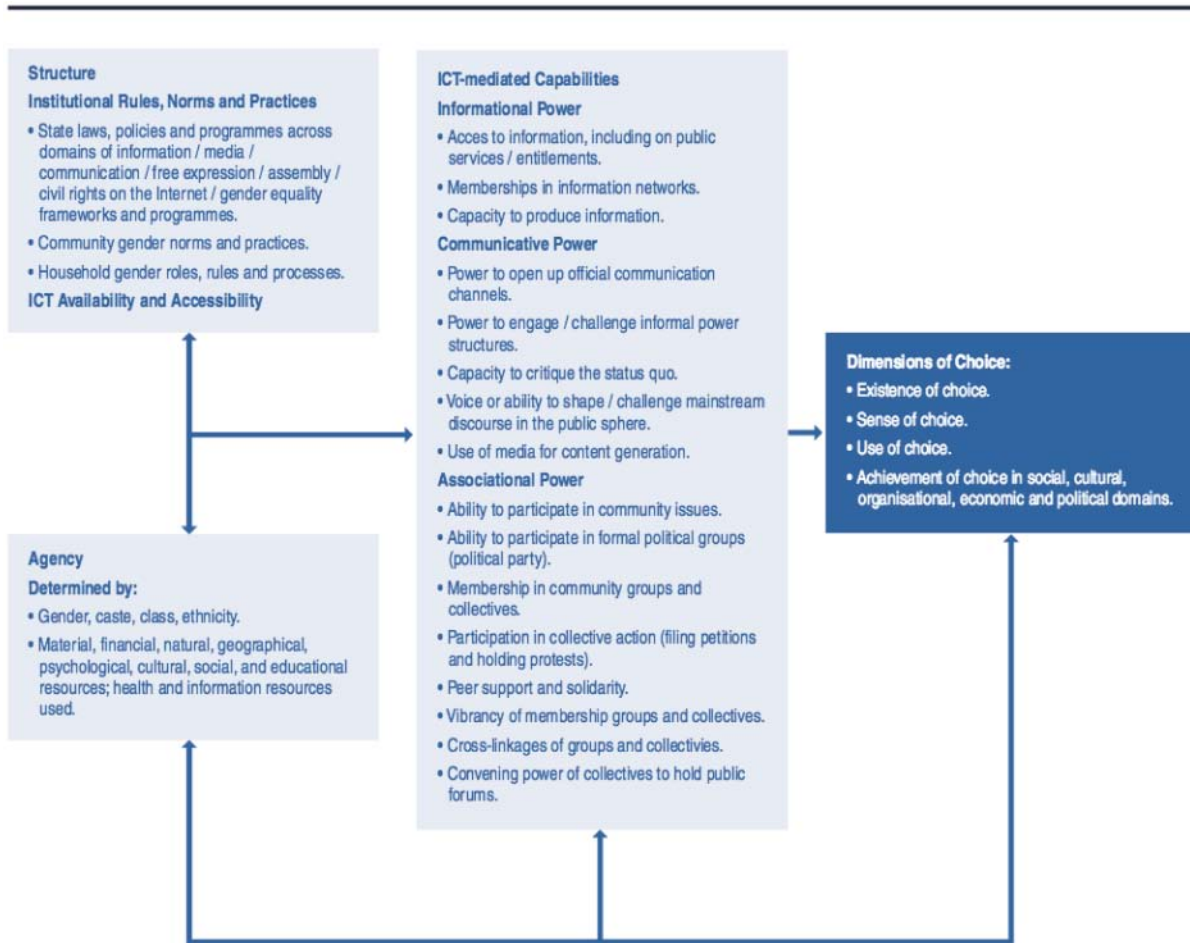
Figure 1: Theoretical Framework developed by Gurumurthy and Chami (2014), drawing on Kleine's (2008) Choice Framework and the Active Citizenship Framework of the Women-gov project. Source: World Wide Web Foundation (2015, p. 11)

Other research (e.g. Sandys, 2005) identifies particular health-related benefits of the increased access to information offered through women's use of ICTs, and many note that the various benefits of digital equality extend beyond individual women's lives to those of their families, and to their communities.

Women's digital exclusion

SDG 5, Target 5b acknowledges the fact that despite the potential for ICT use to contribute to women's empowerment, women's use of ICT is greatly lagging behind that of men in the developing world, with relatively little improvement in this situation over recent years. For example, Mijumbi (2002), exploring women's digital exclusion in Uganda, identified diverse barriers to women's ownership and use of ICTs including:

- Gender inequalities;
- Inadequate gender-sensitive policies supporting women's ICT use;
- Remote geographic locations with unreliable transportation infrastructure;
- Poor ICT infrastructure in rural areas;
- Illiteracy and lack of self-efficacy to use ICTs.

Seven years later, Patil, Dhere and Pawar (2009) concluded that 'oppressive gender relations' were inhibiting women's access to and ownership of ICTs in India and by 2015 a study of poor urban men and women across 9 developing countries by the World Wide Web Foundation (2015) reported that while nearly all women and men in those countries own a phone, women are still nearly 50% less likely to access the Internet than men in the same communities, with Internet use reported by just 37% of women surveyed and Internet-using women being 30–50% less likely than men to use the Internet to increase their income or participate in public life (World Wide Web Foundation, 2015). Table 1 shows the gender gap in Internet use across the 9 countries studied.

Table 1: Country-specific overall Internet use and women's use in particular (from World Wide Web Foundation, 2015, p. 13)

	Urban Population (% of total) (World Bank)	Total % Internet users (WF)	Total % Male Internet Users (WF)	Total % Female Internet Users (WF)	Gender Gap in Internet Use (WF)*	% individuals using the Internet (ITU)[5]	UN HDI Gender Inequality Index rank) (2014)[6]
Yaounde Cameroon	43%	38%	45%	36%	-25%	11	130
Bogotá Colombia	76%	73%	76%	71%	-7%	52.57	92
New Delhi India	53%	46%	53%	47%	+9%	18	103
Jakarta Indonesia	16%	36%	50%	31%	-67%	17.14	115
Nairobi Kenya	47%	29%	57%	20%	-185%	43.40	--
Maputo Mozambique[7]	44%	40%	59%	33%	-79%	5.94	78
Lagos Nigeria	32%	44%	66%	36%	-83%	42.68	146
Manila Philippines	25%	45%	42%	46%	+9%	32.69	122
Kampala Uganda	32%	38%	61%	21%	-190%	17.71	115

* Gender Gap in Internet Use (WF): % Male Internet Users – % Female Internet Users / & Female Internet Users multiplied by 100 = % gap

The report identifies education and age as "the most important socio-economic drivers of the gender gap in ICT access", with older, less educated women having far less access than younger, more educated women: "Controlling for income, women who have some secondary education or have completed secondary school are six times more likely to be online than women with primary school or less" (World Wide Web Foundation, 2015, p. 5). Additional drivers identified include the cost of Internet access, the impact of 'patriarchy online' and men's censorship of what women see on the Internet.

In the same year the World Wide Web Foundation report was published, Potnis (2015) gave a detailed account of both economic and non-economic reasons for the gender gap in ICT use in developing countries. Studying Indian women's digital exclusion, and focusing on mobile phone ownership (which Madianou and Miller, 2011; and Potnis, 2011, cited in Potnis, 2015, identify as

playing a key role in empowering women in developing countries), Potnis explains that in India, mobile phones are by far the most common method of accessing the Internet but only 30% of mobile phones are owned by women. Potnis (2015, p. 2) observes that many of the inequalities posing a barrier to ICT use for women in the developing world replicate broader social inequalities. She divides barriers to women's ICT ownership and digital participation into micro-level (individual), meso-level (related to family or group) and macro-level (regional or national), with reference to related literature (Table 2).

Table 2: Barriers reinforcing the digital divide (adapted from Potnis, 2015, p. 3)

Inequalities and Respective Barriers	Micro-Level	Meso-Level	Macro-Level
Socio-Cultural (e.g. oppressing gender roles for women in male-dominated societies; religious beliefs and practices) (Bourdieu, 1986; Hafkin and Huyer, 2008)	• Women's lack of freedom to make decisions	• Neighbourhood with high crime rate or poverty. • Membership of organizations facilitating access to new media.	• Social norms (e.g. parents saving money for the education of their male child but for the wedding of a female child).
Economic (e.g. inflation, lack of economic opportunities) (Annafari et al., 2013; Rice and Katz, 2003)	• Lack of employment. • Inability to afford ownership of ICTs.	• Low household income.	• High fees for ICT-based services.
Demographic (e.g. lower caste, less education) (DiMaggio and Cohen, 2003; Zainudeen et al., 2010; Dijk, 2005)	• Illiteracy. • Lack of knowledge and/or skills.		• Shortage of ICT teachers. • Dominance of English on the Internet.
Psychological (e.g., beliefs creating an inferiority complex among women) (Madianou and Miller, 2011)	• Adverse attitudes toward ICTs (e.g. apathy about ICT adoption). • Lack of self-efficacy to own and/or use ICTs.		
Geographic (e.g. rural vs. urban location, poor transportation infrastructure) (European Commission, 2005)		• Long distances to ICT facilities.	• Lack of ICT infrastructure (e.g. poor signal strength).

Research around openness and development

This paper's focus on the potential of OER and OEP to help increase women's empowerment in the Global South has links with broader research into the impact of OER projects in development settings. For example, since 2013 the ROER4D project (http://roer4d.org) has been conducting evidence-based research on OER impact and use in South America, Sub-Saharan Africa and South/ South East Asia and the OER Research Hub (now the Open Education Research Hub) have also researched OER use and impact in India (see Perryman, Buckler & Seal, 2014; Buckler, Perryman,

Seal & Musafir, 2014; Perryman & Seal, 2015) and across the member states of the Virtual University for Small States of the Commonwealth (see Perryman & Lesperance, 2015). However, very little research has considered the potential of OER and OEP to help increase women's empowerment in the Global South, though related research on the broader topic of ICT and women's empowerment is growing (e.g. IT for Change, 2014; World Wide Web Foundation, 2015), in part driven by SDG5b.

Our own research, reported in this paper, draws on the open dataset produced by the Open Education Research Hub (OERH) as the basis for addressing three questions:

- To what extent are women being empowered in developing countries through OER and OEP?
- What are the barriers to women's empowerment in developing countries through open educational resources and practices?
- How might those barriers be removed?

Methods

Since 2013 the Hewlett-funded Open Education Research Hub (OERH), formerly Open Educational Resources Research Hub (OERRH), has collaborated with a range of projects and initiatives around the world and across educational sectors to gather evidence of the impact of OER use on teaching and learning, and facilitate comparative research. From a bank of questions (http://bit.ly/OERHUBSurveyQuestions) designed to test eleven hypotheses (de los Arcos, Farrow, Perryman, Pitt & Weller, 2014) and explore teachers', formal and informal learners' perceptions of, and attitudes towards, open educational resources, a number of surveys were drafted and administered via some of the OERRH collaborations (e.g. OpenLearn, Siyavula, the Virtual University for Small States of the Commonwealth-VUSSC, and TESS-India). In total, 7,700 valid responses were collected and analysed with an aim to:

- Profile users of OER—for example, their gender, age, academic qualifications and employment status;
- Assess such users' level of engagement with OER and identify the types of OER used and most popular repositories of open content;
- Learn about the reasons for OER use and the barriers to adopting OER;
- Evaluate the impact of open practices.

The entire data set is available under an open license (www.bit.ly/OERRH_SurveyData).

This paper analyses the OERH data in relation to women in the developing world's existing use of OER and their OEP (and how this compares to that in the developed world), with particular attention to women's interest in using OER, barriers to OER adoption, engagement with OER, and the perceived impact of OER on teaching practices. In order to categorise survey respondents, a distinction between developed and developing countries, or Global North and Global South, was made following Wikimedia's regional classification (https://meta.wikimedia.org/wiki/List_of_countries_by_regional_classification). SPSS software was employed in the analysis. Frequencies of all responses were calculated to have a general description of the data, and independent samples t-tests to examine whether there were statistically significant differences between women in the Global North and Global South, with North/South grouping as an independent variable. Cases with missing values were deleted analysis by analysis. Reliability was high on all subscales, i.e. Cronbach's Alpha on 9 items measuring the impact of using OER on teaching practices (α = .91).

Sample Characteristics

The OERH dataset comprises 7,700 valid responses from 175 countries around the world, although most reside in the Global North (76%). Despite there being more female than male survey respondents overall (50.6%/48.4%), in developing countries female survey respondents account for only 36.6% (n=653). These women, however, are better qualified than their counterparts in the Global North: 71.6% of female respondents in the Global South hold either an undergraduate (31.4%) or postgraduate qualification (40.2%), a greater percentage than in the Global North (61.2%). Levels of employment amongst female respondents in developed countries are higher—43.5% work full-time and 20.8% part-time—but also, more women in the Global North state their status as unwaged with domestic responsibilities—6.4% compared to 3.2% in developing nations. Interestingly, while 10.9% of all OERH survey respondents declare a disability, this percentage increases to 14% for female respondents in the Global North, and decreases to 3.8% for women in the Global South. Equally revealing are the differences between North and South with regard to Internet access: while 87.9% of female respondents in developed countries have broadband in their homes compared to 65.2% in developing nations, access via a mobile device does not set the two groups widely apart —68.7% of female respondents in the Global North and 61% in the Global South use an Internet-enabled mobile phone. This is likely to be a reason for our not finding major dissimilarities in digital practices, with the exception of shopping online (Table 3).

Table 3: Digital Practices of female respondents in Global North and Global South

	GLOBAL NORTH		GLOBAL SOUTH	
	Count	%	Count	%
Sent an email	2204	98.8	385	94.6
Written a document using word processing software	2135	95.7	373	91.6
Used presentation software	1554	69.7	312	76.7
Performed calculations with spreadsheet software	1491	66.9	276	67.8
Contributed to a wiki (e.g. Wikipedia)	368	16.5	58	14.3
Written a blog post	695	31.2	109	26.8
Shared an image online	1397	62.6	205	50.4
Posted on a microblogging platform (e.g. Twitter)	823	36.9	122	30
Took part in a videochat (e.g. Skype)	1334	59.8	252	61.9
Contributed to an Internet forum	932	41.8	137	33.7
Contributed to a social network (e.g. Facebook)	1753	78.6	311	76.4
Used cloud-based storage (e.g. Google Drive)	1366	61.3	228	56
Shopped online	1975	88.6	231	56.8
Downloaded a podcast	1112	49.9	141	34.6
Downloaded a file using a torrent client	440	19.7	117	28.7
Filmed and uploaded video content	628	28.2	127	31.2
Used a virtual learning environment to study or teach	1114	50	180	44.2
Recorded and uploaded a podcast	175	7.8	39	9.6

Findings

Our analysis of female survey respondents in developed and developing countries shows significant differences in women's motivation to use OER and how they engage with OER, while exposing technology as an acute dividing factor affecting OEP and emphasizing the impact of OER in widening the range of teaching methods employed by educators in the Global South.

Interest in using OER

When asked about their interest in using OER, a comparison between responses from women in developed and developing countries reveals that the latter give more importance to the role of open resources in their professional development (68.4% vs 56%), training others at work (22.2% vs 6.7%) and improving both their non-native language skills (32.7% vs 14.6%) and study skills (57.3% vs 47.7%). All these differences were found to be statistically significant (Table 4).

A female educator from the VUSSC comments:

> Using OER puts you in contact with other teachers and you can learn from how they do things differently to you. I've changed a lot from using other people's materials. You can also share your own work with many more people than you could by just publishing it in a journal and as a teacher you can benefit greatly from their feedback and learn how to improve things.

A female respondent in India adds: 'Knowing OER has really helped me in motivating people to use and adopt [resources] in better ways. I train teachers on how to use OER effectively for their teaching and learning.'

Table 4: Independent samples t-tests of female survey respondents' interest in using OER

|	M	SD	df	t	Effect Size°
Professional development			666.4	4.96*	.01
Global North	1.44	.49			
Global South	1.32	.46			
Training others at work			367	6.34*	.02
Global North	1.93	.25			
Global South	1.78	.41			
Improve study skills			434.6	3.11*	.00
Global North	1.52	.50			
Global South	1.43	.49			
Improve non-native language skills			408.6	6.73*	.02
Global North	1.85	.35			
Global South	1.67	.47			

*$p < .001$.
°Eta squared.

Extending the comparison to the responses of women and men in developing countries, we find that using OER for professional development, for training others at work and improving one's study skills are also ranked highly by male respondents. However, women are more motivated than men to use OER to improve their non-native language skills (32.7% vs 29.6%), to teach in an educational institution (30.3% vs 26%) and to find information rather than study a whole course (36.5% vs 28%).

Challenges of using OER

In relation to the barriers affecting the adoption of OER (Figure 2), although all survey respondents agree on the seriousness of overcoming technology problems when downloading resources, the challenge seems particularly severe for women in developing countries: 45.5% report technology as a barrier, compared with 27.3% of women in developed countries. Knowing where to find resources is ranked even higher as a barrier by female survey respondents in the Global South (50.8%), while the greatest difference between Global North and Global South refers to finding resources relevant to their local context—38.4% in developing and 28.4% in developed nations.
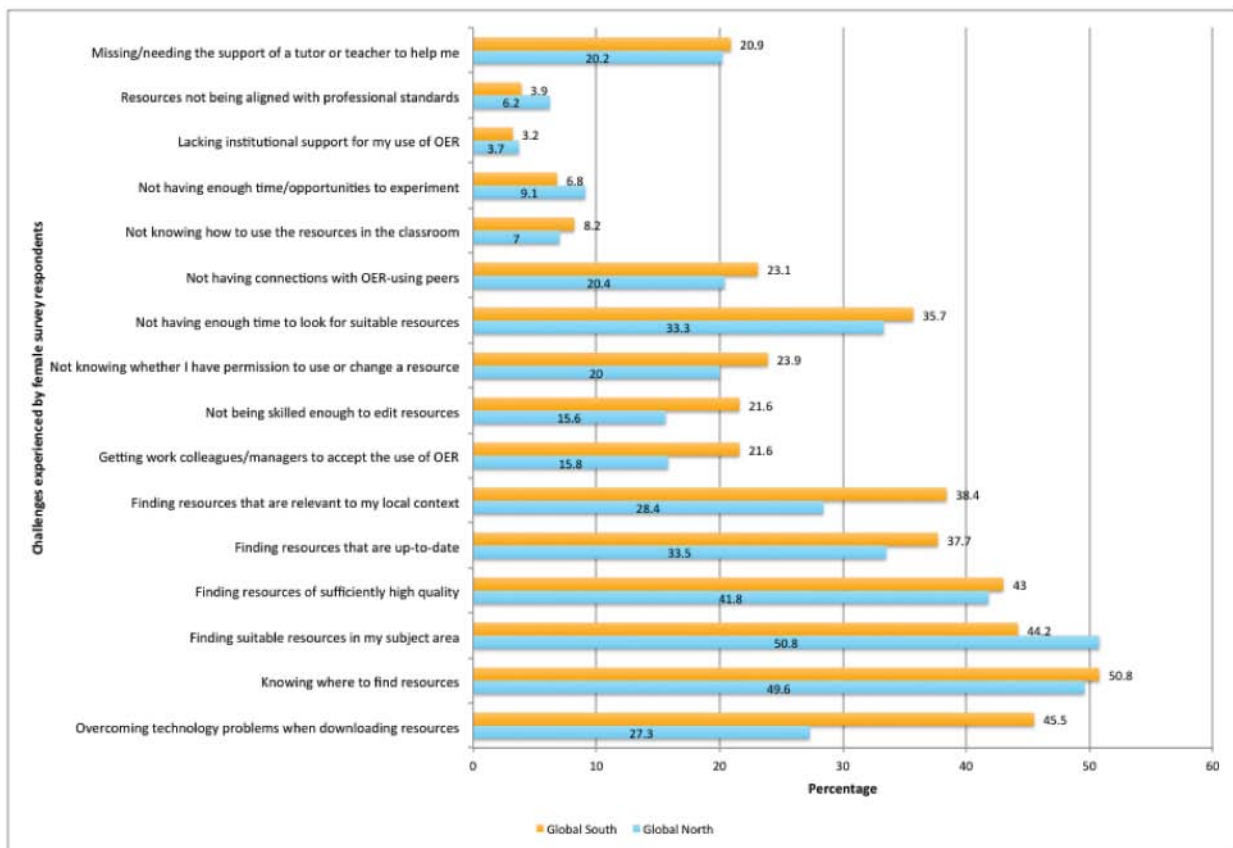
Figure 2: Challenges of OER use experienced by female survey respondents in the Global South and North

In addition to these barriers, independent samples t-tests reveal statistically significant differences regarding women's perception of their ability to edit resources to suit their needs, getting work colleagues/managers to accept the use of OER, and finding suitable resources in their subject area (Table 5).

Table 5: Independent samples t-tests of female respondents' evidence regarding challenges in using OER

	M	SD	df	t	Effect Size°
Overcoming technology problems			498.2	6.47*	.01
Global North	1.73	.44			
Global South	1.54	.49			
Not being skilled enough to edit resources			548.1	2.68**	.003
Global North	1.84	.36			
Global South	1.78	.41			
Finding resources in my subject area			596.8	−2.37**	.002
Global North	1.49	.50			
Global South	1.56	.49			
Finding resources in my local context			565	3.76*	.006
Global North	1.72	.45			
Global South	1.62	.48			
Getting colleagues to accept use of OER			553	2.57**	.003
Global North	1.84	.36			
Global South	1.78	.41			

*$p < .001$, **$p < .01$
°Eta squared.

When analysing how the responses of men and women in the Global South differ in their perception of the challenges of using OER, although findings suggest that female respondents encounter generally higher levels of difficulty across all variables, statistically significant differences were only observed in finding context-relevant resources ($t = 2.40$, $df = 803$, $p < .05$), not knowing whether one has permission to use or change resources ($t = 2.16$, $df = 771$, $p < .05$), and not having enough time to look for suitable material ($t = 2.52$, $df = 794$, $p < .05$).

Engagement with OER

With reference to their engagement with OER (Table 6), female survey respondents in the Global South were found to have adapted resources to fit their needs (75.3%) and created resources for studying/teaching (28.3%) more often than female respondents in the Global North, but shared those resources online on an open license less frequently (6.5%). However, none of these differences were found to be statistically significant. Quotes such as 'I have started feeling that there is no harm in sharing my slides and other study material across the globe, as it would [be of] benefit to a larger section' possibly exemplify the embryonic but optimistic state of sharing practices in developing countries.

Table 6: Engagement with OER by women in the Global North/Global South

	GLOBAL NORTH		GLOBAL SOUTH	
	Count	%	Count	%
I have adapted open educational resources to fit my needs	668	74.1	186	75.3
I have created open educational resources for study or teaching	230	25.5	70	28.3
I have created resources myself and published them on a CC license	78	8.6	16	6.5

A comparison of types of OER highlights similar patterns of use in female respondents from developed and developing countries (Table 7).

Table 7: Types of OER used by women in the Global North/Global South

	GLOBAL NORTH (n= 2275) %	GLOBAL SOUTH (n= 528) %
Videos	65.8	66.4
Audio podcasts	36.2	32
Images	51.8	55.7
Infographics	22.9	22.9
Interactive games	24.8	28.6
Lectures	50.9	52.8
Lesson plans	39.5	37.5
Tutorials	51.2	54
Quizzes	50.7	46.6
Full course	42.6	39
Course module/unit	49.2	48.3
E-books	59.1	67.4
Open textbooks	62.7	70.5
Data sets	23.4	8.3
Learning tools, instruments, plugins	35	31.3

Female respondents in both developed and developing countries report comparable awareness of OER repositories, with YouTube (55.7% in the Global North vs 55.9% in the Global South), TEDTalks (38.8% vs 36.3%) and iTunes (36.7% vs 21.7%) being the most popular. Particularly notable is the fact that repositories specifically branded as 'free learning' and 'open' receive considerably less attention by both groups: MERLOT, for instance, is used by only 1.9% of female respondents in the Global North and 2.4% in the Global South; MIT courseware has been accessed by 16.4% in the Global North and 16.2% in the Global South; and Connexions by 2.6% and 3.7% respectively. Local repositories seem to fare better: a look at responses from female educators in India indicate widespread use of eGyanKosh (59%) and the National Repository of Open Educational Resources (NROER) (18.7%), although still below the prevalence of YouTube (65.6%).

In addition, our data shows that male and female respondents in the Global South engage with OER in similar ways, with adapting resources to fit one's needs being a more frequently reported behaviour than creating resources and sharing them openly. In like manner, YouTube, TEDTalks and Khan Academy are the most popular repositories, irrespective of gender, and open textbooks, ebooks and videos being the most commonly used types of OER.

Impact of using OER on teaching practices

Figure 3 shows a frequencies analysis of how female educators assess the impact of using OER on their teaching practices. An independent samples t-test revealed a statistically significant difference between women in the Global North and Global South in relation to the impact of OER on curriculum coverage (t = 3.17, df = 561, p < .005) and on the teaching and learning methods used (t = 2.16, df = 563, p < .05); women in the Global South (M = 2.26, SD = 1.13) perceive that OER use facilitates their greater coverage of the curriculum compared to women in the Global North (M = 2.58, SD = .99), and report that OER have broadened the range of teaching and learning methods they use in their classrooms (M = 2.23, SD = 1.13) more often than women in the Global North (M = 2.45, SD = 1.0). Statistically significant differences were also found that relate to the impact of OER on the development of ICT skills (t = 3.09, df = 207.8, p < .005) and use of multimedia (t = 2.70, df = 546, p < .05): female educators in developing countries (M = 2.39, SD = 1.2) report a greater improvement in their ICT skills than their counterparts in the developed world (M = 2.74, SD = 1.02), and also indicate they make use of a wider range of multimedia (M = 2.24, SD = 1.06) in comparison with women in the Global North (M = 2.52, SD = 1.03).

Table 8 shows how female and male respondents in the Global South understand their teaching practices have been affected by the use of OER. Men seem to think that the impact is more strongly felt in their coverage of the curriculum, reflecting on the way they teach and broadening the range of teaching and learning methods used; women, however, regard the latter as the biggest impact of OER on their teaching, adding the effect on having a more up-to-date knowledge of their subject area and having broadened the range of multimedia they use in the classroom. One caveat, though; an independent samples t-test reveals that only the difference in use of multimedia carries statistical significance (t = 2.31, df = 299, p < .05).
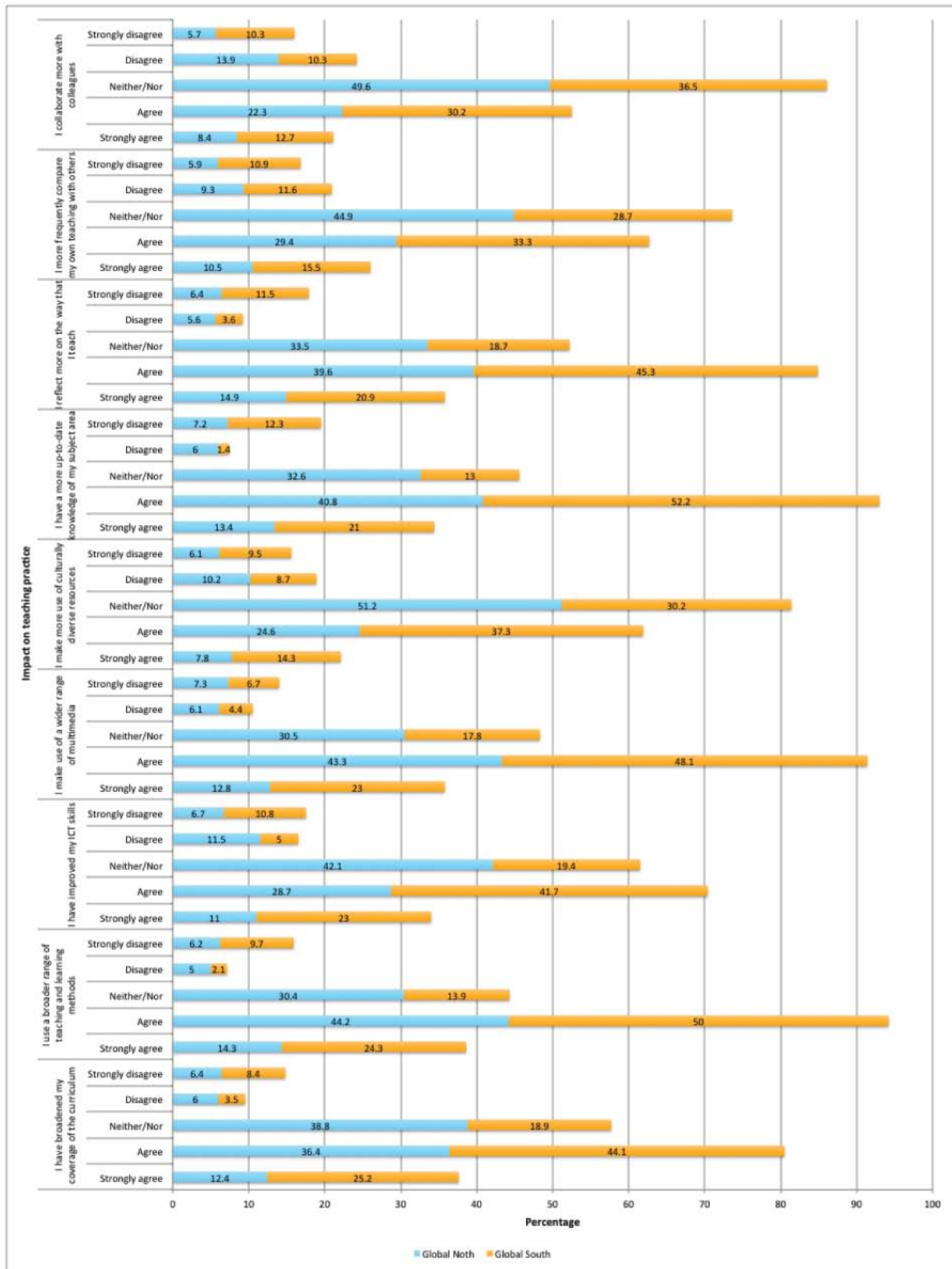
Figure 3: Impact of OER use on teaching practices for female educators in the Global South/North

Table 8: Differences in perceived impact of OER on teaching practices by gender

| | GLOBAL SOUTH | | | |
| | FEMALE | | MALE | |
	Count	%	Count	%
I have broadened my coverage of the curriculum	99	69.2	124	68.5
I use a broader range of teaching and learning methods	107	74.3	111	63.8
I have improved my skills in information and communication technologies	90	64.7	97	55.7
I make use of a wider range of multimedia	96	71.1	100	59.5
I make more use of culturally diverse resources	65	51.6	82	50.6
I have a more up-to-date knowledge of my subject area	101	73.2	108	63.2
I reflect more on the way that I teach	92	66.2	108	65.9
I more frequently compare my own teaching with others	63	48.8	87	52.4
I now use OER study to develop my teaching	66	56.4	71	49.3
I collaborate more with colleagues	54	42.9	85	51.5

Implications

The findings discussed above show that the fairly small (in relation to the total OERH dataset), fairly well-educated group of female survey respondents that feature in our research are using OER relatively extensively for professional development, to train others, to improve their language skills, to broaden their range of teaching resources and to improve their teaching practice. However, our research is limited by our well-educated, Internet-connected self-selecting sample. It is clear, though, that these survey respondents are still facing barriers to their engagement with OER and OEP and reference to related literature indicates that a much wider range of barriers are in operation in the developing world and are preventing women from online participation and the potential for empowerment that it offers.

Engagement with OER and OEP, and women's empowerment

On the basis of O'Neil et al.'s (2014, p. 1) definition of women's empowerment as "a process of personal and social change through which [women] gain power, meaningful choices and control over their lives" it is apparent that OER, and OEP such as resource adaptation, sharing, collaboration and peer support have potential to achieve increased women's empowerment. More specifically, our analysis of the OERH dataset offers an indication that both OER and OEP can help (some) women in the Global South to gain financial power and autonomy through low cost professional development and, following Gurumurthy and Chami (2014), to gain:

- Informational power: by giving women access to quality education, and to relevant, accurate and up-to-date information, including information on health, parenting and civic/political issues; and

- Associational power: by giving free access to knowledge that could lead to women's increased civic and political participation and engagement (also involving women gaining 'communicative power'); by promoting and supporting networking with peers within and beyond the global south, through a culture of openness; and, through capacity-building, whereby OER are used by women to train others, resulting in a multiplier effect.

The level of OER and OEP engagement shown by the OERH female survey respondents (and indeed the male respondents) in the Global South is particularly impressive considering the fact that our research suggests, in common with other studies (e.g. Perryman & Seal, 2015; Perryman & Lesperance, 2015; Perryman, 2013), that female educators, formal learners and informal learners in the Global South face greater barriers to OER use than do similar categories of people in the Global North, especially in terms of the availability and reliability of technology and Internet access, the lack of resources relevant to local contexts and in specific subject areas, and a perceived lack of skill to adapt OER. This level of engagement, in the face of increased challenges over those experienced in the Global North, also echoes other, non-gender-focused studies (e.g. Perryman & Seal, 2015; Perryman & Lesperance, 2015).

Limitations of our research

The relatively small number of OERH survey respondents from the developing world, and the even smaller percentage of female survey respondents from this area, indicates that empowerment through openness is being enjoyed by people who are already empowered. Indeed, the demographic of our sample suggests that OER use and OEP amongst women in the Global South may be limited to a particularly well-qualified elite and it is important to acknowledge that our research covers a limited, self-selecting sample that reflects the gender equality imbalances in the developing world. Inevitably, the OERH survey data, all collected online, does not cover people excluded from OER use and ICT due to lack of connectivity, equipment, opportunity and/or skill.

Recommendations

The World Wide Web Foundation (2015) report makes recommendations for measures that could help increase women's digital inclusion (and, consequently, their engagement with OER and OEP), in the interests of empowerment:

1. Establish time-bound targets for equity in Internet access, use and skills, by gender and income level.
2. Teach digital skills from primary school onwards.
3. Smash the affordability barrier.
4. Practice woman-centred design.
5. Make women's civic and political engagement an explicit goal.
6. Combat harassment of women online.
7. 'It's not (just) the technology, stupid'.

In 7 above, the report makes the important point that:

Empowering women does not happen in separate boxes labelled "offline" and "online", but requires progress across several fronts at once. Government agencies, civil society groups and private sector stakeholders will need to work together in all sectors to ensure that ICT initiatives are systematically integrated with wider efforts to expand women's choices and capabilities in the labour market, in the home, at school and in public life. Training policymakers across different sectors (such as health, education, small business, agriculture) to understand and harness the potential of ICTs to tackle poverty and gender inequality may be a good starting point. (World Wide Web Foundation, 2015, p. 7)

More specifically, any increase in women's empowerment through openness (and ICT engagement more broadly) needs to follow, or parallel, the removal of other, micro-level, meso-level and macro-level (Potnis, 2015) factors connected with gender inequality such as lack of financial autonomy, low levels of literacy, child marriage, early motherhood, gender-based violence, traditional seclusion practices, the favouring of boys in families' education investment, and the gendered division of household labour—all identified by UNESCO (2015, p.26) as amongst the "structural barriers and entrenched discriminatory social norms' that impede women's empowerment", and featuring in Gurumurthy and Chami's (2014) research framework (Figure 1) and Potnis's (2015) table of barriers reinforcing the gender-related digital divide (Table 1).

We strongly support the World Wide Web Foundation recommendations above, including their assertion that social, political, cultural and economic changes in the offline world are vital for achieving women's empowerment both generally and through the use of ICTs (and, it follows, through engagement with OER and OEP). However, we have limited our own recommendations to those which researchers and OER/OEP projects can realistically achieve:

1. Extend the practice of releasing OER in a variety of formats, to mitigate against the cost barrier to engagement:

The World Wide Web Foundation report (2015) suggests that cost is a major inhibitor to Internet connectivity and use of ICTs by women in developing countries, noting that:

> In the countries in our study, a monthly prepaid data allocation of one GB (enough for just 13 minutes of Web use a day, excluding video) costs, on average, about 10% of average per capita income. That's 10 times more than what the same data costs the average OECD citizen, relative to income, and is double what people in developing countries spend on healthcare (p. 4).

The consideration of cost is particularly pertinent to our own research in suggesting that it is possible that the 'freeness' of 'online only' OER would be irrelevant where the cost of connecting to the Internet to access such OER is prohibitive. While it has long been voiced that "no well-known definition of Open Educational Resources (OERs) states that the resource must be available online" and "in fact OERs do not even have to be digital" (Open Knowledge Foundation, 2014), the majority of OER are released solely in digital format. That said, various OER for development projects (e.g. TESS-India) have been releasing multi-format versions of resources, including print, CD, SD card and radio-delivered versions, in order to meet the needs of their target users. We fully support the Open Knowledge Foundation (2014) recommendation that "when a version is available online there is need to encourage OER producers to offer an offline/portable version wherever feasible" and, indeed, we propose that this should be the default practice when creating and releasing OER.

2. Prioritise the development of communities of practice (Wenger, 1998) for the creation of OER and enactment of OEP, to include women at all stages of empowerment:

Glennie, Harley, Butcher and van Wyk (2012, p. v) note the dangers of OER for development projects involving "the rich north [pushing] resources at the poor south" without thought of reciprocity, leading to one-directional flows of knowledge and resources—a tendency that replicates broader trends in international development. Acknowledging this, Perryman, Buckler and Seal (2014, p. 1) argue that "when collaboration is embedded within OER production and localisation, their creation and use can lead to a knowledge partnership approach whereby communities of OER practice engage in mutually beneficial sharing of expertise and contextual understanding". We propose that it is important to have women as *creators* as well as consumers of ICTs (and OER), and that OER projects should seek to develop user-centred communities of practice such as those featuring in the Karnataka OER project (http://karnatakaeducation.org.in/KOER/en/index.php/Main_Page; see

also Perryman, 2013) and operating in the Virtual University for Small States of the Commonwealth (see Perryman & Lesperance, 2015), as a means of providing skills development and peer support around women's creation, use and evaluation of OER.

3. Move into the offline world when conducting research on ICTs and openness, and explore a broader range of barriers to digital participation and engagement with openness:

The World Wide Web Foundation (2015) identify a correlation between women's activities offline and online, for example in noting that:

> Women who are active in "offline" political and civic life are not only more likely to be connected in the first place, but are also three times more likely (controlling for education level, age and income) to use the Internet to express opinions on important or controversial issues than other women. We need to better understand this synergy between offline and online agency in order to learn how gender norms that silence women in both realms can be overcome (p. 5).

It is clear that purely online research will only perpetuate the gender-related digital divide and we recommend that future research on openness in development contexts should include hard copy surveys delivered to hard-to-reach areas. In the next phase of our own research we will be conducting a new survey, covering a wider range of barriers to ICT/OER/OEP engagement, including societal, economic and cultural inhibitors to participation, specifically targeted to women, and conducted both online and offline.

4. Prioritise the localisation of existing OER, including translation into mother tongue languages to increase accessibility and relevance:

Removing technological barriers to openness by increasing Internet connectivity and ICT availability and reliability, making ICTs more affordable to use, and minimising societal barriers to digital participation will not be effective in increasing engagement with OER if resources are contextually inappropriate and are inaccessible due to the language in which they are presented. Robinson-Pant (2007, p. 429) points out that "in many countries of the world there is gendered access to languages" and "whereas men and boys have often had the opportunity to learn the language of power at school, women may only know how to speak their mother tongue". IBIS (2014, p. 2) concur that "marginalised people (especially women) speak languages that are often not valued or even recognised outside their communities" and that these "'linguistic minorities' often outnumber speakers of the dominant/national language". Consequently, IBIS argue, "the question of language thus has huge implications for participation, governance, citizenship, fulfilment of rights and the distribution of power and resources". We believe that the 'question of language' also has huge implications for empowerment through openness and we therefore recommend that OER localisation should include translation into mother tongue languages where possible. Ivins (2012, p. 219) argues that "localization must involve locals; a community of practice bolsters localization; localization must be done in appropriate formats; and effective localization is directly proportional to understanding local contexts". Accordingly, localising resources on a community of practice, or crowd-sourced basis could be of value here in drawing on the skills of experts in these languages.

Conclusion

So, what can the open education movement do to help increase women's empowerment through openness, and specifically OER and OEP? We propose that while top-down initiatives can be effective in attracting funding and institutional support for projects intended to achieve transformation in a development context it is also crucial for such projects to have a bottom-up focus driven by the people they are aiming to help. Communities of practice (Wenger, 1998) such as Karnataka OER

can work well in this regard, especially in facilitating capacity building. However, communities of practice such as Karnataka OER are often dependent on at least some Internet connectivity and ICT skill amongst members and, for some women, participation in such communities is precluded by societal and structural factors such as discrimination, isolation, lack of autonomy and financial power, and lack of access to education. These basic 'unfreedoms' (Sen, 1999) need to be removed before the full potential of openness can be realised. Advocacy, activism and raising awareness is important here and, indeed, the 2015 SDG have driven a renewed focus on this in relation to SDG5. Partnerships with NGOs and other organisations working in the Global South can also work well in informing localisation of OER in terms of language, content and appropriate formats. Above all, we recommend that all OER and OEP projects operating in the Global South should have a gender equality component to ensure the privileges typically enjoyed by the open education movement can be leveraged to help contribute to achieving widespread women's empowerment, on a global scale, as swiftly as possible.

Acknowledgement

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Book Review of MOOCs: Opportunities, Impacts, and Challenges. Massive Open Online Courses in Colleges and Universities

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Introduction

For several years there has been hype about Massive Open Online Courses (MOOCs) in higher education. These MOOCs are changing the landscape of higher education by changing the way online education is viewed. Many unanswered questions exist for faculty, administration, and students about how these MOOCs will impact the current status quo in the American university. Now that the hype is slowing down around the creation of MOOCs, it is the time to analyze the struggles and successes of these massive online courses.

As the title points out, the author strives to analyze opportunities, impacts, and challenges for universities now that MOOCs are part of this educational landscape. Each chapter of this book has two goals. To look at things that have gone wrong in MOOCs offered up to this point, and also to look at new and innovative practices that can be incorporated into higher education. To facilitate these goals, the author has broken up this text into three sections (a) The Landscape, (b) Nuts and Bolts, (c) The Shape of Things (to consider). The author has written this book to appeal to college and university faculty and administrators, but this book would also appeal to the general public interested in the current and future landscape of higher education.
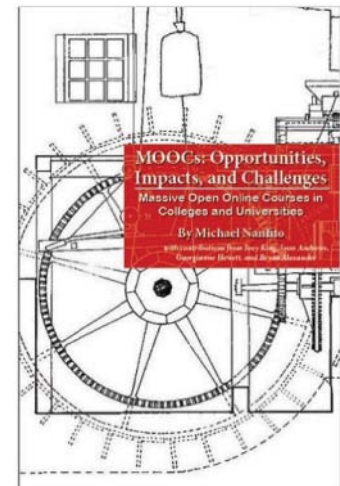
Content

Part 1: The Landscape

The first section of this text includes three chapters: Isolating the Hype, Identifying Expectations and Hope, and Demographics of MOOCs. These three chapters focus on the current realities of MOOCs. Included in these chapters are the current public/private partnerships, current funding models, and current enrollment data in MOOCs. In this text, the author presents several questions about MOOCs. How should universities count MOOC enrollment? Why are completion rates so low in MOOCs? Should universities charge for MOOCs? Who is enrolling in MOOCs? As in most of this book, there are not answers to many of these questions, but developing an improved model of higher education begins with asking good questions.

Part 2: Nuts and Bolts

The second section of this text includes two chapters: Impacts of Online Learning Technologies and Can MOOCs be Made to Add Up. The first chapter in this section looks at the software platforms that are being used to facilitate MOOCs. This chapter also includes information about the necessity of accessibility, copyright, and bandwidth issues that have been noted in early MOOCs.

Chapter five deals with money. This chapter looks at corporate partnerships and other methods of funding a MOOC. Some of the methods of paying for an open course seem to be selling advertising space in the course, charging for test proctoring, charging for a completion certificate, or charging for course credit. The author makes no judgment on the correct model for any institution, but does provide a rudimentary analysis of each of these scenarios.

Part 3: The Shape of Things (to consider)

The last section of this text includes four chapters: Creditable Credits, Measurement of Knowledge and Competency, The Rise of the Machines, and the Conclusion. Chapter six looks at traditional university credits and how they may apply to MOOCs. Some may ask if college credit should be given for completion of a MOOCS. Others think that credit should be given for this type of course work, but the traditional credit (which was created to reflect seat time) is no longer a valid measure for universities. Again, the author provides no judgment on this matter, but does provide information for the reader to form his/her own ideas.

Assessment of students is a hot topic in every area of education. Assessment in the MOOC area provides its own challenges. MOOC providers have the option to develop assessment systems that will provide credit for completing the MOOC. Alternatively, an option being researched by several universities is the ability to complete competency exams for courses offered at the university. This exam option would allow students to get credit for all of their prior knowledge, not just the knowledge acquired from a MOOC.

Just like assessment, big data and data analytics are growing topics in higher education. The class sizes of MOOCs provide a significant advantage in for data analytics by increasing sample sizes. MOOCs are providing a unique area for big data and data analytics. They provide a large sample size of students while completing all interactions online. This data can be analyzed to provide teaching and learning insight to future MOOCs, as well as, traditional online and face-to-face courses.

Chapter eight also briefly discusses adaptive learning. Many textbook publishers and platform vendors are working on adaptive learning environments. These environments can be a benefit to students when used correctly to give the student the level of learning he/she would benefit from the most. In the last chapter of this text, the author makes the conclusion that MOOCs are here to stay. Face-to-face courses are also here to stay. It is up to each institution to review their strategic plan and mission and decide what mode of delivery fits into these documents. MOOCs are not the answer for every higher education institution, but they will have a place in the landscape.

Conclusion

This book is a great practical look at the MOOCs that have been carried out by individual universities and in university/private company partnerships. It is an easy read and applicable to university administrators and faculty members, as well as, students, parents, and anyone interested in higher education in America. The author does a good job of providing information while allowing the readers to draw their own conclusions. This book also provides a reference section in each chapter for

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readers to dig deeper in any area of the areas covered. In conclusion, this book covers the 2013 landscape of MOOCs in higher education very well. The topics of online learning technologies, learning analytics, awarding college credits, and strategic planning covered in this book can also be applied to current MOOCS and traditional online courses. This book is a valuable contribution to the field of online learning through a consolidated and unbiased look at MOOCs.

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