United Nations
Educational, Scientific and
Cultural Organization

COMMONWEALTH of LEARNING

PERSPECTIVES ON OPEN AND DISTANCE LEARNING

Open Educational Resources and Change in Higher Education: Reflections from Practice

Jenny Glennie, Ken Harley, Neil Butcher and Trudi van Wyk
Editors

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Published by Commonwealth of Learning, Vancouver, 2012

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development and sharing of open learning and distance education knowledge, resources and technologies.


Commonwealth of Learning, 2012

PERSPECTIVES ON OPEN AND DISTANCE LEARNING: Open Educational Resources and Change in Higher Education: Reflections from Practice

ISBN 978-1-894975-53-7

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Foreword

In July 2009, nearly 2,000 people, representing most countries of the world, gathered at UNESCO in Paris for the World Conference on Higher Education. Subtitled The New Dynamics of Higher Education and Research For Societal Change and Development, the conference explored a number of salient trends, including the increasing use of information and communication technology and open and distance learning. Open educational resources (OER) were discussed within that context, and a memorable moment in the conference was a robust exchange between two South African heads of large distance teaching universities. At that time, Professor Brenda Gourley was Vice-Chancellor of the UK Open University, which was intensely engaged in developing its OpenLearn website of OER. Professor Barney Pityana, then Principal and Vice-Chancellor of the University of South Africa (UNISA), took issue with the enthusiasm for OER, fearing that it would lead to a wave of intellectual neo-colonialism whereby the rich north would push these resources at the poor south without thought of reciprocity. Elsewhere at the Conference, delegates noted that, paradoxically, the "OER community" was a rather closed group of OER producers giving little attention to the reuse and repurposing of these resources.

The potential importance of OER was taken up at the UNESCO General Conference later in 2009, which urged that more be done to alert educational policy makers and governments to this opportunity. This led the Commonwealth of Learning (COL) and UNESCO to work in partnership on two initiatives. In 2010–2011, the project Taking OER Beyond the OER Community: Policy and Capacity for Developing Countries held nine face-to-face and three online workshops for educational leaders and policy makers in Africa and Asia. As a result, the two organisations jointly published *A Basic Guide to Open Educational Resources* and *Guidelines for Open Educational Resources in Higher Education*. These documents provided a solid base for the 2011–2012 project Fostering Governmental Support for OER Internationally. This involved surveying governments about their intentions and policies with regard to OER, and holding regional policy forums in preparation for UNESCO's World OER Congress in June 2012.

This book is evidence of the solid progress being made in response to the challenges flagged at the 2009 UNESCO conferences. Activity in developing countries accounts for the majority of the work reported here, and the experience of using and repurposing OER receives as much coverage as their initial development. Other papers describe how OER can be fitted most productively into the wider educational ecosystem.

Given its mandate of expanding access to learning and sharing learning materials, COL has made an institutional commitment to OER, becoming the first international intergovernmental organisation to have an explicit corporate policy on their use. This book is a further expression of UNESCO's and COL's commitment to this most important development. I thank the authors for their pioneering work and I commend it to you.

Sir John Daniel
Commonwealth of Learning

Acknowledgements

The editors would like to acknowledge with gratitude all those who have made a significant contribution to the publication of this book. We are indebted to Sir John Daniel (former President, Commonwealth of Learning) for his leadership in OER, and to Professor Asha Kanwar (President, Commonwealth of Learning) for her very useful comments on the initial concept note for the book and for her encouragement and support. Ms. Catherine Ngugi (OER Africa Project Director, Saide), Professor Cheryl Hodgkinson-Williams (Associate Professor of ICT in Education, University of Cape Town, South Africa) and Ms. Zeynep Varoglu, (Programme Specialist, UNESCO) provided considerable assistance in drafting the concept note for the book. Ms. Patricia Schlicht (Programme Assistant, eLearning, Commonwealth of Learning) and Ms. Donna Preston have been invaluable in coordinating the production of the publication. We are also most grateful to Ms. Dania Sheldon for the high level of professionalism she has displayed in editing the manuscript and to Ms. Denise Tremblay and Ms. Alex Hennig for the excellent typesetting and production of the book.

This book was initiated and supported throughout by the Commonwealth of Learning and UNESCO. Saide's OER Africa Initiative, funded by The William and Flora Hewlett Foundation, provided extensive support to the editors. Finally, and most importantly, we would like to acknowledge all of the authors, without whom this book would not have been possible. Thank you for your patience in dealing with all of our queries, requests and minutiae: we hope you are all happy with the result.

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Jenny Glennie is the founding director of the South African Institute for Distance Education (Saide), a non-profit organisation committed to increasing access to quality lifelong education, especially for more marginalised groups. Under her leadership since 1993, Saide has become well respected across the continent for its capacity development (especially in course design and materials development), policy formulation, and gathering and dissemination of information, as well as for its OER Africa Initiative, which supports the development and use of OER in Africa.

Jenny has a long history in distance education, building on 15 years at the Sached Trust, a prominent anti-Apartheid NGO operating across the country. Inter alia, she was director of course development and production (including being responsible for the development and production of a ground-breaking weekly newspaper supplement covering formal and non-formal education for youth and adults).

She is the South African government's representative on the board of the Commonwealth of Learning (COL) and a long-standing council member of UNISA, South Africa's mega distance education university. In 2002, COL conferred on her the title of honorary fellow, for her contribution to distance education. She was recently awarded the Chancellor's Medal at the University of Pretoria for her contribution to education in South Africa.

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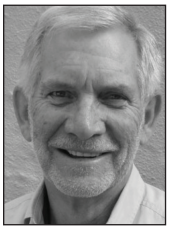

Ken Harley holds an Emeritus Professorship at the University of KwaZulu-Natal, South Africa. As Head of the School of Education, he led and managed research and curriculum developments. His publications include three books, six chapters in books, and 21 articles in refereed journals. He was Editor of *Journal of Education* for 12 years and still serves on the Editorial Board.

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Trudi van Wyk joined the Commonwealth of Learning in 2009 as Education Specialist – eLearning, where she focuses on increasing digital literacy in institutions and communities; providing ICT in Education policy support to governments; preparing teachers for ICT integration into teaching and learning; and promoting the use of OER. She pursues these goals through advocacy, capacity-building, professional development, innovative use of ICT, policy support and development of models.

Previously, Trudi was Director: Curriculum Innovation (ICT in Education) in the South African Department of Education, focusing on ICT in Education policy, applications and the implementation of ICT in education and training.

She has also managed various international collaborative ICT projects for South Africa, including the SCOPE project of the governments of South Africa and Finland, the Nokia m-learning Initiative and the NEPAD e-Schools Initiative. She was the Chairperson of the Southern African Development Community (SADC) Technical Committee on Open and Distance Learning.

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Andy Lane has been at The Open University, in the UK, since 1983, and held various offices in that institution's former Technology Faculty, including being Head of the Systems Department, Associate Dean and Dean. Promoted to Professor of Environmental Systems in 2005, Andy was Director of The Open University's multi-award-winning OpenLearn Initiative (www.open.ac.uk/openlearn) from 2006–2010, served as a board member of the Open CourseWare Consortium from 2008–2010, and has worked on a number of UK and Europe-wide OER projects. He has authored or co-authored many publications dealing with systems of open education, especially the use of open educational resources.

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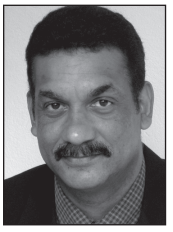

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During his time with the Ministry of Education, he established the Seychelles Industrial Training Centre, now called the Seychelles Institute of Technology, and later served as Director of the same institution.

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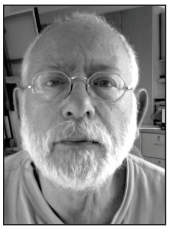

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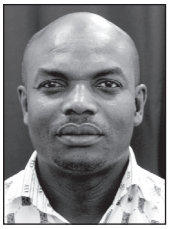

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List of Acronyms

A2K	access to knowledge
AAMC	Association of American Medical Colleges
AAOU	Asian Association of Open Universities
AAU	Association of African Universities
ABDA	Brazilian Association of Copyrights
ABDR	Brazilian Association of Reprographic Rights
AERC	African Economic Research Consortium
AeU	Asia e University
AfSIS	Africa Soil Information Service
AJOL	African Journals Online
APS	American Physical Society
AU	Athabasca University
BERLiN	Building Exchanges for Research and Learning in Nottingham
CCANZ	Creative Commons Aotearoa New Zealand
CGIAR	Consultative Group for International Agricultural Research
CHS	colleges of health and science
CIAT	International Center for Tropical Agriculture
CIS	Commonwealth of Independent States
COL	Commonwealth of Learning
CPD	continuing professional development
DISA	Digital Information South Africa
DOAJ	Directory of Open Access Journals
DPTE	Diploma in Primary Teacher Education
FAO	Food and Agriculture Organization
FDHA	Foothill De Anza Community College
FNDE	National Fund for Education Development (Brazil)
GPOPAI	Research Group for Public Policies for Access to Information
HEA	Higher Education Academy (UK)
HEI	higher education institution(s)
ICDE	International Council for Open and Distance Education
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	information and communication technology/technologies
IFPRI	International Food Policy Research Institute
IGNOU	Indira Gandhi National Open University
IGO	intergovernmental organisation
IISc	Indian Institute of Science

IIT	Indian Institute of Technology
IITE	Institute for Information Technologies in Education (UNESCO)
IP	intellectual property
IPR	intellectual property rights
ITREOH	International Training and Research in Environmental and Occupational Health program (Fogarty International Center, National Institutes of Health, USA)
ITU	International Telecommunication Union
JHSPH	Johns Hopkins School of Public Health
JISC	Joint Information Systems Committee (UK)
KATH	Komfo Anokye Teaching Hospital
KBTH	Korle Bu Teaching Hospital
KNUST	Kwame Nkrumah University of Science and Technology
KSA	knowledge, skills and attributes
LMS	learning management system
LSEN	learners with special educational needs
MIT	Massachusetts Institute of Technology
MOOCs	massive open online courses
MQA	Malaysian Qualifications Agency
MSU	Michigan State University
NASET	National Association of Special Education Teachers
NGO	nongovernmental organisation
NIH	National Institutes of Health
NPTEL	National Programme on Technology Enhanced Learning
NZGOAL	New Zealand Government Open Access Licensing
NZQA	New Zealand National Qualifications Authority
OCI	Open Content Initiative
OCW	open courseware (can also refer to OpenCourseWare at MIT)
OEP	open education(al) practices
OER	open educational resource(s)
OERTen	OER Tertiary Education Network
OERu	OER university
OPAL	Open Educational Quality Initiative
OpenDOAR	Directory of Open Access Repositories
OSTRICH	OER Sustainability through Teaching and Research Innovation: Cascading across HEIs
OTTER	Open, Transferable, Technology-enabled Educational Resources
OUS	Open University of Sudan

OUT	Open University of Tanzania
PCK	pedagogical content knowledge
PLOS	Public Library of Science
PNE	National Plan of Education (Brazil)
QA	quality assurance
RPL	recognition of prior learning
Saide	South African Institute for Distance Education
SBCTC	State Board for Community and Technical Colleges (USA)
SIM	self-instructional module
SIM/SLM	self-instructional/self-learning material
SPARC	Scholarly Publishing and Academic Resources Coalition
SPSS	Statistical Package for the Social Sciences
SREB	Southern Regional Education Board (USA)
TES	Teaching Enhancement Series
TESSA	Teacher Education in Sub-Saharan Africa
TQF	Transnational Qualifications Framework
U-M	University of Michigan
UCT	University of Cape Town
UCT CHED	University of Cape Town Centre for Higher Education and Development
UCT FHS	University of Cape Town Faculty of Health Sciences
UEW	University of Education, Winneba
UG	University of Ghana
UG CHS	University of Ghana College of Health Sciences
UKOU	The Open University (UK)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISA	University of South Africa
USAID	United States Agency for International Development
USP	University of São Paulo
USU OCW	Utah State University OpenCourseWare
UWC	University of the Western Cape
VASAT	Virtual Academy for the Semi-Arid Tropics
VLE	virtual learning environment
VUSSC	Virtual University for Small States of the Commonwealth
WAHSA	Work and Health in Southern Africa (Swedish International Development Agency)
WHO	World Health Organization
WSIS	World Summit on the Information Society

Introduction: Discourses in the Development of OER Practice and Policy

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Overview

In the last decade in particular, the promotion, sharing and use of open educational resources (OER) have been growing exponentially. However, as with any new phenomenon or paradigm, our knowledge of OER's ramifications and achievements to date necessarily lags behind actual developments. The concept of OER — understood simply as "educational resources ... that are openly available for use by educators and students, without an accompanying need to pay royalties or license fees" (Butcher, 2011, p. 5) — has multifaceted dimensions and implications. For educational institutions, the dimensions are legal, managerial, financial, technical, technological and pedagogical; for practising educators, at stake are ways of teaching that are normative, together with a sense of identity that is both personal and professional. It would be astonishing if research, which by its very nature must be clearly focussed, were able to keep abreast of all such aspects of OER.

Our editorial stance is that OER development is best served by critical reflection offered by key players in or contributors to the OER field. This provides the rationale for the book and the selection of contributors.

It has been noted that "while OER activity is global ... the largest and best funded initiatives have mostly been in developed countries from North America and Europe" (Lane, 2010, p. 2). As a result, little is known about important questions such as how the more acute levels of resource constraint typical of developing countries impact on demand for OER and on OER "reuse". The case studies and reflections in the present book accordingly cover OER practice and policy in a diverse range of contexts, with a strong focus on events in developing countries. However, the focus on experiences from the developing world is not exclusive, as

valuable "generic lessons" applicable also to developing countries can be drawn from research in the more developed countries.

This introduction first sketches a contextual setting for the chapters that follow. With reference to the existing literature, we begin by reviewing OER developments and some of the questions that have arisen from advances made thus far. Drawing inferences from these questions, we identify some of the more important gaps in the way OER research has been conducted. We argue that failure to begin exploring these gaps carries risks that could impede further OER progress.

Second, we provide very brief descriptions of the book's chapters and vignettes. The focus is on locating these pieces within the OER landscape rather than presenting complete summaries of each. Readers curious to find out more about a particular chapter or vignette that catches their interest should refer to the relevant abstract.

In the conclusion to the book, we provide a brief reflection on key issues that emerge from the case studies.

The Contextual OER Setting

OER Developments and Some of the Questions that Arise

OER momentum has been sparked and led by individual enthusiasts, universities and other agencies, ranging from international organisations to funders, and even some governments. Prominent OER enthusiasts have a notable presence on the Internet. Vibrant OER blogs are evident, some written and maintained by individuals,[1] others providing useful services such as identifying and reviewing helpful resources.[2] One evaluation of a funded project reports that individual commitment to OER sometimes borders on the "evangelical" (Harley, 2011, p. 10).

Perhaps the most striking example of individual "conversion" is that which occurred when one of the Massachusetts Institute of Technology's (MIT) institutional heads came to a revolutionary conclusion whilst taking a shower: "Well, if we're not going to try to make money from our educational material, maybe we should just give it away" (Attwood, 2009). At the institutional level, however, personal conviction has to be translated into policy and practice. In the case of MIT, it has. MIT's OpenCourseWare (OCW) site,[3] which makes course materials such as syllabi, tests and lecture videos from over 2,000 MIT classes available free online, is reportedly one of the most popular search sites of its kind. Indeed, the institution itself now operates differently. MIT students expect their courseware to be available online, and a sizeable proportion of MIT alumni frequent the OCW website for ongoing professional development. The next logical step was announced recently:

> for the first time it [MIT] will offer credentials — under the name "MITx" — to students who complete the online version of certain courses, starting with a pilot program this spring.... University officials described "MITx" as a non-profit entity established inside the university that will offer an "MIT-sanctioned certificate" for completing various courses or, perhaps eventually, whole course sequences ... (Pope, 2011)

Research into the effects of OER initiatives in the United Kingdom's Open University (UKOU) highlights various benefits, which include improved visibility and profile for the university, bringing enhanced relationships with major strategic partners in the UK. There is also evidence of new students being attracted to the university (Gourley & Lane, 2009).

OER developments and positive outcomes at both MIT and UKOU place them amongst the examples of institutions that have found ways of sustaining OER activity after their initial funding base was reduced. It is not hard to find other examples of funded projects that have achieved notable success. Rice University's open courseware initiative, like that of MIT, was funded by grants from The William and Flora Hewlett Foundation, as were many other OER initiatives around the world.[4] Rice's non-profit publisher, OpenStax College, is an example of an initiative that has attracted multiple funders: The William and Flora Hewlett Foundation, the Bill & Melinda Gates Foundation, the Twenty Million Minds Foundation, and the Maxfield Foundation. This initiative

> will offer free course materials for five common introductory classes. The textbooks are open to classes anywhere and organizers believe the programs could save students $90 million in the next five years if the books capture 10 percent of the national market. (Smith, 2012)

The Bill & Melinda Gates Foundation is prominent in funding OER projects in agriculture, amongst other focus areas.[5] The Shuttleworth Foundation has funded research on copyright, as well as the meeting that in 2008 drafted the "Cape Town Open Education Declaration", urging governments and publishers to make publicly funded educational materials available at no charge via the Internet.[6] More recently, the Shuttleworth-funded Siyavula project[7] has produced open textbooks in key subject areas for the South African curriculum, which the national Department of Education has made available to all Grade 10–12 learners enrolled in Physical Science and Mathematics.

Clarity regarding the nature and scope of OER has been provided mainly by two international organisations that have consistently championed OER: the Commonwealth of Learning (COL) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The former has made OER an important component in all aspects of its work, emphasising the delivery of products, mainly in the form of materials. Since the term "open educational resources" was first adopted at UNESCO's 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries, UNESCO has taken a leadership role in making countries aware of the potential of OER.

Ongoing co-operation between COL and UNESCO has been responsive to needs expressed by the higher education sector:

> At the 2009 World Conference on Higher Education: The New Dynamics of Higher Education and Research For Societal Change and Development (UNESCO, Paris, 5–8 July 2009), it was communicated that ODL [open and distance learning] approaches and ICTs [information and communication technologies] present opportunities to widen access to quality education, particularly when Open Educational Resources are readily shared by many countries and higher education institutions (Communiqué, 8 July 2009). (UNESCO & COL, n.d.)

Two recent COL/UNESCO publications bring further coherence to our understanding of OER. The *Guidelines for Open Educational Resources (OER) in Higher Education* (COL & UNESCO, 20) provides an overview of key issues for integrating OER into higher education. Key stakeholders are addressed: governments, higher education providers, academics, students and accreditation/regulatory bodies. Because of the widely consultative nature of their compilation, these guidelines have credibility and plausibility. *A Basic Guide to Open Educational Resources (OER)* (Butcher, 2011) distinguishes the essence of OER from confusions with eLearning, distance education, open education and resource-based learning/teaching. This guide addresses questions frequently raised about creating, finding, using and adapting OER.

Developments suggest that OER comes with a compelling logic. There is a plethora of work on the history and promise of OER in relation to enhanced learning experiences for greater numbers of students at reduced cost. In its "Report Prepared for the UNESCO 2009 World Conference on Higher Education", UNESCO notes the inexorable logic of "massification" in the sector (Altbach, Reisberg, & Rumbley, 2009). This logic is driven, on the one hand, by greater demand for access to higher education, and on the other, by demand for human capital and skills on the part of modern economies. Implicit within this logic is the need for enhanced quality in teaching and learning.

In Sub-Saharan Africa, a region with the lowest tertiary gross enrolment ratio in the world (five per cent) (Altbach et al., 2009, p. 38), the notion of freely available, high-quality resources to serve teaching and learning in resource-scarce contexts has an obvious resonance. Indeed, much of the OER impulse is instrumental, aimed specifically at overcoming deficits. For example, a report to The William and Flora Hewlett Foundation, entitled *A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges, and New Opportunities*, declares that

> the plan is intended to be a strategic international development initiative to expand people's substantive freedoms through the removal of "unfreedoms": poverty, limited economic opportunity, inadequate education and access to knowledge, deficient health care, and oppression. (Atkins, Brown, & Hammond, 2007, p. 1)

At the same time, the instrumental/deficit impulse for OER is intersected by powerful political and social imperatives for equity and social justice. Such imperatives find expression in views such as the following:

> Free and Open Educational Resources at the University of the Western Cape (UWC) are deeply rooted in our institutional culture, stemming from the role we played in the struggle for political freedom in South Africa.... The focus at the UWC is on the benefits of freedom that include social justice, rather than solely on the utility benefits, hence the continued use of the term *Freedom* within the conceptualisation and the choice of licences consistent with that concept. (Keats, 2009, p. 47)

As with the urge to achieve instrumental objectives, whether liberatory aims are actually translated into successful educational outcomes remains an open question of the kind to which the present collection of case studies seeks to

respond. The point being made here is that the instrumental logic of OER is undoubtedly infused with a powerful moral authority.

OER may also bring differential benefits in relation to particular "modes of delivery" (which may or may not correspond to institutional type). For example,

> providers wishing to use eLearning now have available a rapidly growing body of open educational resources: freely available learning materials that can be adapted to particular local needs. This is a crucial development. The combination of expanding connectivity and the swelling reservoir of open educational resources is potentially revolutionary, not least because it may allow institutions to achieve low per-student costs without having to achieve huge volumes. Course development costs are a major item for quality distance education. Open educational resources allow the widespread adaptation and use of good learning material. (Daniel, Kanwar, & Uvalić-Trumbić, 2007)

Even from our brief overview it is evident that OER progress has been remarkable. The main challenge is one of sustaining and extending the OER platform that has been built. OER has been depicted as a "disruptive innovation" that has secured a number of "early adopters" (Stacey, 2010). It is possible that the early adopters of OER enjoy a profile that brings funding opportunities and an appeal to potential students in a way that may not similarly accrue to institutions not at the vanguard of the movement. Jan Hylén's state-of-the-field review in 2006 concluded with questions such as, Who is using OER and for what purpose? "A lot of fundamental questions still remains [sic] to be answered" (Hylén, 2006, n.p.). In recent years, some of these questions have been addressed, and some of the chapters that follow are testimony to these developments.

In the next section, we cluster many of the significant questions that could be asked about OER under the umbrella of teaching and learning "practice", and we find evidence to suggest that the orientation of OER research tends to be somewhat uncritical.

Significant Questions About OER — and Approaches to Answering Them

The most significant gap in the literature is that many of the important questions concerning actual OER *practice* remain unanswered. For example, at the present stage of OER "take-up", "we are watching OER move from being an end i[n] itself to becoming a means to an end" (Vollmer, 2010). Yet significant questions about ends being achieved remain unresolved. A wealth of literature — and educational theory — testifies to the effectiveness of well-developed resources and materials in supporting the more traditional modes of contact teaching, with its predominance of "teacher talk". With OER, however, the fundamental issue of effective resource-based teaching and learning leads to nuanced questions, such as:

- Can learning resources designed for specific students in particular contexts be as successful in other contexts?
- Will "reusers" of OER exploit the advantages of open licensing and adapt high-quality resources to their own teaching situations?

- What are the conditions under which adaptations and improvement might occur?
- How will increasingly widespread student access to online open content (i.e., that is not officially part of course designs) affect the dynamics of the teaching and learning process?

Such questions about OER practice are also found in Asha Kanwar's[8] reflections on learning from OER experiences. She argues that there is too much focus on technology and OER products, and too little on stakeholders and processes: "Most of the available literature on OER focuses on production. How do we move to the next level and promote actual use and re-use? How will this help us achieve development outcomes?" (Kanwar, 2011). In an analysis of publicly and foundation-funded OER initiatives worldwide, Ulf-Daniel Ehlers concurs: "[T]he focus of current, well-known OER initiatives is on the creation and publication of OERs. Use and reuse are still somewhat underrepresented" (Ehlers, 2011, referencing Paul Stacey). If there is indeed some validity in the view that there is hesitancy on the part of academics to adapt or reuse others' content (Anderson, 2009), we do not know either the extent of this hesitancy or how to account for it. A number of complementary possibilities seem plausible: since OER development is well reported, the gaze of the literature may not yet have settled on OER reuse; or because of unawareness of copyright laws and the opportunities afforded by open licensing, much reuse might even be taking place discreetly, "below the radar", so to speak; or as an academic community we might be so swamped with information that we take little note of potentially useful resources.

A different kind of obstacle might jeopardise not only OER use and reuse but also original design and creation. Academics function in institutional policy environments that are in turn informed by national higher education policies. Policies, as objective and external facts, surround academic activity. They shape expectations and reward academics to the extent that the academics stay within their assigned performances. By tradition, it is publication of peer-reviewed research that leads to reward and social esteem. As an enabling or deterrent force in matters of OER creation and adaptation — as well as better teaching — policy is critical to the development of the kinds of practices about which, it has been argued, we need to know more. This accounts for the policy focus of chapters 13–15 in this book.

A bigger problem than absence of research into significant aspects of OER is simple lack of the kind of critical, evidence-led insights on which higher education places so much emphasis. Lack of critical perspective emerges strongly in a recent survey of academic OER publications in Africa (Papachristou & Samoff, 2012):

- Many articles cover OER within a particular institution "without examining the wider trend or broader challenges of implementation" (p. 1).
- Throughout the literature, there are "enthusiastic endorsements of open educational resources, often with little or no attention to the practical issues and problems that arise from actual use" [although lack of Internet access emerges as a frequently identified barrier] (p. 2).
- Critique of OER initiatives and implementation is infrequent, as is "a critical perspective on the role and utility of open educational resources" (p. 2).

- "To date, the major education journals have published very few articles directly concerned with open educational resources" (p. 2). This might be because of the "strong and seemingly unleavened optimism of the research. Hardly any of the articles identified major obstacles and problems, or noted stillborn or unsustained initiatives, or reported significant frustrations or failures" (p. 3).

Lack of critical perspective is perhaps unsurprising when the concept of OER presents itself as such a self-evident social "good". The situation is similar to the erstwhile uncritical acceptance of schooling as an unquestionable social "good" that could unproblematically resolve social ills like poverty and inequality — until the radical de-schooling movement emerged in the 1970s.[9] At present, there is little sign of an even moderate intellectual "de-OER" movement. Perhaps this is because OER has no clear "disciplinary" home, and it is from such a base that the most informed critiques normally originate. It is true that in some countries, publishers have mounted legal actions to curtail free and open accessibility to educational resources. However, one suspects that oppositional measures of this kind are impelled by vested commercial interests rather than by disinterested academic enquiry. Indeed, the fears of publishers might be testimony to the vast potential of OER rather than a reflection of serious questions about its efficacy.

In looking to the future, Lane and McAndrew argue: "In the end, success is more likely to happen through experimentation on the ground by learners and teacher practitioners than by the efforts of educational researchers or technologists" (Lane & McAndrew, 2010, p. 959). Whilst agreeing with this judgement, we hope that the present collection of grounded reflections on OER practices and OER policy development, provided by OER practitioners themselves, offers the promise of insights and inferences that will usefully inform future OER debate and development.[10]

The Risk of Not Knowing More About OER

Randall Collins opens his history of intellectual change by stating: "Intellectual life is first of all conflict and disagreement" (Collins, 2000, p. 1). Harmonising OER production with research has the potential to sharpen quality by infusing critical reflection into the OER field, which, because of its ready ideological appeal, might be susceptible to lapsing into a "feel-good" lack of criticality.

In other words, the OER movement is vulnerable to the consequences of meliorism. Representing the belief that the world tends to become better and that humans can aid its betterment, meliorism has obvious if perhaps optimistic appeal. And it certainly has resonance with OER. However, the problem with meliorism is that it assumes a particular intensity at times of social dislocation and crisis. Such a time was the early years of the Great Depression in the USA, for example, when economic collapse, mass unemployment and concerns about social injustice led to a powerful movement that sought to redirect the curriculum towards "correcting social and economic ills" (Kliebard, 1987, p. 198). The problem with such admirable social intentions, and what made them "meliorist", was their very intensity. With policy focusing so strongly on the desired effects of curriculum proposals, the realities constraining curriculum implementation were simply overlooked. The reconstructionist curriculum project in the USA

floundered because there were "just too many speeches on the subject and not enough grassroots efforts to work with the teachers themselves" (Kliebard, 1987, p. 199):

> In the curriculum field ... the urge to do good is so immediate, so direct and so overwhelming that there has been virtually no toleration of the kind of long-range research that has little immediate value to practitioners in the field, but which may in the long run contribute significantly to our basic knowledge and understanding. (Kliebard, 1975; cited in Goodson, 1995, p. 65)

There is clearly some risk attached to dispatching higher education on a melioristic OER voyage of faith that is uninformed by reflective experience. Broadly speaking, the chapters assembled in this book are predominantly "success stories", but they also begin to highlight the kinds of challenges and difficulties that will face OER development in contexts where "[t]he academic profession is under stress as never before" and "higher education has become a competitive enterprise" (Altbach et al., 2009, p. iv and xv).

An Overview of the Chapters

The book begins with van Wyk's description of the UNESCO and COL initiative Taking OER Beyond the OER Community: Policy and Capacity. This is important in the context of strategies to move OER projects and initiatives from their present marginalised, donor-driven impetus to more enabling and sustainable environments supported by institutions and governments. The next two chapters provide important overviews of the state of the OER field in two important regions generally not well covered in the literature. Both introduce concepts relevant to all OER in all settings: the "massification" challenge facing higher education, together with quality concerns, and the importance of local context and culture. In Chapter 2, Badarch, Knyazeva and Lane assess OER progress in the diverse, multi-ethnic and multilingual societies of the non-English-speaking CIS and Baltic States. Here, OER is found to be at "an early stage of maturity". In Chapter 3, Harishankar's analysis of pedagogy and technology in three very different initiatives in India suggests that the OER that have been developed have features that provide an enabling basis for reuse.

The next three chapters provide empirically based case studies of funded OER projects in Africa. In Chapter 4, Omollo, Rahman and Yebuah trace the development of OER for the health sciences, and OER and policy "from scratch" — and in tandem — at the Kwame Nkrumah University of Science and Technology and the University of Ghana. Sapire, Reed and Welch's coverage of the development and take-up of a full six-unit module to improve the teaching of mathematics in South Africa follows in Chapter 5; OER cost-effectiveness is more often claimed than demonstrated, but the authors provide evidence of high-quality, cost-effective OER, and of OER take-up. On an even larger scale, Wolfenden, in Chapter 6, covers OER development in the core subjects for teacher education across 13 institutions in nine Sub-Saharan countries. OER design principles — and in particular a highly structured template for OER creation — specifically allowed for adaptation and take-up across a range of contexts and cultures.

This book interleaves a number of vignettes to capture more personal individual accounts of OER experiences. After Chapter 6, Ngugi's evocative snapshot of a single day in a Kiswahili language class shows how exposure to the Teacher Education in Sub-Saharan Africa project (TESSA, described in Chapter 6) generated more than localisation and adaptation of existing materials. New learning materials, jointly created by teacher and students, provided evidence of ingenuity and creativity seldom found in school classrooms.

After this vignette, the theme of OER take-up is then further developed in Chapter 7. Conole's outline of how OER might be more effectively integrated into formal and informal learning contexts is illustrated by use of the Open Educational Quality Initiative (OPAL) framework. The chapter analyses OPAL's methodology and reflects on how its guidelines may be used to promote open education practices (OEP) across the entire OER community, from policy makers, managers and administrators to educational professionals and learners.

Levey's lively Chapter 8 moves directly into the legal issues and practical methods of searching for OER. There is little in the literature about these matters, yet they encompass essential processes for OER take-up and reuse to move to the next step of realisation. In addition to learning more about the abundance of resources that have contextual relevance to the developing world, and Africa in particular, we are introduced to the promise — and challenges — of searching for OER.

Chapter 9 reminds us of what the literature tends to under-represent: the role of the student. In arguing that resources mediate teacher–student relationships, Lane shows why we need to broaden our concept of the term "student" to include past students and even "non-students" who may access OER. The theme of changing social relationships provides a useful connection with the theme of pedagogy that is developed in the next two chapters.

In Chapter 10, Kanuka and Gauthier argue that learning and teaching in higher education depends on more than just teachers with content knowledge. Essential to OER take-up is the way that the distinctive forms of disciplinary content knowledge and pedagogical content knowledge (PCK) intersect with diverse cultural settings. They show the promise of a "teacher enhancement series" built on the theoretical PCK basis they develop.

At this point, Lesperance's vignette describes how in the Virtual University for Small States of the Commonwealth, the manner in which OER were developed and the parallel development of a Transnational Qualifications Framework facilitated the use and reuse of resources. Collaborative materials development can support programme equivalence and student mobility across national boundaries.

In Chapter 11, from an Asian setting, Phillips's account of OER take-up in teacher education programmes provides an authentic illustration of the importance of course designers addressing curriculum and pedagogy in OER. Integration of OER into existing programmes requires adaptation that is sensitive to particular sets of students. The age and working situations of students were major considerations in this case.

This chapter is followed by two personal accounts of moving into resource-based teaching and OER. Rybicki describes his individual "OER" pioneering, a decade before the term OER was officially coined by UNESCO. Myers's equally personal "life in the real world" account shows how OER may flower or flounder within the

same institution. Despite some positive effects, his attempt to develop all eight modules for public health students from farther afield encountered obstacles in the form of staff workload and lack of alignment with a rigid national regulatory framework.

Mawoyo and Butcher's contribution in Chapter 12 forms a bridge from the backdrop of OER practice to the realm of OER policy. With its focus on the supply side of the OER chain, the authors present a variety of case studies from different parts of the world, in a useful overview and analysis of the differing ways in which institutions and individuals have approached the task of releasing existing materials under open licenses.

In Chapter 13, Hoosen and Butcher continue the theme of enabling policy environments. However, here we encounter on-the-ground developments across a range of actual cases. Although a picture emerges of no standard sequential development, most institutions appear to have addressed policy as a reactive measure. Institutions also appear to be lagging behind national governments in matters of policy development.

We then have two striking instances of national OER policy development. In Chapter 14, Rossini traces messages and developments moving Brazil towards acceptance of the principle that publicly funded educational resources should be OER. On a world map, New Zealand looks far removed from the kinds of broader debates fuelling OER policy in Brazil. However, Mackintosh's Chapter 15 case study of the Otago Polytechnic, within a case study of New Zealand, shows how a particular national cultural outlook — very different from that identified in Chapter 2 — leads to a kind of organic OER growth with its own momentum in both policy and practice.

Notes

1. E.g., David Wiley at http://opencontent.org/blog and http://opencontent.org/blog/archives/2127.
2. E.g., Tony Bates at www.tonybates.ca.
3. See http://ocw.mit.edu.
4. See www.hewlett.org/programs/education-program/open-educational-resources.
5. See www.gatesfoundation.org/Pages/home.aspx.
6. See www.capetowndeclaration.org.
7. See www.shuttleworthfoundation.org/projects/siyavula.
8. Professor Kanwar is Vice President of the Commonwealth of Learning.
9. Represented most notably by Illich (1971).
10. For the merits of such an approach, see Bhola (2002).

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CHAPTER 1

Taking OER Beyond the OER Community: Policy Issues and Priorities

Trudi van Wyk

Abstract

Formulated in response to the 2009 World Conference on Higher Education, Taking OER Beyond the OER Community: Policy and Capacity is an initiative of UNESCO and the Commonwealth of Learning, working to expand knowledge of open educational resources (OER) and provide motivation for institutions and governments to create an enabling environment to support OER. It is widely accepted that use and adaptation of existing OER has the potential to improve the quality and effectiveness of higher education and/or to reduce cost. It is also accepted, however, that OER alone cannot increase access and quality in higher education.

To support ongoing discussion and deliberation, an OER dossier was created and several advocacy/capacity-strengthening workshops and online forums on OER were organised across Africa and Asia. Workshops focussed on different aspects of OER, all in pursuit of the common goals of building capacity, advocating the use of OER and expanding the OER community. A number of prevalent issues emerged from these workshops, which are discussed in this chapter.

It is clear from the experiences and insights of this initiative that innovative ways must be found to support the creation and use of quality resources and the promotion of quality teaching in higher education. OER initiatives need to be more effectively supported by governmental and institutional policies, structures and procedures. The chapter concludes by identifying several policy issues and priorities that deserve attention.

Keywords: *Creative Commons, OER community, OER movement, OER policy, policy environment, policy guidelines*

Introduction

The "OER movement" — which has subsequently been referred to as the "OER community" — emerged, by some accounts, in 2002. Since that time, UNESCO has contributed to fostering dialogue amongst participants in the movement/community through a series of online discussion forums and by creating and sustaining an online community of interest. D'Antoni and Savage (2009) describe the role of this OER community as one solution to extending the reach of education and expanding learning opportunities through OER. The UNESCO OER Community now constitutes a recognised space for international exchange of information, resources and views on the World Summit on the Information Society (WSIS) Platform of Communities (see www.wsis-community.org). Through this and other vehicles, the concept of OER has been debated and refined, related issues clarified and discussed, and barriers to OER use and production identified. Other significant initiatives in higher education, such as OER Africa and the Open CourseWare Consortium, to name only two, emerged at a similar time and have promoted the use, reuse, repurposing and contextualisation of OER. Such initiatives have been predominantly, but not exclusively, in higher education.

Despite significant progress made in the introduction of OER into higher education, within the UNESCO OER community and through a range of other similar initiatives, the OER concept is still not widely known and understood, especially by policy makers and institutional managers. Furthermore, where OER projects and initiatives are implemented, they are mostly marginal and donor-driven (Kanwar, Balasubramanian, & Umar, 2010).

Consequently, in 2010, UNESCO, in collaboration with the Commonwealth of Learning (COL), launched the initiative Taking OER Beyond the OER Community: Policy and Capacity. This initiative aimed to increase the level of and widen the understanding of OER by educational decision makers and quality assurance experts in Africa, Asia and the Pacific. The initiative built on the results of previous and ongoing work of the two organisations in OER, as well as ongoing collaboration between them.

This chapter provides a description of Taking OER Beyond the OER Community and the impetus for both institutions and governments to create an enabling environment in support of OER. It discusses emerging policy issues and priorities identified by participants in the initiative, and describes the subsequent process of developing the Guidelines for OER in Higher Education, as well as the engagement of governments through the Fostering Government Support for OER Internationally project.

2009 World Conference on Higher Education

The 2009 World Conference on Higher Education: The New Dynamics of Higher Education and Research for Societal Change and Development (UNESCO, 2009a), laid a solid foundation for the Taking OER Beyond the OER Community initiative. A communiqué based on the outcomes and recommendations of six regional conferences (in Cartagena de Indias, Macau, Dakar, New Delhi, Bucharest and Cairo), as well as on the debates and outcomes of the World Conference, communicates four important issues in support of the use of OER (UNESCO, 2009b). It notes that higher education has an important responsibility to provide

quality teaching and learning, as one of the core missions of higher education is to contribute to social and economic development (OECD, 2008). The four major missions are:

- Developing human capital (primarily through teaching).
- Building/creating knowledge (primarily through research and knowledge development).
- Disseminating and using knowledge (primarily through interactions with knowledge users).
- Maintaining knowledge (inter-generational storage and transmission of knowledge).

As part of achieving these objectives, higher education has to expand access, whilst simultaneously pursuing the goals of equity, relevance and quality in developing human capital (teaching).

The World Conference appealed to governments, institutions, and regulatory and quality assurance mechanisms to recognise the importance of attracting and retaining qualified, talented and committed research staff and teaching staff. It called for investment in the training of faculty and staff to fulfil new functions in evolving teaching and learning pedagogy and systems.

In addition, the Conference noted that, in the light of limited financial and human resources, institutions and governments ought to work together to pool experience and resources, develop policies and strengthen infrastructure. It explicitly focussed on partnerships that promote international co-operation and co-operation between institutions (including South–South and North–South–South co-operation). It called for concerted action at national, regional and international levels to assure the quality and sustainability of higher education systems worldwide — particularly in Sub-Saharan Africa, small island developing states, and least developed countries. Greater international, regional and national collaboration was identified as desirable, particularly in areas such as governance, teaching, research and innovation, recognition of qualifications, and quality assurance.

The Conference recognised that public funds are limited, and may not be sufficient for a rapidly developing sector. Alternative formulas and sources of funding should be found, as well as innovative and cost-effective models and mechanisms to maximise the output of limited resources. It strongly argued that the application of information and communication technologies (ICT) in teaching and learning has great potential to increase access, quality and success, and that open and distance learning approaches and ICT present opportunities to widen access to quality education, particularly when OER are readily shared by many countries and higher education institutions. It also argued that the results of scientific research should be made more available through ICT, in addition to open access to scientific literature. And it encouraged, in the face of increasingly scarce resources, exploration and intensified use of electronic library resources and tools to support teaching, learning and research.

The Conference concluded that Member States, working in collaboration with all stakeholders, should: develop policies and strategies at system and institutional levels to formulate long-term, sustainable strategies for higher education (both

teaching and research), aligned with internationally agreed development goals and national/regional needs; provide platforms for dialogue and the sharing of experience and information on higher education; and assist in building capacity in the formulation of higher education and research policies.

Taking OER Beyond the OER Community: Policy and Capacity

In 2010, in response to the outcomes and recommendations of the 2009 World Conference on Higher Education, UNESCO, in collaboration with COL, launched Taking OER Beyond the OER Community. This initiative specifically provided a platform for educational decision makers and quality assurance experts to build understanding of OER, as well as for dialogue and the sharing of experiences and information, as directed by the 2009 World Conference.

Specifically, the initiative targeted two levels of audiences. First, it targeted governmental and institutional decision makers, to build a common understanding of OER and greater support for the use, repurposing and reuse of OER in both developing and developed countries. Second, it targeted educational practitioners (teaching personnel, support personnel, teaching and learning materials developers, and quality assurance and recognition bodies' practitioners), to recognise OER as a cost-effective way of advancing quality teaching and learning, and to create, repurpose and use OER.

At the initiative's commencement, an OER dossier was developed to serve as a resource for discussions and deliberations. The dossier emphasised that use and adaptation of existing OER has the potential to improve the quality and effectiveness of higher education and/or to reduce cost. The dossier defined the concept of OER, gave an overview of ongoing initiatives in the creation and implementation of OER worldwide, provided an OER value proposition with potential for educational transformation, outlined some emerging challenges in the creation and implementation of OER, and gave an overview of key open licenses (Butcher, 2010).

The dossier argued that OER alone cannot increase access to or quality in higher education; however, OER offer an opportunity to make available quality and affordable resources that can contribute to increased access and quality in higher education. It further argued that most institutional and national policies and budgetary frameworks will require modification, so that teaching staff can be empowered to develop and use good-quality OER. This is supported by Felder and Brent (1999), who reason that policies which advance, support and incentivise teaching staff serve to encourage those staff into new thinking (and doing) about pedagogy and resources, as a result of which the quality of teaching (and learning) can be improved.

Using the dossier as a guide, four advocacy and capacity-strengthening workshops and three online forums on OER were organised between April and November 2010. These workshops were spread across Africa and Asia, attracted diverse audiences, and focussed on different aspects of OER, all in pursuit of the common goals of building capacity, advocating the use of OER and expanding the OER community.

The workshops highlighted that in times of higher demand on institutions to provide greater access with dwindling resources, universities have to tackle this challenge innovatively and creatively. This imperative was linked to governmental policies on funding for learning outputs, as well as institutional policies and recognition of materials development. The workshop identified as a major barrier the absence of clear policies and budget commitments for quality teaching at institutional as well as governmental levels (Anthony, 2010). Participants expressed a need for much more information, capacity-building and policy guidance. The workshops also reiterated some of the benefits of OER, such as reduced time lag between producing and using materials, relevance, reuse, contextualisation and customisation (including localisation and translation into local languages), supported by evidence such as Baraniuk (2008) has outlined.

The most prevalent issue emanating from the workshops was how to invest in quality teaching and resources, in a context where higher education policies and budgetary frameworks tend to accord higher status to research activities than to teaching and learning activities.

However, OER poses a threat to some institutions' business models and to the retail value of learning materials. In the light of these practices, participants from open universities were not convinced that OER is an option for (open) universities and requested further debate and dialogue on the issue. Significant attention was also given to ICT platforms and technical requirements for accessing and repurposing OER.

Three online discussion forums took place to expand participation in the initiative, raise awareness and promote informed discussion and debate amongst stakeholders in higher education. The forums focussed on different OER issues, such as policy, capacity, licensing, use and reuse of OER, as well as considering practical issues in the implementation of OER. These discussions were mainly conducted at a practitioner's level. They confirmed a need for continued dialogue, building capacity in implementation, policy guidance for both governments and institutions on the promotion of quality teaching and learning as well as the centrality of quality teaching and learning materials, and the positive impact of OER on the quality of teaching and learning.

In December 2010, UNESCO and COL invited Member States to a policy forum on OER in Paris to reflect on progress and chart the next steps in the process. The policy forum recommended that there be continued dialogue and capacity-building on the issues around OER, and that COL and UNESCO develop policy guidelines for different stakeholder groups to support the integration of OER into higher education.

Throughout the initiative, there was firm support of the value of OER for addressing the central issues of the 2009 World Conference on Higher Education, viz:

- Promoting quality teaching as a core function of higher education.
- Retaining quality teaching staff who embrace changed pedagogy and the use of OER.
- Supporting teaching staff to improve the quality of teaching, as well as incentivising quality teaching.

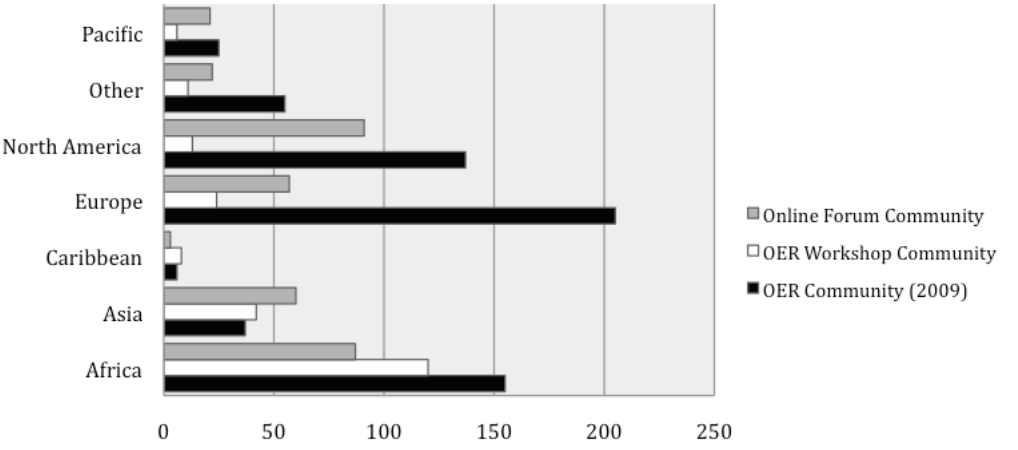
- Fostering collaboration and pooling of resources to tackle financial challenges in higher education.
- Developing innovative and cost-effective models and mechanisms to maximise the output of limited resources, including the application of ICT and open and distance learning approaches.

Analysis of Participants

One of the aims of the Taking OER Beyond the OER Community initiative was indeed to "take OER beyond the OER community". With 341 participants in the online forums and 224 in the workshops, the initiative succeeded in engaging several people who were new to the concept and issues of OER, and thereby expanded the profile and regional distribution of the 2009 OER community, as reported by D'Antoni and Savage (2009).

Figures 1.1 and 1.2 reflect the distribution of the participants in the initiative.

Figure 1.1: Regional profile of the OER community, reflecting the OER Community (2009), the OER Workshop Community and the Online Forum Community



Data from original OER community, retrieved from D'Antoni and Savage (2009).

Figure 1.1 reflects that the regional profile of the OER Workshop Community has shifted towards the developing regions such as Africa (from 25 to 53 per cent) and Asia (6 to 19 per cent), and away from developed regions such as North America (22 to 6 per cent) and Europe (33 to 11 per cent). Although the Pacific was one of the targeted regions, no workshops took place there and the Pacific regional profile underwent no significant change (4 to 3 per cent). The positive nature of the above numbers is due to targeted invitations to participate in workshops.

Although less significantly, the Online Forum Community demonstrated similar tendencies. Participation from Africa rose from 25 to 26 per cent, and that of Asia from 6 to 18 per cent. The Online Forum Community participation from the Pacific increased from 4 to 6 per cent. Participation in the online forums reflects that the ongoing OER debate and dialogue is notably influenced by Africa (25 per cent) and Asia (18 per cent), as much as by the developed north (Europe [17 per cent] and North America [27 per cent]).

Figure 1.2: Stakeholder profile of workshop participants

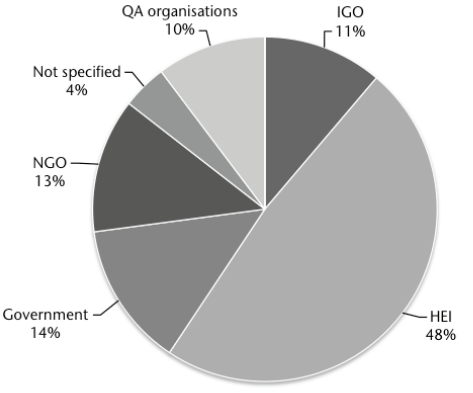


Figure 1.2 reflects that the workshop participants were mainly from higher education institutions (HEI, 48 per cent) but also represented a wide range of stakeholders, organisations and institutions.

The complementary spread of the above profiles reflects the representative nature of policy issues and priorities set during the initiative, as well as the perspectives of the major stakeholder groups. Although the participant profiles confirm the achievement of one of the initiative's key aims (to increase the community in Africa, Asia and the Pacific), a challenge remains to keep people involved in ongoing debate and dialogue.

Policy Issues and Priorities from the Taking OER Beyond the OER Community Initiative

Following the Taking OER Beyond the OER Community initiative, it is evident that innovative ways must be found to support the creation and use of quality resources and the promotion of quality teaching in higher education. For this to happen, OER initiatives need to be more effectively supported by governmental and institutional policies, structures and procedures. Several of the identified policy issues and priorities deserve attention.

Enabling Environment

All of the workshops called attention to the creation of an enabling environment, including enabling policies and policy guidelines — such as on copyright and intellectual property rights (IPR) — supportive funding regimes, human resources, partnerships, and accessible and robust ICT connectivity infrastructures by governments and institutions. Governments play a crucial role in setting national policies, providing guidelines and setting priorities that shape the direction of higher education systems. Institutional policies are implemented in response to and in order to implement national policies, directives and guidelines.

The workshops concurred that institutions can benefit from governments creating an enabling environment (as described above) and setting an example of practice. Therefore, they urged that intergovernmental organisations such as UNESCO and COL encourage governments to participate in and set examples of good practice

— e.g., by ensuring that educational materials developed using public funding are available under an open license. Sharing educational materials produced using public funding has significant potential to improve the quality and accessibility of educational delivery across national higher education systems by making OER more readily available for use by all higher education providers, not just the recipient of the public funds (Butcher, 2010). Likewise, governments can use open licensing regimes to increase the leverage of public investments, by facilitating widespread reuse of those investments with minimal additional investment.

Raising Awareness

The workshops noted that it is vital to continue raising awareness, within governments in particular, about the importance of open licensing of educational materials and the effect that OER can have on quality education. Useful tools for this have thus been developed — for example, *A Basic Guide to OER* (www.col.org/OERBasicGuide) and the *Guidelines for OER in Higher Education* (www.col.org/OERGuidelines). These and other tools need to be made systematically and widely available to the broader public to expand understanding of open access, open licensing and OER.

Specific reference was made to raising awareness in governments. This is an important step towards creating an enabling environment, as discussed above.

Continued Dialogue and Debate

As the UNESCO OER Community has successfully done (reported in D'Antoni & Savage, 2009), dialogue and debate on key issues need to continue and expand beyond the OER community into all stakeholder levels and groups. Governments in particular should be encouraged to engage with the issues, and specifically to make publicly funded materials openly accessible as OER, as well as to acknowledge the need for public investment in quality teaching and learning materials. With appropriate sensitivity, intergovernmental organisations such as COL and UNESCO should engage in dialogue with governments on these matters and create a comprehensive inventory of current and proposed practices with respect to open access to educational materials (West & Victor, 2011). An inclusive process for government buy-in and progressive support for the use, reuse and contextualisation of OER should be orchestrated. This dialogue not only should focus on advancement of OER, but also should provide examples and solutions for practical issues such as copyright, business models, dissemination and interoperability, to name a few.

Expanding the Community

The workshops recommended that the OER community should be further extended to include more people from different stakeholder groups. These include groups such as information specialists — for example, librarians and knowledge workers, IT specialists and developers — and a broader representation of management from institutions and governments.

The WSIS Knowledge Communities Platform, an online collaborative platform hosted by UNESCO, is ideally placed to expand the community. The wider

objective of the platform is to facilitate information gathering and exchange, and to stimulate common development of ideas and projects in the area of ICT for development (www.wsis-community.org). However, regional OER initiatives such as OER Africa (www.oerafrica.org) are also pivotal in expanding the OER community. The workshop participants were positive towards online communities, but expressed concerns about the technical complexities of platforms for the non-technical person, as well as the complexities of some of the debates by "OER experts". They expressed a need to include all levels of participants and to build capacity in OER issues at different levels, specifically at management and leadership levels in governments and institutions.

Capacity-Building

Parallel to awareness-raising and debate, capacity-building was identified as essential to the mainstream use of OER. Capacity-building is needed not only at the level of practitioners, but also at the leadership, management and support levels. Concerted efforts must be made to develop capacity at all levels, such as was reported at a pre-conference OER workshop that took place on 2–3 August 2011 at the Distance Education and Teacher Education in Africa (DETA) Conference in Mozambique. The workshop appealed (1) to intergovernmental organisations and international/regional formations such as OER Africa to expand their capacity-building efforts so that OER can become a mainstream activity in quality teaching and learning and (2) to the donor community to support these efforts.

Role of Intergovernmental and Donor Organisations

The workshops highlighted the role that intergovernmental and donor organisations can play to advance OER in a wider context and within a broader stakeholder distribution, especially in support of creating enabling environments within governments and institutions. Intergovernmental organisations are well positioned to use their extensive networks of contacts in governments to build understanding and raise awareness within these governments. This awareness has to be progressively expanded to institutions (at all levels, viz. leadership, management, practitioners, support personnel and students), as well as to quality assurance/accreditation bodies and academic recognition bodies. Furthermore, donor co-ordination can help to ensure that development investment is productive and not duplicated at all by other investments from other or their own agencies.

Development and technical agencies that implement projects funded by governments and by international and multilateral agencies can make a significant difference in ensuring that investments are not diluted by being repeated in more than one activity. Agencies that provide grant funding or other project support can encourage use and reuse of existing OER and require an open license for any resources created with agency support (West & Victor, 2011).

ICT Environment

As Butcher (2010) outlined in the OER dossier, ICT is enabling the transfer of data and access to a variety of resources of varied quality. Furthermore, globalised communication systems and networks enable more people to have access to and

communicate via these networks. More people than ever before are collectively sharing, publishing and generating knowledge. This presents an opportunity to create and share a wider range of learning resources, thereby accommodating a greater diversity of learner needs. It also poses significant challenges regarding how to deal with issues of intellectual property and copyright.

The emergence of ICT into people's workplaces and private lives has also made personalisation of learning a reality, which poses a challenge for the development of technical methods to share information, and by implication OER, across multiple platforms and using different technologies. Management, access, cost and currency with new developments were all issues raised and debated in the workshops. Access to ICT infrastructure and networks in developing countries was specifically raised as an issue that needs to be tackled at different levels.

Other priorities raised were quality assurance, financing and research. These are comparable with the priority issues for action that emanated from the first report on the activities of the UNESCO OER Community (D'Antoni & Savage, 2009). The above policy issues and priorities are indicative of the need for policy support and guidelines. Examples of governments and institutions beginning to respond to these challenges are presented in some of the case studies in this collection.

Guidelines for OER in Higher Education

In response to recommendations made at the workshops and the Paris forum, and through a broad consultative process, UNESCO and COL have developed *Guidelines for Open Educational Resources (OER) in Higher Education* (UNESCO & COL, 2011). These are loosely inspired by the model of the 2005 UNESCO–OECD *Guidelines for Quality Provision in Cross-Border Higher Education* (UNESCO, 2005) and, like them, target key stakeholder groups, as recommended by the workshops and consultative process: governments, higher education providers, teaching staff, student bodies, as well as quality assurance/accreditation and qualification recognition bodies.

The guidelines outline key issues and make suggestions for integrating OER into higher education. Their purpose is to encourage decision makers in governments and institutions to consider OER as a cost-effective option for increasing access to quality teaching and learning (UNESCO & COL, 2011). As part of the development process, a draft of these guidelines was presented to the identified stakeholder groups to assist in identifying and addressing the issues surrounding OER and thereby ensure that they support accessible, quality teaching and learning.

A workshop for senior management of open universities and of technical and vocational institutions in Africa took place on 25 May 2011 in Tanzania, to coincide with the 6th eLearning Africa Conference. This workshop was simultaneously interpreted in French and was attended by both anglophone and francophone participants. A significant workshop on OER for senior management of Asian Association of Open Universities (AAOU) members took place on 1 October 2011 in Penang, Malaysia, and contributed to the final version of the *Guidelines for OER in Higher Education*.

Several practitioner-level OER workshops took place in The Bahamas, Guyana, Zambia and Tanzania, whilst a pre-conference workshop on OER in Teacher Education took place at the DETA Conference in Mozambique. Practical

workshops such as the DETA pre-conference workshop advanced the use, reuse and repurposing of OER at the practitioner level as well as awareness-raising and capacity-building at implementation levels.

The *Guidelines for OER in Higher Education* were launched on 1 November 2011 at the 36th UNESCO General Conference (UNESCO & COL, 2011). In parallel, *A Basic Guide to Open Educational Resources* was published, and is an important starter document and compendium of information and resources (Butcher, 2011).

Moving to Policy in Support of OER: Fostering Government Support for OER Internationally

The fundamental problem still remains — with some notable exceptions — that awareness of the educational potential of OER and open access is still limited to a few networks of enthusiasts, mainly in developed countries, although in reality these concepts should be even more attractive to developing countries, where education systems face major challenges of access, quality and cost. Based on the above arguments and recommendations, as a follow-up activity to Taking OER Beyond the OER Community, an initiative called Fostering Government Support for OER Internationally was conceptualised. This initiative is funded through The William and Flora Hewlett Foundation, as well as through programme funds from UNESCO and COL, and will further advance the ideal of making educational resources developed with public funds freely available for reuse and repurposing.

The aim of the initiative is to adopt a clear definition of open licenses and encourage governments to support the principle that products of publicly funded work should carry such licenses. Governments can facilitate the sustainable implementation of OER by creating incentives for use and reuse, removing barriers to OER adoption, and funding technical infrastructure to increase access to OER. They can also encourage openness as a component of public policy by requiring all publicly funded materials to carry a public license, publishing educational research through open access journals and making more government data publicly available.

Conclusion

Although the above initiatives are a significant step in the advancement of OER, work must continue to raise awareness, create an enabling environment and expand the OER community. A number of examples of national and institutional policies, with different aims and objectives, are available and will be covered in the following chapters.

Taking OER Beyond the OER Community and Fostering Government Support for OER Internationally expanded on the excellent work done on OER by UNESCO and COL, particularly in the OER community and other regional formations such as OER Africa. These initiatives attempted to provide a supportive environment for current OER practices and programmes to be contextualised, shared, enhanced and expanded. It is also encouraging that the recommendations made and priorities set by the OER community were affirmed through these initiatives

and that their priorities were supported by research, even done outside the OER context and community.

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CHAPTER

2

Introducing the Opportunities and Challenges of OER: The Case of the Commonwealth of Independent States and the Baltic States

Dendev Badarch, Svetlana Knyazeva and Andy Lane

Abstract

This chapter describes the results of surveys undertaken by the UNESCO Institute for Information Technologies in Education, based in Moscow, aimed at investigating the prerequisites, challenges and opportunities for the production and use of OER in the non-English speaking countries of the Commonwealth of Independent States (Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Ukraine, Uzbekistan) and the Baltic States (Latvia and Lithuania). Based both on the historical background to the educational systems within these countries and the analysis of the survey results, the most typical barriers and challenges to the development and repurposing of OER are identified. Some recommendations for the steps needed to overcome the identified barriers and meet the necessary challenges in order to further promote OER in these countries are developed and described. To support these conclusions, some results of analogous surveys conducted by the Institute for Brazil, China, Japan, Mongolia, Turkey and Vietnam are cited.

Keywords: *ICT in education, non-English-speaking countries, open educational resources*

Introduction

Since 2002, when UNESCO hosted the Forum on the Impact of Open Courseware for Higher Education in Developing Countries, at which the term "open educational resources" (OER) was adopted (UNESCO, 2002), the Organization has supported a number of global initiatives, including online discussions about the critical factors that help or hinder the development and use of OER within the worldwide UNESCO OER Community (D'Antoni, 2007; Haßler, 2009).

In 2009, the UNESCO Institute for Information Technologies in Education (IITE), based in Moscow, launched its own OER initiatives.[1] The main objective of these initiatives is to promote inclusion within the OER movement of non-English-speaking countries, as to date, most activity has been in English-speaking ones (Lane, 2010). These initiatives have included large-scale research, producing policy briefs on OER-related topics,[2] and organising conferences on key sectors such as teacher education (UNESCO IITE, 2011b) and associated issues across UNESCO Member States. The full set of initiatives includes the following components:

- *An analytical component* covering a survey of the use of OER in the Commonwealth of Independent States (CIS) countries, Baltic States and other non-English-speaking countries, aimed at identifying country-based needs and opportunities for OER, followed by expert meetings to discuss the results and develop recommendations.
- *A capacity-building and networking component* at regional and sub-regional levels to raise awareness of OER in the target countries, increase literacy in copyright and licensing issues, train trainers for resource users and producers, and facilitate networking amongst experts in relevant fields.
- *An IT component* to establish a multilingual web portal to support the diversity of national languages existing in the region and develop opportunities for sharing OER in national languages in the future.

In 2010–2011, UNESCO IITE commissioned a study of the current status of OER, drawing upon recognised national experts on information and communication technology (ICT) in education[3] in the CIS and the two Baltic States, as well as several other non-English-speaking countries (Brazil, China, Japan, Mongolia, Turkey and Vietnam). The desk reviews and onsite interviews done by the researchers were supplemented by a survey of the experts' opinions, using an emailed questionnaire specially developed for this purpose by IITE with the contribution of researchers from The Open University, in the UK. The desk study and the survey provided insight into how OER-related patterns varied in these non-English-speaking countries.[4]

This chapter focuses on the first of the above-mentioned components: an exploration of the prerequisites, challenges and opportunities for the production and use of OER in most of the countries of the CIS and Baltic States. It begins by introducing the background to the educational systems and summarizes the findings of surveys on the "state of the art" in the awareness and use of OER in these countries. Based on an analysis of the most typical barriers to the development and repurposing of OER found in these surveys, the chapter provides suggestions and recommendations for the steps to be taken to meet the challenges.

The Target Countries of the Survey

The CIS and Baltic States covered by the survey were the republics of Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Ukraine and Uzbekistan, as well as Latvia and Lithuania. The populations of most of these countries are multiethnic and either multilingual or bilingual (national language and Russian), since each of these countries was, for a longer or shorter period during the last two centuries, subject to Russianisation and Russification under the legacy of either or both the Russian Empire and the Soviet

Union. Independence in the late 1980s and early 1990s gave impetus to political and economic transformation and to reforms in various spheres, including education. The previous legacy of centralisation and state control was replaced by the decentralisation of governance, the diversification of provision, and the commercialisation of higher education institutions (HEIs) through privatisation and the introduction of tuition fees (Heyneman, 2010). The strategies for educational reforms vary across these countries, from replacing Soviet education policies and practices with European ones to keeping the educational structures and practices introduced by the Russian authorities during the Soviet period whilst restoring some pre-Soviet traditions (Silova, 2011). The language shift from Russian to national languages, in some cases accompanied by a change of alphabet, resulted in the change of the language of instruction, which was sometimes complicated by some functional limitations of certain titular languages (Pavlenko, 2008). Ideological changes also resulted in revisions of the curriculum, which, together with the change of the language of instruction, necessitated the development of new textbooks and courseware in these national languages. Furthermore, the development of the ICT infrastructure within and across these countries has stimulated further changes in methodological approaches and instructional methods towards learner-centred teaching and away from teacher-centred instruction (UNESCO IITE, 2009).

These 20 years of reforms, which were more or less successful in each of the countries, also resulted in changes to the structure and governance of their educational systems, the modification of admission procedures and many other transformations. Currently, all these countries are, to a greater or lesser extent, involved in the Bologna process.[5] However, most of them still face problems related to insufficient funding, conservatism of the academic community, low wages for academics and consequent lack of motivation, insufficient numbers and qualifications of tutors, and enrolment disparities due to demographic processes.

OER Practice in the CIS and Baltic States

The study of the current status of OER in the CIS and two Baltic States revealed that most of them are at a very early stage of maturity in their adoption and use of OER, some of them being more advanced, others less so (OPAL, 2011). One can find few examples of good OER practice in the CIS Internet domains where the resources are both openly available to all and openly licensed to encourage reuse. Whilst some educational resources are openly accessible via the Internet, thus encouraging sharing and reuse as is, very few of them meet the most widely accepted definitions of OER, which encompass adaptation and repurposing:

> Open Educational Resources are teaching, learning or research materials *that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution*. (OECD & CERI, 2007, emphasis added)

> 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 or 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. (Atkins, Brown, & Hammond, 2007, emphasis added)

The available OER in the surveyed countries vary from "big OER"[6] — huge, government-funded repositories (primarily in China and Russia) — to "little OER" or independent, open course websites, developed and maintained by universities and even by individual teachers. Several large-scale repositories and federal portals for educational resources have been established in Russia, which also has large-scale regional collections of educational materials, as well as portals for professional communities of educators sharing their resources, but these are not open to all. The Russian-language OER usually can be shared within the country and amongst other countries within the CIS, as long as they are suited to the needs of those countries. Similar national-scale and national language initiatives have been launched in several other CIS countries: for example, a national Azerbaijan Educational Network piloted in Azerbaijan, a Belorussian National Educational Internet Portal developed in Belarus, a Network for Education and Science established in the Kyrgyz Republic, and an Armenian Education Portal supported by the Ministry for Education and Science and the World Bank. Traditional universities in the CIS sometimes voluntarily provide libraries open access to their instruction manuals and learning materials. Nevertheless, most university portals contain resources only available upon registration or restricted to users from a certain educational institution or country. Whilst these are not strictly OER, in that they are not in the public domain, they are available to significant communities of people within the educational systems in that institution or country. Some virtual and Internet universities have also been established within projects supported by international and foreign organisations (IREX, NATO, UNESCO, World Bank) that open their resources to a wider public. Interestingly, each country has portals containing open public-domain resources in the national language, to support users willing to learn the national language, history and culture.

Rationale for OER

The experts from the surveyed countries noted above identified the main (internal) motivations or (external) incentives that are needed for educators to spend their time and efforts to create and use OER:

- An interest in innovative teaching methods and resources.
- A willingness to expand the access of students and colleagues to their materials.
- A desire to enhance the visibility of the university.
- An opportunity to gain additional recognition and scores during appraisal.

The experts also believed that the use of OER might bring two major benefits to their countries' education systems. First, there is a potential financial saving due to eliminating the duplication of efforts in the development of teaching materials. Second, the use of OER can have a positive impact on the quality of the education being offered. Both of these beliefs have also been found in studies from other countries.

Barriers to the Wider Development and Use of OER

The introduction of OER and related practices creates a number of strategic, financial, legal, pedagogical and cultural challenges at both institutional and national levels, as well as amongst the academic community in general. Related findings from the survey were presented at an international workshop in Moscow in May 2011.[7] An unpublished review of that workshop by one of the authors (Andy Lane) noted a considerable desire to make it easier for educational materials to be shared within and between CIS countries, particularly materials in Russian that are suited to the needs of Russia and the other CIS countries. It also noted that many of the barriers to the systemic adoption of OER reflect those reported in other studies of countries more advanced in the development and use of OER.

Indeed, the survey of expert opinions confirmed the most frequently mentioned factors that appear to prevent wider introduction of OER into educational practices in the surveyed countries:

- National/institutional strategies for the informatization of education are mainly oriented towards infrastructure and seldom encourage the development of educational content. (The term *informatization* is widely used in the CIS to refer to the application of ICT in educational practice.)
- Educators (and others) lack awareness about the availability of OER and the opportunities it provides.
- Most people are not familiar with intellectual property rights (IPR); moreover, national IPR regulations are currently incompatible with open licenses.
- Emerging pedagogical approaches that use OER in countries more advanced in accepting and using OER are yet to be adopted by educators and HEIs.
- Quality assessment and assurance provisions for "kite-marking" OER as being academically and/or pedagogically sound do not exist.
- The reward/encouragement system for introducing OER into educational practice is non-existent at educational institutions, and the provision of educational content is not considered during instructors' performance evaluations.

In spite of these numerous barriers, which are often interlaced, many institutions and projects are attempting to make educational resources more shareable and usable by others. The most significant constraint is probably a cultural one, influenced by historical policies and practices relating to the way educational systems are currently organised. These are in turn greatly influenced by the "common" histories noted earlier. We will now consider these barriers in more detail.

Language Barriers

The surveys found that in addition to educational materials in the titular language, those in Russian have a greater potential for being used in many CIS countries, particularly because the English proficiency of the majority of students is insufficient for the wide use of English-language educational resources. Even in those cases where the proficiency of individual students is high enough,

understanding and acquiring information presented in a foreign language takes more time and effort than learning from materials in the student's first or native language.

Technological Barriers

The ICT infrastructure has developed unevenly within the surveyed countries, and is often insufficient to support the widespread development and sharing of OER. Despite considerable progress in recent years, access to and use of ICT by the populations in these countries is comparatively low. According to the International Telecommunication Union (ITU) ICT Development Index, such access indicators as the percentage of households with computers and with Internet access in 2010 varied from 4.0 and 3.2 in Kyrgyzstan, and 4.5 and 1.3 in Uzbekistan, to 40.8 and 31.2 in Belarus, and 50.0 and 42.1 in the Russian Federation (ITU, 2011). A similar picture emerges for use — the proportion of individuals using the Internet varied from 20 per cent in Kyrgyzstan to 31.2 per cent, 40 per cent and 43.0 per cent in Belarus, Moldova and Russia, respectively (ITU, 2011).

Even if the infrastructure is present, separate issues affect people's competence in using it. Although in recent years much effort and money have been invested in computer literacy training for teachers, their skills in some CIS countries are insufficient to use open source software and OER in their professional activities on an everyday basis (OLTF, 2011). In many of the surveyed countries, the development and adaption of OER is inevitably restricted by the shortage of faculty having the necessary orientation, motivation, knowledge and skills.

Economic Issues

Finance was a constant issue for the experts surveyed, just as it is for those in most countries trying to foster OER. Most of the countries covered by the survey belong to the categories of developing or transition economies, which means that the national governments have to take sensitive decisions on prioritising certain items in their budget expenditures. For most of them, education is a priority, but currently there is an excessive skew towards infrastructure (the experts surveyed had placed a strong emphasis on the national and institutional education informatization strategies for the ICT infrastructure), whereas the experts' belief that content is now equally important will necessitate sounder financial investment and incentives in future for the production of content, possibly at the expense of infrastructure investment.

Legal Barriers

The legal issues related to copyright and licensing with respect to OER in these countries were considered and discussed at the aforementioned Joint Workshop on Open Educational Resources and Intellectual Property Rights, in Moscow in May 2011. In considering the problems faced when trying to use one of the most popular sets of open licenses, the Creative Commons (CC) licenses, in their respective countries, many legal experts reported that electronically concluded contracts and licenses were not valid in their countries, and that waiving some of the rights granted by existing copyright law was perceived as legally impossible.

In many cases, the resistance to adopting open licenses was not always related to the fact that national IPR legislation contradicted the terms of CC licenses. All participants suggested that most, if not all, current legal problems with CC licensing in their countries can be overcome — not least because of expected changes to the relevant laws in the short to medium term. However, such changes will take time and will delay the adoption of OER and related open educational practices. Again, some countries are more advanced than others in this respect. For example, another workshop held in Moscow in December 2011[8] revealed that CC licenses do comply with the Azerbaijan national legislation on IPR, and the National Copyright Agency fully endorses the use of these licenses for educational materials.

Lack of Awareness and Lack of a Sharing Culture

The survey responses also showed that the concept of OER is not widely recognised in most of the surveyed countries. Indeed, the majority of faculty and management staff in HEIs remain unfamiliar with OER and open licensing issues, despite the upsurge in interest globally.

Furthermore, attitudes to sharing might be a problem, with educators not recognising that there currently is a lack of a knowledge-sharing culture, particularly around sharing and reusing learning materials. As Lane (2010) has commented,

> the biggest barrier for teachers is a cultural one around teaching practices and overcoming academic practices surrounding using, reusing or remixing other people's material for fear of infringing copyright or being accused of committing plagiarism; or of believing that it is inappropriate for local needs or poor quality. Equally the culture in many institutions or academic communities of practice is to value research or producing your own content rather than put effort into teaching or use other people's content.

Within this tension is widespread ignorance amongst teachers about the copyright implications of educational works for the creator and the many potential users. In particular, as noted in Lane's unpublished review mentioned earlier, there are often misconceptions around the "free to access and consume" culture that the Internet enables, as opposed to the "freedom to reuse in certain ways" that open licensing of works enables,[9] and the consequences of these approaches for different groups in society.

The review went on to say that the concept of "free to access and consume" should more properly be the "freedom to access and consume", as there are always costs involved in accessing the Internet in general (the computing device itself and Internet service provider access) and in accessing certain sites in particular (access fees). However, for lifelong learners, being able to access materials for minimal cost is often what matters most, not the "freedom to reuse in certain ways" nor the "freedom to adapt". Furthermore, many teachers, particularly in primary and secondary education, may be more interested in pre-developed educational resources that directly help them in their teaching than in adapting resources themselves.

The "freedom to use in certain ways" offered by open licensing is central to the concept of OER, in that teachers and institutions are able to adopt and adapt others' works so as to save time and effort in teaching preparation and delivery and to enhance the learning experiences for the targeted learners. Currently, much OER development, both generally and in the surveyed countries, is still rooted in the "publish for use as is" mode, where the sharing is one-way rather than reciprocal.

Lane's unpublished review also found many perceived barriers to both sharing and adapting resources. These are caused by the misconceptions noted earlier and also by fears about opening one's personal material and practices to the scrutiny of others, in case they are deemed of low quality, especially as teaching is considered to be largely a solo act performed in front of a limited audience. This may equally be the case with publishing the reworked material of another teacher as with publishing one's own material. Thus, the review suggested that there may be more direct benefits if teachers work collaboratively to share their combined knowledge and experiences, and thereby to co-author common OER that all are then free to adopt and adapt without having to worry about the legal or quality implications of doing so, as has been reported in other studies (Lane, 2011; Van Dorp & Lane, 2011).

Regulatory Barriers and Pedagogy

Much of the formal education system at primary, secondary and tertiary levels in the surveyed countries is heavily prescribed or governed by national policies and statutory laws, particularly curriculum and qualification frameworks. Such prescription can make institutions and teachers cautious about changing their own policies and practices, including sharing their educational resources and adopting and adapting other people's resources. This tension between the academic values of sharing knowledge and the "commercial" values of selling educational content or services and/or competing for fee-paying students both nationally and internationally has been raised in the UK (OLTF, 2011) and in Europe (ELIG, 2011), as well as in many international online discussion forums.

In the CIS, pedagogy still favours face-to-face presentation by an individual lecturer rather than flexible, resource-based, student-oriented learning managed by a team of teachers working together. A lack of support staff to help teachers adopt these new practices is also a serious problem in promoting OER. Significant attention has not yet been given to how learners might gain value from using OER outside of school or college and throughout their lives, and equally how OER might provide a means to both widen participation in higher education and create bridges between secondary schools and universities or universities and workplaces.

However, collaborative development of resources and adoption of new pedagogic approaches are long-term issues with respect to OER use, as even collaborative problem-based and student-oriented didactic approaches have yet to be embedded in many higher education teaching practices, outside of some distance teaching institutions. This particularly relates to how well the co-developed content meets the contextual needs of the different partner institutions. To ensure that the open educational content meets the quality standards required by the institutional

users, without the quality control process restricting the spirit of creativity, alternative evaluation practices could be put in place alongside the existing practices that encourage a participatory culture of open peer review. A good example of a government-supported OER initiative that pays special attention to the quality of educational content is an open courseware (OCW) project implemented in the People's Republic of China — the Chinese Quality Course Project — which also aims to improve the quality of the undergraduate education more widely.[10] Contributors to this project are selected on a competitive basis: HEIs and lecturers can apply to have their courses be recognised as Quality Courses. The quality of developed resources is regularly monitored and they are accessible as OER.

Conclusions and Recommendations

This brief analysis of the state of the art for OER production and use in the CIS and neighbouring Baltic States has made it possible to conclude that much effort still needs to be invested both to raise awareness about OER and to promote the production and use of OER in these countries. The overall study has shown that whilst many of the issues raised are common to OER developments in other countries and regions, some differences arise from particular contexts and cultures; special emphasis needs to be placed on integration of, and networking within, the target communities themselves as well as within the wider international OER communities and networks.

If the potential of OER to transform educational practices is to be realised in the CIS and Baltic States, the major challenges to be tackled are:

- Awareness and promotion of OER and open licenses.
- Education strategy, regulation and financing.
- ICT infrastructure and skills.
- Pedagogy, curriculum and quality standards.
- Fostering an attitude of sharing.

From these initial findings it is also possible to provisionally recommend some ways in which OER could be better promoted across the CIS and neighbouring Baltic States, and which may have wider relevance in other countries around the world. Generally, the OER movement needs to develop through both top-down and bottom-up initiatives: strategic decisions should be taken at the national level, administrative decisions at the institutional level, and the activities of educators should complement both levels.

First, *government strategy and government-supported initiatives* are needed. Governments should encourage publicly funded HEIs to collaborate in sharing their educational resources and to provide the necessary infrastructure and support. In line with the Organisation for Economic Co-operation and Development recommendations formulated in *Giving Knowledge for Free* (OECD & CERI, 2007), it is important to ensure comprehension, at all levels, that *academic and research output, as well as the national cultural heritage, made available in digital format with the use of public funds should also be available for education, at no cost*.

Thus, public funding should be allocated to provide the ICT infrastructure, but also for production of educational content, maintenance of OER repositories, and acquisition of adequate ICT skills appropriate to producing and sharing OER.

Further, governments should support national OER initiatives (see the example of Wikiwijs[11] in the Netherlands or the UKOER programme[12]), as well as the establishment of national consortia of OER/OCW HEIs (e.g., the China Open Resources for Education,[13] the Japan OCW Consortium[14] and the Turkish OCW Consortium[15]), or work internationally by encouraging institutions to join the global OpenCourseWare Consortium.[16] More specifically for the CIS countries, as they share common educational traditions, the OER movement could be supported at the Commonwealth level, in the same way as the Commonwealth of Learning[17] does for the Commonwealth of Nations. UNESCO IITE will help with this by developing guidelines for OER promotion in the CIS, taking into account the suggestions in the *Guidelines for OER in Higher Education* developed by UNESCO and the Commonwealth of Learning (UNESCO & COL, 2011). The *Guidelines* should, however, be aligned with the national context of specific CIS countries and include specific recommendations for different stakeholders. In particular, the recommendations should envisage (i) revised policies and standards regulating higher education, (ii) financial mechanisms to create and enable environments for the production and use of OER, (iii) capacity-building and awareness-raising on OER issues, (iv) recommendations for wider use of open licensing and open format standards, (v) curriculum design and (vi) measures aimed at ensuring the adoption of new pedagogical approaches.

In addition, governments need to take immediate steps to align national copyright and IPR legislation and regulations with open licenses. The recently released draft of CC license 4.0 is currently being discussed by the OER community, and the national agencies of some CIS countries are already involved in these discussions. Adoption of CC 4.0 would contribute considerably to the promotion of OER, although it is also important to have the copyright status of educational materials explicitly stated in educational portals when they are published, so that users can be clear of their legal status.

Second, to encourage greater use and understanding of OER, *the concept of "openness"* — the philosophy of sharing, reusing, adapting, readapting, translating and localising educational resources — *should be widely promoted amongst educators, learners and the general population by governments and institutions alike*. This strategy should focus on actions to promote the OER movement in and across all these countries. In particular, more OER needs to be available in the titular languages or Russian, because in many CIS countries the English proficiency of the majority of students is not sufficient for them to use English-language educational resources. As already noted, even in those cases when the proficiency of individual students is high enough, understanding and acquiring information presented in a foreign language takes more time and effort than doing so in their native language.

Third, *institutions and teachers need to promote and support learner-centred pedagogical approaches that rely on educational resources as much as direct teacher instruction*. Institutions will need to provide training and development for their teaching staff, and both recognise and reward teachers who develop and publish good OER. Teachers will need to investigate and adopt new teaching practices that encourage learner-centred pedagogical approaches which use new technologies and require

greater co-operation. It will also be incumbent on teachers to accept that their students will use new technologies and OER anyway, and that they need to collaborate with fellow teachers and others to more effectively share their practices as well as their content.

Notes

1. See http://iite.unesco.org/knowledge_services/open_educational_resources
2. See http://iite.unesco.org/policy_briefs
3. Hmayak Danielyan (Yerevan University of Management and Information Technologies, Armenia), Shakhnaz Shakhbazova (Azerbaijan Technical University), Victor Kazachonak and Pert Mandrik (Belarus State University), Gul Nurgalieva and Elena Artykbayeva (Republican Research and Methodological Centre for Informatization of Education, Kazakhstan), Signe Balina (University of Latvia), Airina Volungeviciene (Lithuanian Distance and eLearning Association), Maria Duca (University of the Academy of Sciences, Moldova), Aleksey Sigalov and Aleksey Skuratov (INFORMIKA, Russian Federation), S. Adresheva (Ministry of Education and Science, Kyrgyz Republic), Inna Malyukova (Ukrainian Institute for Information Technologies in Education, Ukraine) and Norbek Taylakov (Tashkent University of Information Technologies, Uzbekistan).
4. The scope of this article is limited to the CIS and the Baltic States. It contains a few references to the surveys undertaken in the other countries, when such references are necessary for comparison. IITE plans to publish the results of the surveys completed in these countries as a synthesis report. Case studies on OER in Lithuania, Brazil and China have been published (Volungeviciene, 2011; Santos, 2011; Wang & Zhao, 2011).
5. The Bologna process is a collective effort by public authorities, universities, international organisations and institutions within the European Higher Education Area, involving 46 countries in total, aimed at achieving greater compatibility and comparability in their collective systems of higher education; see www.ehea.info.
6. The concepts of “big OER” and “little OER”, analogous to “big science” and “little science”, were introduced by Martin Weller (2010).
7. Joint Workshop on Open Educational Resources and Intellectual Property Rights; see http://iite.unesco.org/events/387945
8. UNESCO International Workshop on Intellectual Property Rights and Creative Commons Open Licenses, and an Expert Meeting on Use and Creation of Open Educational Resources; see www.iite.unesco.org/news/639059
9. Some of these misconceptions arising around UK OER initiatives are outlined at https://openeducationalresources.pbworks.com/w/page/25228307/OER%20Myths, whilst for African initiatives, the FAQs at OER Africa also address them: www.oerafrica.org/understandingoer/FAQsonOER/tabid/1097/
10. Based on the survey prepared for UNESCO IITE by Chunyan Wang (in press).
11. See www.wikiwijs.nl
12. See www.jisc.ac.uk/whatwedo/programmes/elearning/oer2
13. See www.core.org.cn/en
14. See www.jocw.jp
15. See www.acikders.org.tr
16. See http://ocwconsortium.org
17. See www.col.org

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CHAPTER

3

Tracing the Trajectory of OER in India: Reflections on Three Initiatives

V. Bharathi Harishankar

Abstract

Open educational resources are a nascent phenomenon in India, enabled by the growth of information and communication technologies and open source technologies. There are not yet clear benchmarks for their form, content, purpose and role.

A few recent attempts have kick-started OER experimentation in India.

1. The National Programme on Technology Enhanced Learning (NPTEL) provides digitised and web-based lectures on engineering courses to faculty and students in private engineering colleges.
2. The Virtual Academy for the Semi-Arid Tropics (VASAT) provides non-formal "natural resource literacy" to rural communities using simple technology tools.
3. FlexiLearn, an initiative of the Indira Gandhi National Open University (IGNOU), expands the scope of open and distance learning by providing "free learning resources integrated with a Learning Management System" to enhance personal learning free of cost.

This chapter examines the educational goals and the pedagogical and technological designs of sample resources from these initiatives as OER. Together, the three cases chosen for study are diverse in terms of type, focus and target student profiles, thus providing a representative basis for an OER trajectory in India.

Keywords: *educational goals, FlexiLearn, ICRISAT, IGNOU, IIT, NPTEL, OER in India, pedagogical design, VASAT*

Introduction

Are knowledge and education exclusive domains accessible to a few or are they converging sites for collaborative practices? Ideally, education provides a site for collaborative interactions between teacher and teacher, teacher and learner, and learner and learner. In principle, the development of information and communication technologies (ICTs) enables these collaborations *anytime*, *anywhere*. However, institutional policies, individual mindsets, copyright issues and restrictions on proprietary software hinder the actualisation of this collaborative ideal. Whilst open source technologies convincingly undermine the notion of proprietary technologies — both software and hardware — open educational resources (OER) herald a context wherein knowledge and education are free in terms of content, teaching and learning practices, and technology. Moreover, they are free to access, use, modify and reuse.

Around the world, different countries have responded to the call for OER in varying ways. In the Asian region, especially in India, OER are a nascent phenomenon. However, a few recent experiments provide an interesting trajectory. This chapter examines three different exemplars of OER to assess their potential for reuse and to map their implicit educational goals and the corresponding pedagogical designs. The underlying premise is that in the multilingual and diversified cultural context of India, for the potential of OER to be realised they have to offer a framework for collaborative teaching and learning as well as provide viable models and mechanisms for reuse. The succeeding sections of the chapter will

- Briefly discuss Indian higher education in the context of ICT developments and OER.
- Contextualise the three case studies taken up for analysis.
- Identify and examine the design structures of the samples and assess their potential as OER.

Indian Higher Education — A Brief Overview

India is a country of contrasts with respect to education. On the one hand, a large number of Indians go abroad for higher education. On the other, despite the Constitution of India providing for free and compulsory education to all children up to the age of 14, a large segment of the population is illiterate with no access even to primary education. At the higher education level, the government provides "full policy support and substantial public funds to create one of the world's largest systems of higher education" (Kaul, 2006, p. 27). However, there is a veritable demand–supply gap: "India would have to nearly quadruple existing college seats and more than quadruple the number of professors to achieve the [desired] 20 percent GER [gross enrolment rate] by 2014" (Dukkipati, 2010, p. 2). It is in this context that the power of technology to reach out to large sections of the population assumes importance. This is echoed in policy documents on Indian higher education, such as India Vision 2020 and the 11th Five Year Plan, which emphasise the need to create knowledge-based resources (Gupta, 2002, p. 24–26) as well as high-quality e-content ("Harnessing Growth", 2008). The intention is to compensate for the paucity of faculty and poor infrastructure by using

ICTs to create information pathways and lifelong learning options (University Grants Commission, 2003, p. 22–23). Already, decreasing costs of hardware and availability of connectivity have helped in digitising "Indian intellectual content" and created a platform for collaboration amongst teachers and learners (Government of India, Planning Commission, n.d., p. 102).

Table 3.1 presents some initiatives of ICT-enabled education in India.

Table 3.1: ICT-enabled education in India

Name of the organisation	Intended audience level	Type of initiative	Knowledge resource output
Consortium for Educational Communication (CEC)	Higher education	Television programmes	Curriculum-based resources archived in a learning object repository
National Council for Educational Research and Training (NCERT)	Primary & secondary education	eResources	Online textbooks
National Science Digital Library (NSDL)	Secondary & tertiary education	eResources	Curriculum-based content
Eklavya	Multiple levels	Open educational eResources	Content in Indian languages
Open Source Educational Resources Animation Repository (OSCAR)	Multiple levels	Teaching resources	Web-based animations
eGyanKosh	Higher education	Online courseware & videos	Self-instructional material
National Mission on Education through ICTs (NME-ICT)	Multiple levels	e-content, e-journal and e-books	Web portal
National Educational Foundation (NEF)	Multiple levels	Web-based open resources	Repository

Source: Harishankar (2012, p. 224).

These initiatives span different levels of education (primary, secondary and tertiary) and different types of providers (government/public, private). However, they converge in their attempts to provide access to quality teaching–learning resources. The case studies analysed in this chapter form part of this spectrum.

Before examining the case studies, it is necessary to provide working definitions of OER in the Indian context.

What Are OER and Why Are They Important to India?

OER may be defined as "educational resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials that have been designed for use in teaching and learning) that are openly available for use by educators and students, without an accompanying need to pay royalties or licence fees" (Kanwar & Uvalić-Trumbić, 2011, p. 5). In this definition, "open" refers not only to content but also to the free use of software tools, licenses and best practices (Wiley, 2008, p. 10).

Amongst the various components in the above definition, licenses often prove to be a major stumbling block in the successful practice of OER. This is because "open and free" licensing would necessitate an acceptance of the "4Rs" coined by Wiley (2008, p. 8), which are put forward as a framework to assess the extent to which a resource is open.

The 4Rs are described on the OpenContent website (Wiley, n.d.) as a framework for assessing the extent to which content is open:

- **Reuse** – the right to reuse the content in its unaltered/verbatim form (e.g., make a back-up copy of the content)
- **Revise** – the right to adapt, adjust, modify or alter the content itself (e.g., translate the content into another language)
- **Remix** – the right to combine the original or revised content with other content to create something new (e.g., incorporate the content into a mash-up)
- **Redistribute** – the right to share copies of the original content, your revisions or your remixes with others (e.g., give a copy of the content to a friend)

Giving the right for resources to be used in the above four ways demands a paradigm shift in the way teaching–learning resources and practices are perceived by individual teachers and institutions. This necessitates (i) on the part of the teacher, confidence to articulate one's best practice, willingness to collaborate and commitment to quality and (ii) on the part of the institution, enabling policies of openness as well as viable models to share and yet maintain competitiveness with other institutions in terms of enrolment. Sometimes accessible OER raise questions/doubts regarding the reliability, quality and usability of the "closed" resources currently in use.

In India, the extensive reach of ICTs and open source technologies has enabled widespread dissemination of and access to OER. As with ICTs, the imminent danger is to overemphasise the technology and neglect the underlying pedagogy. As Balasubramanian et al. (2009) state:

> The four most common mistakes in introducing ICTs into teaching are: (i) installing learning technology without reviewing student needs and content availability; (ii) imposing technological systems from the top down without involving faculty and students; (iii) using inappropriate content from other regions of the world without customizing it appropriately; and (iv) producing low quality content that has poor instructional design and is not adapted to the technology in use. (p. 24)

In fact, these mistakes provide indicators against which to determine and assess the potential of OER. This is because the pitfalls listed above hamper the "transformative opportunities for education" to increasingly open access (Iiyoshi & Vijay Kumar, n.d., p. 2).

A pertinent question is whether and how the practice of developing, releasing, adapting and reusing OER can become a functional model in India. Eric Raymond distinguishes proprietary and open source software by using the analogy of "the cathedral and the bazaar". A cathedral is built by workers according to a master plan devised and implemented by the church. In a bazaar, conversely, there are no clear-cut divisions of groups and there is widespread bartering and exchange (Wiley, 2008, p. 19–20). The essay's central thesis is Raymond's proposition that "given enough eyeballs, all bugs are shallow", which he terms Linus' Law: the more widely available the source code is for public testing, scrutiny and experimentation, the more rapidly all forms of bugs will be discovered. In contrast, Raymond claims that an inordinate amount of time and energy must be spent hunting for bugs in the cathedral model, since the working version of the code is available only to a few developers. The analogy can be extended to the creation, use and reuse of OER in India: an overarching code of sharing and collaboration is required at policy and institutional levels, whilst each user — teacher or learner — needs freedom to determine how the resource will be used, modified or reused.

Contextualising this Reflection

The following three experiments offer good variety for the purpose of studying OER in India.

1. The National Programme on Technology Enhanced Learning (NPTEL) (www.nptel.iitm.ac.in), a joint effort of the seven Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc), proposes to make available lectures on select courses by their specialist faculty to the mushrooming population of faculty and students in private engineering colleges. The mode of distribution is offline CDs, YouTube lectures and web-based courses. The YouTube lectures and the web-based courses cover the same curricula but involve different faculty members.
2. The Virtual Academy for the Semi-Arid Tropics (VASAT) (www.icrisat.org/vasat/learning_resources/VC), a wing of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), has a hub for learning resources on agricultural practices. It proposes to build "natural resource literacy among rural women and men". The learning resources are presented as PowerPoint (PPT) slides, Flash videos and HTML files.
3. Indira Gandhi National Open University (IGNOU) is the largest institution for open and distance learning in India. Recently, it has integrated the concept of open access into its teaching–learning system by providing free courses to learners through its FlexiLearn service (www.ignouflexilearn.ac.in). It aims to provide "free learning resources integrated with [a] learning management system" to enhance personal learning free of cost.

NPTEL seeks to make available, as OER, the existing courses and expertise in a face-to-face format to a larger population. The VASAT resources offer capacity-building

in the non-formal education sector. IGNOU's FlexiLearn attempts to expand the scope of open and distance learning. All of them have a clear-cut conception regarding the creation and use of freely available resources. Whether they can provide examples of good OER practice in India forms the rest of the discussion.

Reviewing the Three OER Initiatives

A. NPTEL

NPTEL is funded by the Ministry of Human Resource Development (MHRD), Government of India. Started in 1999, this programme seeks to introduce multimedia and web technology to enhance the learning of basic science and engineering concepts (NPTEL, 2007, p. 3). Its learning resources are in two formats — digital videolectures and web-based courses. The first phase has resulted in 260 courses, with 1,000 more courses proposed in the second phase. As the website states: "The mission of NPTEL is to enhance the quality of Engineering education in the country by providing **free online courseware**."

The initiative commenced in response to a mushrooming of private engineering colleges in India over the last two decades, resulting in a yawning gap in the quality of teaching–learning between "premier" institutions and the "second/third" tier institutions. This gap provides the justification for NPTEL's Operational Objective, "to make high quality learning material available to students of engineering institutions across the country by exploiting the advances in information and communication technology" (NPTEL, 2007, p. 6). An additional purpose is "to facilitate the competitiveness of Indian industry in the global markets through improving the quality and reach of engineering education" (NPTEL, 2007, p. 6). However, as of now, the license is only for noncommercial use. Whilst this enables open access by all, the potential for reuse under a Creative Commons license is curtailed, as is described in the FAQ on the NPTEL website (NPTEL, n.d.):

> The copyrights are owned jointly by the MHRD, IITs/IISc and the faculty. MHRD has encouraged faculty to convert their electronic content to textbooks in various engineering and science subjects (which will not affect what is freely available). The rest of the issues are being studied carefully at present. Barring a few courses, the rest of the materials are likely to be distributed under a Creative Commons license in the future.

NPTEL's courses take into account the variations in syllabi and curricula across institutions and are customised to "create necessary variants from a modular content" (NPTEL, 2007, p. 10–11). The technology solution involves a selection of "formats which ensure that the content creation and course management platforms are decoupled". It combines simple course-management packages and videolectures using an array of methods such as "chalk-and-talk, tablet writing, power point [*sic*], two and three dimensional animations, interactive codes etc." (NPTEL, 2007, p. 11–12) to disseminate best teaching and learning practices across the country.

Initially, NPTEL focussed on resources for core engineering streams such as civil, computer science, electrical, electronics and mechanical engineering courses. At present, it also includes courses on other engineering streams, as well as on humanities and social sciences. Whilst a basic design template is followed in all the lectures, the structure and organisation of each lecture/resource is at the discretion of the individual faculty member.

For the purpose of this study, I analyse a few samples from the course on Electro Magnetic Fields. These are in the form of digital videolectures delivered by Prof. Harishankar Ramachandran (HSR) of the Department of Electrical Engineering, IIT Madras. This choice is informed by the concerned professor's willingness to share his experiences of developing and delivering this course. Prof. HSR enumerates the process of designing his lectures as follows:

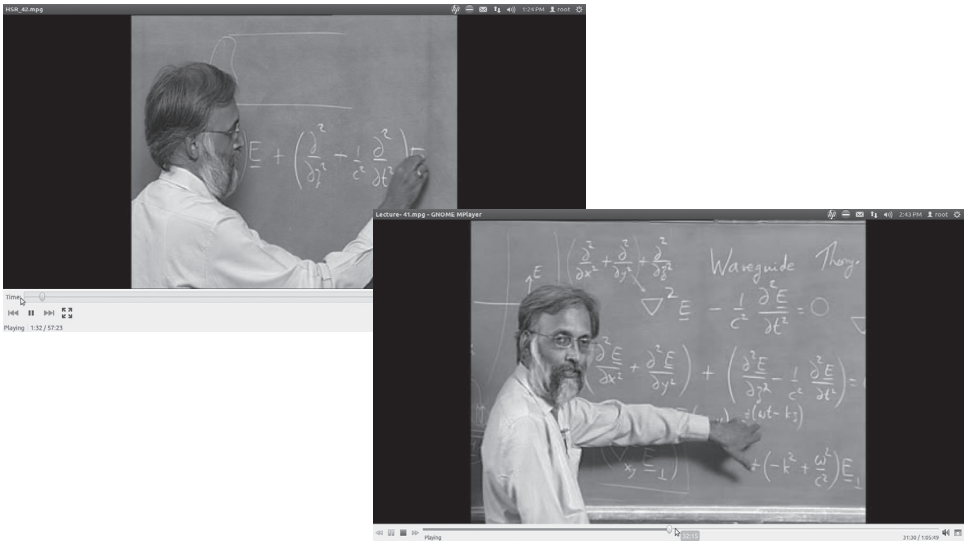
1. MHRD decides to include Electrical Engineering as a priority curriculum and NPTEL identifies 50 courses to be created under Electrical Engineering.
2. HSR agrees to teach "Electro Magnetic Fields" (42 lectures of one hour duration each), which is a course useful to students of Electrical Engineering and Electronics and students of Communications Engineering.
3. Using the syllabi that two state universities gave to HSR, he analyses the syllabi and designs the module plan.
4. The plan is approved by NPTEL and the curriculum is developed according to NPTEL.
5. HSR begins creating lectures.
6. Once lectures are completed, they are evaluated for accessibility by faculty in second-tier engineering colleges.
7. All the lectures are verified and errors are either digitally corrected or re-shot.

The time for the design process includes six months to create and six months to edit and review (H. Ramachandran, personal communication, 10 December 2011).

The level of the target audience is gauged — in this case, undergraduate engineering students in second-tier engineering colleges all over India. The syllabus units are modularised into lecture topics, with decisions made regarding how topics and sub-topics will be covered in one-hour slots. The weight given to different topics in the overall curriculum planning must also be decided.

When reviewing the videolectures, the first thing that catches our attention is the extensive use of the blackboard to write down formulas, derive equations and the like. As Prof. HSR points out, "managing the blackboard required special attention because the camera could capture only one part of the three-part blackboard and so the lecturer's movement was restricted. Also, when an unintended error or oversight happened, the entire sequence had to be re-shot" (H. Ramachandran, personal communication, 10 December 2011).

Figure 3.1: Snapshots from HSR's lectures



A positive feature of the lectures is the recapitulation of concepts encountered earlier in the course. Furthermore, the explanations are not only repeated as memory cues but also graded from simple to complex as the course progresses. This aspect assumes importance because the recorded lectures are beamed for student access at the NPTEL regional centres, and faculty (not necessarily the course creators) field questions from students over a satellite link. Recently, a web-based satellite interaction platform has also been put in place.

In their present form, the lectures have potential for the 4Rs of reuse, revise, remix and redistribute. Reuse is possible, as is evident from the available but yet to be codified user statistics. Redistribution pertains to licensing issues, which are described above and which allow for all but commercial use. The potential for revision and remixing depends on the lecture format used to suit the target audience. Currently, it is not possible easily to revise/adapt a particular lecture because of its format. The NPTEL lectures were originally intended as stand-alone series of lectures to be telecast nationwide. In this instance, the priority is to create lectures and not necessarily chunks with potential for reuse. With the uploading of these lectures on YouTube, an interesting possibility has emerged. Faculty in private engineering colleges can use a small portion of the videos and create their lectures around a particular NPTEL lecture. Thus, a lecture can be supplemented or remixed with other resources in a limited way. Prof HSR's remark on granulation to enable portability is perceptive:

> The way I tend to teach is to reach towards a central point about three fourths of the way into the lecture. So the lecture is intended to be viewed as a whole. It probably does not make sense as five-minute chunks. In any lecture, there are natural dividing points and it is possible to chunk at those points — say 15- to 20-minute chunks. (H. Ramachandran, personal communication, 10 December 2011)

The NPTEL team is now breaking the lectures into smaller units with keyword indexing. Once this task is completed, it may be easier to use the lectures in other contexts.

From a pedagogical perspective, the lectures have a number of positive features, which ensures that they will be of use in the Indian context: first, they are aligned to syllabi commonly found in India, second, they cover the syllabi in a sequenced and systematic manner, and third, they relate to examples and illustrations from the Indian context. A further positive feature, as mentioned earlier, is that each lecture recaps previous concepts that have been introduced. Consideration has been given to the likely profile of the learners and, in particular, their language level. To this extent, the lectures have potential for the 4Rs. Interestingly, anecdotal evidence indicates that a large segment of users is comprised of research scientists in government organisations and engineers in Indian companies.

B. VASAT

The Virtual Academy for the Semi-Arid Tropics (VASAT; www.vasat.icrisat.org) is an allied institution of the International Crop Research Institute for the Semi-Arid Tropics, one of the Consultative Group on International Agricultural Research centres in India. VASAT seeks to create "demand-driven" and "needs-based" content to educate and support rural communities. It uses ICTs and open and distance learning methodologies to bring home the best knowledge and practices from national and international sources, modify them to suit local needs and enable the rural communities to further adapt them for their specific needs.

With this objective in mind, the resources have been released with a Creative Commons noncommercial attribution license. Educators therefore have the right to reuse the resources as they are, revise them as appropriate and remix them with other resources, on condition that VASAT is acknowledged as the author and that the resulting resources are not used for commercial purposes.

The resources are designed for use by rural communities with enormous experiential knowledge but little or no classroom-based or formal education. Thus, relevant and just-in-time information is imparted in manageable chunks with viable learning outcomes.

The programme consists of eight courses, on Groundnut, Sorghum, Pearl Millet, Pigeonpea, Chickpea, Climate, Plant Nutrition Management and Soil. The individual lessons/units are accessible in different formats — HTML, Flash, PowerPoint and ZIP. This ensures portability across different levels of system requirements and connectivity.

The selected sample is a course with 12 modules on groundnut production. The opening page lists the target learners for the course, the structure of the modules and the learning objectives. That the focus of the resource is on tangible outcomes is evident in the fact that all except two objectives (*know* and *understand*) use action words:

> **Audience:** This course is meant for Farmers, Agricultural Extension Personnel and Others interested in practical agriculture.
>
> **Structure:** This course is divided into Modules, Lessons and Units.
>
> **After completing 12 Modules in this course you will be able to:**
>
> - Identify soils to grow groundnut.
> - Explain the climatic requirements for groundnut crop.

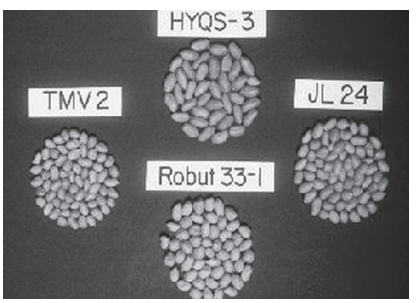
- Describe field preparation for groundnut crop.
- Choose and efficiently apply manures and fertilizers.
- Recognise groundnut plant nutrient deficiency symptoms.
- Choose suitable crop rotation practices.
- Follow proper sowing techniques to get optimum groundnut plant stand in the field.
- Identify weeds and their control in groundnut.
- Understand soil moisture relationships in groundnut cultivation.
- Appraise maturity of pods and harvesting of groundnut crop.
- Know about proper storage of groundnuts. (Virtual Academy for the Semi-Arid Tropics, 2012)

The 12 modules have varying numbers of lessons, depending on the range of topics covered, and some lessons are further divided into units. Beginning with a definition of the topic, the modules comprehensively cover topics that include area of cultivation, common diseases affecting the crop, sowing methods, harvesting methods and storage methods. Even at the level of lessons, and certainly at the level of units, this resource is effectively divided into manageable learning chunks. Every module ends with a multiple-choice, self-check exercise that assesses quick comprehension. The exercise section is in PowerPoint slides, with a simple navigation tool. Apart from providing an instant response, e.g., "you are right", the solution page also explains the correct answer.

The effective use of textual space is a highlight of this resource. For instance, in the screenshot given in Figure 3.2, there is enough to aid in conveying a complete chunk of information. Apart from giving the course title, module number and lesson number, the resource includes labelled pictures (such as this one) relevant to the given chunk of information. Buttons with arrows for previous and next pages help in the easy flow of information.

The screenshot contains four labelled pictures. Whilst lay readers might be puzzled about the alphanumeric descriptions, the agricultural community would immediately recognise the type of groundnut grain under discussion.

Figure 3.2: Labelled picture from an example module



Whilst some modules include higher-order content aimed at an informed audience, both the general-purpose and domain-specific content are written in

a straightforward, lucid and precise style. Simple illustrations and animations enhance understanding.

C. FlexiLearn

FlexiLearn is an initiative by India's largest open university — IGNOU. This initiative follows the National Knowledge Commission's recommendations to create OER and utilise the power of networking offered by technologies. It is also an advance in IGNOU's learning repository — eGyanKosh — which was created in 2005 "to store, index, preserve, distribute and share digital learning resources developed by the Open and Distance Learning Institutions in the country" (eGyanKosh, n.d.). At present, the repository has 40,000 self-instructional print resources which are combined as modules and expanded into fully-fledged courses, and 1,600 videos. As the website states, the mission is to enable "democratisation of Higher Education by taking it to the doorsteps of learners and providing access to high quality education to all those who seek it" ("Education free of cost with Flexi Learn at IGNOU," 2009).

The initiative is a natural progression for an open and distance learning institution, in that such an institution is well versed in ensuring that education and knowledge acquisition are enabled outside the face-to-face classroom infrastructure. In FlexiLearn, the material for the entire course, arranged in well-structured modules, is provided as an "open access resource" with a Creative Commons license, which allows reuse and remixing. Moreover, testing and assessment are also free. However, certification requires payment of a course fee. Here is an instance of OER arrangements offering open access but also ensuring financial viability to the institution concerned.

Like NPTEL and VASAT, the technology component in FlexiLearn is simple, in that learning modules are placed within a well-organised course and programme structure. Resources covering manageable chunks of learning with specific learning outcomes are placed in a learning management system. This enables flexibility in terms of individual pacing as well as the feel of a complete course/programme. Courses can be browsed by title, topic or level and searched through keywords. There are also discussion groups, which facilitate peer-to-peer interactions.

At a basic level, FlexiLearn is a digitised version of the course content of almost all IGNOU programmes. There is an impressive array of programmes offered at different levels — certificate, diploma, post-graduate diploma, undergraduate and post-graduate. Course content is designed in the self-instructional/self-learning material (SIM/SLM) format, which enables learners to understand and comprehend without the need for live classroom interaction. Each course is divided into blocks, which are in turn further divided into units. The organisation of a sample unit for a course on Gender Analysis is given below.

The unit follows a logical structure, with an introduction, list of learning objectives, and clear-cut division into sections and sub-sections. Whilst the introduction provides a context for the topic under study, the objectives provide tangible outcomes for the learner. In the sample, the topic is covered in 15 different sections, interspersed with pictures, tables, illustrations, explanations, activities, as well as "check your progress" exercises. This method of organisation

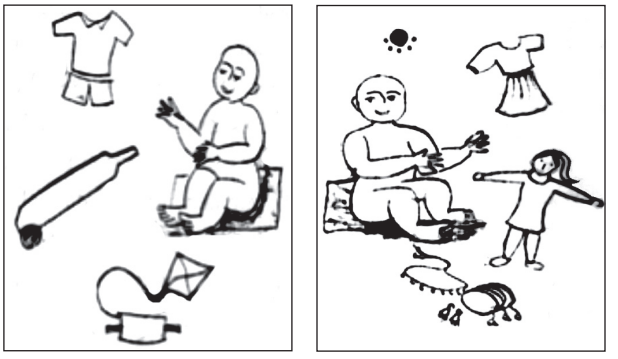
provides logical expansion of the central idea. In fact, these sections (more than the unit as a whole) will provide usable chunks for reuse and modification. Here is an instance where the resources could be improved with the appropriate modifications to suit the new technological medium, so as to avoid the inevitable "electronic page turning" and provide more interactivity.

As an illustration, let us consider a sample module. The introductory text is simple and aimed at self-study by learners.

> What are these social traits? For example, women are supposed to be slender, shy, sensitive, traditional, home bound, not to run or jump around, not to laugh loudly etc. Men are supposed to be bold, strong, tough, confident, talk loudly, not to be shy, not to cry etc. Men and women are not born with these traits. We bring up boys and girls in such a way that they acquire these traits. These are gender related traits.

This simple explanation sets the tenor of the entire module. This is followed by simple line drawings and pictures to expand the ideas (see Figure 3.3). While the idea is effective, the pictures/drawings could have been of better quality.

Figure 3.3: Sample module from a course on Gender Analysis



As an OER, this small sample is a complete learning object with concept definition and illustration. In fact, the pictures can be used by the teachers and learners as illustrations or to create a picture-based activity. The unit ends with a recap section, glossary, references and practice questions. Whilst the overall structure of the unit is designed for independent learning, the resource is basically a verbatim digitisation of the existing print material. This is an instance which makes us wonder whether openness will facilitate an enhancement of the material — i.e., in terms of good-quality pictures and illustrations, and interactive, learner-focussed activities.

Reflecting on the OER Initiatives

All three of the initiatives are in their early stages of development, making this reflection preliminary, particularly as evidence of the extent of "reuse, revision and remixing" still needs to be collected. Nevertheless, a number of features have become apparent.

First, a common feature of the three OER initiatives is that the necessary support structures from both governmental and institutional perspectives are in place. This implies that individual endeavour, institutional policy and national mission are synchronised. In addition, use was made of existing courses (FlexiLearn) and existing human resources (lecturers from the seven IITs and from IISc for NPTEL). These factors have made it possible to make available a large number of resources.

Second, all the resources have been created (NPTEL) or adapted (VASAT and FlexiLearn) in India through an in-house process, involving collaboration with peers. Moreover, it is reported that the needs of the students have been taken into account. It thus appears that the initiatives have avoided at least two of the mistakes that Balasubramanian et al. identified: using inappropriate content without customising it properly, and not reviewing student needs and content availability.

Thirdly, in all three initiatives the resources have been released with licenses that give the right to reuse, remix and redistribute, and in some cases to revise. In the case of NPTEL, the license for redistribution is restricted to noncommercial purposes. Whether these restrictions constitute a major barrier to use must be established by research.

Such rights are, however, a necessary condition for the potential of OER to be realised. Exercise of these rights must be enabled by the appropriateness of the technology used, the format of the resources and, of course, their quality. These characteristics are summarised in Table 3.2.

In all three initiatives, the utilisation of available and appropriate technologies is commendable. Despite the fact that all three institutions are well reputed at the national level and have a strong international presence, and despite the financial outlay available for each initiative, there seems to be a conscious decision to keep the technology simple in order to ensure maximum portability. After all, bandwidth issues and poor connectivity are still realities when designing eLearning and web-based content in India.

Finally, each of the initiatives has elements of sound pedagogical and instructional design underpinning the resources: assessment of learner needs; appropriate and good quality content; and some sound instructional design. In this respect, the initiatives have avoided another of the mistakes that Balasubramanian et al. identified; in all cases, the format is suitable for use in face–to-face, open and distance learning, and non-formal educational contexts.

The following best practices that emerge from these initiatives can be used as frames/templates for future OER initiatives:

- Learning technology synchronised with content availability.
- Pedagogical and technological systems matched.
- Technological design simple enough to be replicated.

Table 3.2: Comparative overview of the three initiatives

Name	Type	Mission	Institutional policy	Technology design	Pedagogy design	OER enabler	Future pointer
NPTEL	Videolectures/ web-based courses	Enhance quality of engineering education	Share expertise and high-quality teaching resources	Course management package + simple tools: chalk-and-talk, PPT, tablet writing, 2/3D animations	Accommodate variations in syllabi and create variants for modular content	Sound instructional design	Keyword indexing (in progress) to ensure granulation + Creative Commons license + separate design template integrating face-to-face and online distance learning
VASAT	Learning objects with needs-based content	Empower rural communities through ICT and capacity-building	Convert scientific knowledge into practical solutions by providing free access to just-in-time information	Common file formats – PPT, HTML + open source LMS – Moodle + simple illustrations and animations	Granule of learning approach	Easily replicable method of presentation and granularity	Localisation in terms of translations into regional languages + collaboration with rural users in content creation
FlexiLearn	Free online courses based on open access concept	Democratise Indian higher education through access to high-quality education	Access to resources, testing and assessment are free; certification requires payment of course fee	LMS with keyword search	Learning modules in self-learning format	Self-paced learning with learner autonomy	Granulation to ensure portability + design template for open access learning

Conclusion

The type and level of education, underlying mission, individual willingness, institutional policy, and technological and pedagogical design of each of the three initiatives reveal potential for growth of the OER phenomenon in India. Whilst discussing the use of technology in education, Ezer points out the distinction between "technology; what it can do, what forms of interaction it invites, what properties it has" and "the idea of technology, what people think of it, how they see it helping their situation, how they shape its meaning" (2005, p. 59). The same analogy may be usefully applied to the OER phenomenon in India. The definition of OER — its properties, its scope and the interactions it allows — has not yet been explored theoretically in India. However, "the idea" of OER — what individuals think of it, how they define its meanings and how they perceive its usefulness — has shaped the three initiatives discussed in this chapter, providing an instance of practice preceding theory. Clearly, the correspondence between the theory and the practice of OER in India is a matter for the future.

Note: The author wishes to thank the University of Madras and the IDRC-funded PANdora Project, which enabled the research underlying this chapter.

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CHAPTER

4

Producing OER from Scratch: The Case of Health Sciences at the University of Ghana and the Kwame Nkrumah University of Science and Technology

Kathleen Ludewig Omollo, Adam Rahman and Chris Andrew Yebuah

Abstract

This chapter looks at the production and promotion of health open educational resources (OER) at the University of Ghana (UG) and Kwame Nkrumah University of Science and Technology (KNUST). Both institutions initially chose to produce materials from scratch rather than build upon existing OER, and then subsequently shared the materials through a global distribution network to advance health education across the continent. Their aim was to use OER to offset the challenges of an ever-increasing number of students, inadequate faculty size, insufficient funding for educational materials and equipment, limited physical and technical infrastructure, curriculum gaps and low research capacity. To create and publicly share educational materials, both universities undertook a number of activities to strengthen their professional, policy and technological infrastructures. Participants discussed the importance of clear copyright ownership and informed consent policies, the skills required to produce OER, incentives for authors, and ways to ensure efficiency of production as well as good quality in the materials produced. In the OER production processes that emerged, health science lecturers develop the educational content, but OER media specialists assist with photos, videos and sound, and employ basic instructional design principles to package effective learning materials. The OER are shared through multiple distribution methods for ease of access across the universities, the continent and the world. KNUST and UG have demonstrated that it is possible for resource-constrained African institutions to create effective, world-class electronic learning modules that are relevant to their needs and also beneficial to other universities.

Keywords: *capacity-building, copyright clearance, electronic learning, health education, instructional design, materials development, skills development*

Introduction

The Kwame Nkrumah University of Science and Technology (KNUST, est. 1952) and the University of Ghana (UG, est. 1948) are the two largest public universities in Ghana, with 23,000 and 30,000 students, respectively. Their associated Colleges of Health Sciences (CHS) are responsible for training many of the healthcare workers in Ghana. In 2008, both universities introduced open educational resources (OER) projects to enhance health science instruction.

Their many accomplishments of the past three years include raising awareness of OER within CHS, developing processes, skills and structures to support the creation of OER by lecturers and support staff, producing media-rich interactive OER modules, introducing their students to OER, and using and adapting OER from other institutions. Additionally, both universities proposed modifications to academic practices and official policies to promote publishing Creative Commons (CC)-licensed content such as OER.

KNUST and UG provide noteworthy models of (i) motivations for creating and adapting OER, (ii) how to develop capacity to locally produce OER, (iii) advocacy tactics for ideological and financial support for OER across large, diverse colleges and universities and (iv) progression and vision in OER to complement other delivery methods for education.

This chapter is derived from semi-structured interviews with staff, lecturers and students involved in OER activities at KNUST and UG. The interviewees gave their consent for the authors to use their names and direct quotations.

Background

The OER activities at KNUST and UG emerged in 2008, when both universities were partners in a number of cross-institutional grants and workshops.

KNUST and UG were introduced to OER during a May 2008 workshop in Accra. The workshop included 27 participants from six other African universities and institutes, three foundations and the University of Michigan (U-M), who gathered to discuss the relevance and potential of OER to improve health education in Sub-Saharan Africa. Later in 2008, KNUST and UG entered into a two-year partnership with U-M, the Ghana Ministry of Health, and the Bill & Melinda Gates Foundation to strengthen human resources for health education and healthcare professionals in medicine, nursing and public health.

The following year, The William and Flora Hewlett Foundation sponsored a pilot activity to develop health OER through collaboration amongst several universities that participated in the May workshop: KNUST, UG, University of Cape Town, University of the Western Cape and U-M, as well as OER Africa, an initiative of the South African Institute for Distance Education (Saide). In late 2009, the partner institutions submitted a successful two-year, follow-on grant proposal. The follow-on grant launched an African Health OER Network, with the aim to advance health education across the continent by using OER developed by and targeted towards Africans in order to share knowledge, address curriculum gaps and support communities around health education.

Motivations for OER

Kwame Nkrumah University of Science and Technology

KNUST expects that its engagement with OER will facilitate ongoing curriculum renewal, enhance the teaching and learning experiences of students and educators, promote knowledge sharing and raise the institution's global visibility. The ambition is that OER will help — at least in part — to offset the challenges of an ever-increasing number of students; inadequate faculty size; insufficient funding for educational materials, equipment and financial constraints; limited physical and technical infrastructure; and low research capacity.

> *We struggle to have access to information. If we have information, why do we not also share it as part of a pool of universities? Using OER, our institutions are able to exchange information for the purpose of improved learning.*
>
> *Peter Donkor, Pro Vice-Chancellor and former Provost of CHS, KNUST*

University of Ghana

Leadership within UG and its CHS views OER as a tool to achieve the strategic objectives of the college and the university at large. Within CHS, one aim of OER is to promote standardisation of clinical practices. OER enables faculty to preview how a topic is taught at other institutions and make comparisons with local methods. It also encourages conversations around how various instructors may conduct clinical or laboratory procedures differently within an institution. Such transparency enables opportunities for curriculum analysis, which may facilitate standardisation within and across institutions.

> *What will happen when this is done is that it will tend to standardise things and the students will understand or grasp that this is what they will be expected to know.*
>
> *Nii Armah Adu-Aryee, general surgeon and clinical instructor, UG*

At UG, the vast majority of the university's courses — and currently all health science courses — are taught face-to-face, but a small subset of courses is taught through distance education, either paper-based or online. UG plans to expand distance education to cover half of all enrolled students.

> *The university has a target that at least half of its population will be taking courses outside of campuses, and it has a vision of providing rich content electronically for its students. So OER provides a great opportunity for the university to achieve that end.*
>
> *Patrick Kuti, webmaster, ICT Directorate, UG*

Grand Vision

One long-term goal common to both universities is to increase the number of healthcare workers. Sub-Saharan Africa has the lowest percentage of the global healthcare workforce and the lowest relative health expenditures, yet has one of

the highest percentages of global disease burden. Like many Sub-Saharan African countries, Ghana struggles with low doctor-to-patient ratios. There are only 0.15 doctors and 0.92 nurses per 1,000 Ghanaians, which is well below the World Health Organization (WHO) recommendation of 2.0 doctors and 2.5 nurses. Ghana ranks amongst the lowest for healthcare worker density and amongst the highest in overall mortality. To improve public health, the Ghanaian government aims to triple the number of healthcare workers. However, the medical schools in Ghana can only admit 30 per cent of qualified applicants due to limited faculty size.

A key barrier in growing and strengthening the national workforce of health professionals is the lack of instructors to teach basic and clinical sciences, which is complicated by the duplication of effort in developing learning materials. The aim is that OER will, in the long term, reduce the faculty time and cost required to produce teaching materials or present lectures.

> *Something produced in Zimbabwe may be useful to some of us in Ghana, and vice versa, and it will cut down significantly on cost. We shouldn't feel isolated at our universities by trying to do everything and cover all topics on our own. We should fight a unified battle in producing things.*
>
> *Richard Phillips, lecturer, Department of Internal Medicine, KNUST*

Time saved on materials development can then be re-apportioned for more dynamic, interactive learning activities with students (such as discussions, laboratory experiments or clinical demonstrations), or instead for publications or professional development for lecturers. For example, one professor of molecular medicine at KNUST estimates that once he completes his module for lipid metabolism, he will be able to reduce his lecture time on the topic from six hours to four.

Rationale for Producing Local OER

When OER was introduced to KNUST and UG in 2008, there was already a small but growing collection of OER produced by other universities and available for anyone, worldwide, to use or adapt. Both universities, however, chose to focus their initial OER activities on promoting local creation of OER, often from scratch, instead of using existing OER or even existing materials developed by faculty. Several factors informed this decision.

Lack of Existing, Relevant OER

At the start of the project in 2008, there were few health OER — and even fewer materials produced by Africans. Many of the existing resources created outside Africa were not viewed as suitable for local contexts. More recently, though, there have been a few examples of using OER from elsewhere. For example, two lecturers at the UG dental school have used OER from U-M, Johns Hopkins University, and the Global Health Informatics Partnership as part of their teaching and research.

Lack of Contextually Appropriate Materials in General

One motivation for creating OER was to fill a gap in existing educational materials — both proprietary and open. The most common medical textbooks used

worldwide are predominantly Western and therefore feature Western practices and scenarios. This means that the books may promote different processes, have different cultural influences, and rely more heavily on expensive tests and equipment to guide diagnoses, compared to how those same topics would be taught by Ghanaian health professionals.

> *Most of the medical textbooks are written by people in the USA. There are only a few from our country. You read the things they are doing, which are advanced [and high-tech] things, here in Korle Bu, but we don't [and can't] do that here. So the fact that the videos actually involve our lecturers who are telling us what they [are doing] here in Korle Bu, is a good thing.*
>
> *third-year clinical student, Medical School, UG*

Additionally, those textbooks often use images of Caucasian patients, which may occasionally be problematic. For example, certain dermatological diseases may manifest themselves differently in dark skin compared to light skin. By creating and sharing their own materials, Ghanaian lecturers are able to develop and gain access to more contextually appropriate teaching resources.

> *When you look in textbooks, it's difficult to find African cases. The cases may be pretty similar but sometimes there is something that you see on a white skin so nicely and [it is] very easy to pick up, but on the dark skin it has a different manifestation that may be difficult to see. Sometimes it is difficult for the students to appreciate when they see a clinical case that involves an African.*
>
> *Richard Phillips, lecturer, Department of Internal Medicine, KNUST*

Simulating In-Person Demonstrations that Are Difficult to See in Large Classes

Both universities had nascent eLearning activities prior to engaging with OER, but many lecturers still relied on low-tech delivery methods, such as paper notes, dry-erase boards and PowerPoint slides. Consequently, the primary goal of OER was to create materials for students where often there previously had been none. For example, beginning in 2011, both KNUST and UG started to experiment with adapting existing materials for OER. At KNUST, one OER narrated lecture in dentistry was based on existing PowerPoint slides. KNUST's Department of Communication Design is in the process of revising a maternal health flipbook, created by a former student for publication as an OER. Some of the basic sciences and internal medicine OER modules in progress at UG are loosely based on existing lecture slides.

Most importantly, open licensing enables lecturers to make materials readily available to current students by giving them permission to copy and share with their peers, and by ensuring that materials are accessible to students outside the classroom and even after they finish their courses.

> *We are not doing OER for the benefit of people outside of KNUST, primarily, even though we see that as a secondary benefit. Having my lecture material readily available to students, 24 hours a day, seven days a week, means that they can even read or watch it before they come to meet me in the lecture room. Therefore, they will probably ask the right questions, if they've read it. After the lecture, if there is something they do not*

understand, I expect that they'll be able to refer back to my materials and go over them again.

Peter Donkor, Pro Vice-Chancellor and former Provost of CHS, KNUST

Likewise, one of the reasons for creating OER anew was to codify local practices by local professors as a back-up for the limited in-person, faculty-student discussions caused by high faculty-student ratios, overflowing classrooms and crowded clinical demonstrations.

[With OER,] patient privacy is, in a way, preserved. [As a patient,] I wouldn't feel comfortable having 20 students around me. [As a lecturer,] you want to document [rare conditions] so you can show your students without having to go back to the patient over and over again.

Sandra Hewlett, lecturer, Dental School, UG

Showcasing Specialised Knowledge

One U-M final-year medical student remarked that his peers who do part of their clinical rotations abroad often return to Michigan with more confidence in their ability to diagnose, because they have learned to rely on their knowledge and on simpler equipment. Aware of their unique expertise, CHS instructional staff members aspire to share this specialised knowledge with their students and their global peers. For example, one physician from KNUST is a renowned expert on Buruli ulcer, an infection most common in Sub-Saharan Africa, and consults on the topic for WHO. He developed a Buruli ulcer instructional module — which he also licensed as an OER — for the WHO.

This motivation to demonstrate unique expertise has been especially strong amongst senior faculty in the UG Medical School. These senior faculty view OER as a method for imparting their wisdom to the next generation of doctors and for bequeathing their teaching legacy to the school through video. Several retired faculty who now serve as part-time consultants for UG have been authors for OER modules at U-G.

We have a number of old professors in the system … who are so enthusiastic about OER production that a lot of them have produced some material. This is very good because of their experience in teaching students over such a long time.

Aaron Lawson, Provost, CHS, UG

Developing Socio-Technical Infrastructure to Support Local Production of OER

To create educational materials that they were comfortable sharing publicly, the two universities undertook a number of activities to strengthen professional, policy and technological infrastructures. During the workshops that followed, participants discussed the importance of clear copyright ownership and informed consent policies, skills required to produce OER, incentives for faculty to participate, and processes to ensure efficiency of production and quality of the materials produced.

Copyright

At KNUST and UG, the universities own the copyright to materials produced by teaching and support staff. Consequently, each university needed to revisit institutional policies to clarify that lecturers have the authority to publish and license materials, including under a CC license, on behalf of the university. Additionally, many staff and students were unaware of basic principles of copyright law. Piracy is common amongst students because within Ghana there is a low risk of being held accountable for copyright infringement. Since the materials shared as OER would be shared publicly, worldwide, in countries with stronger copyright enforcement, training was essential to reinforce with content authors the importance of adherence to copyright laws. Basic training in copyright, CC licensing and copyright clearance was therefore needed to explain the advantages of sharing content under the "some rights reserved" designation, as opposed to the default of "all rights reserved".

Informed Consent

Each institution chose to focus its OER production on clinical videos and laboratory procedures, since those are the most difficult to see up close in large classes. Many clinical videos require filming of patients; in those cases, obtaining informed consent and upholding patient privacy are essential. KNUST and UG each have affiliated teaching hospitals, and it is expected that large groups of students will be shadowing physicians on ward rounds. However, at the outset of the projects, neither the hospitals nor the universities had consent forms or even informal accepted standards that would permit patient recordings for any use other than internal viewing amongst hospital staff. Each university had to develop new practices for informed consent and to explicitly request permission to record procedures.

At KNUST, lecturers usually obtain oral permission from patients for recordings. Many physicians at Komfo Anokye Teaching Hospital (KATH) have commented that written consent would not be culturally acceptable, because in the Kumasi area it is extremely rare for people to sign forms, except in unusually weighty circumstances such as when purchasing land. They have found that patients agree to participate when the background and permission information is discussed orally, but if the same information is presented in a written form for signature, it is met with more suspicion. KNUST is currently exploring how to adapt UG's patient consent process for OER so that it can be used at KATH.

At Korle Bu Teaching Hospital (KBTH) in UG, physicians opted to create a formal, written consent form for patients to sign. UG physicians have generally found that patients are willing to be recorded and to sign the permission form. In some circumstances, however, patient consent has been solicited orally due to literacy barriers. As at KATH, physicians at KBTH also have encountered some patients who, when presented with a document to sign, deemed written consent to be too serious an action and insisted on giving only oral permission. At KBTH, several patients opted out of recording altogether.

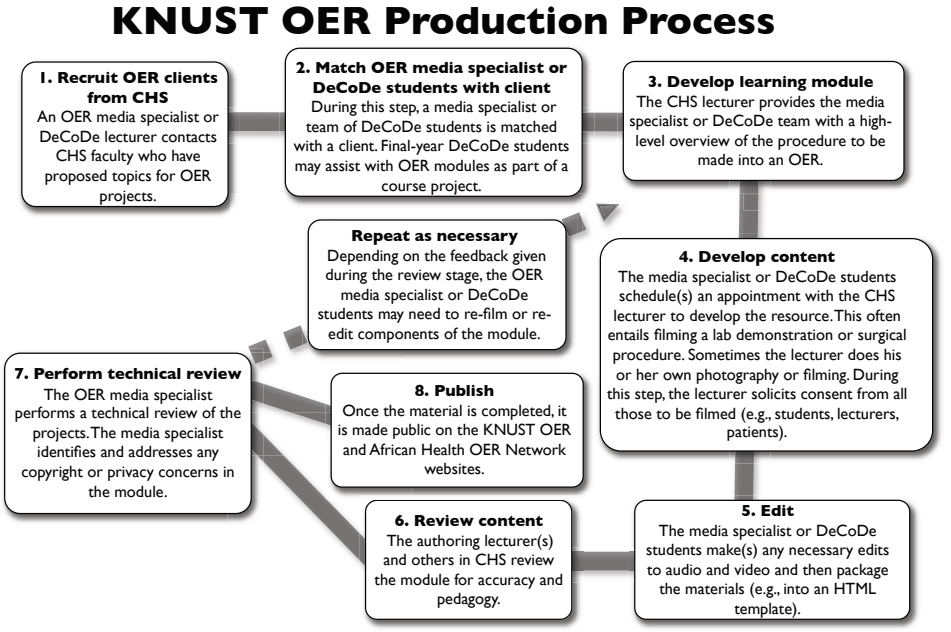
Skills and Equipment for Electronic Learning

Each university had to address the challenges of marshalling human resources and mobilising, or in some cases developing, the technical skills and physical infrastructure needed to produce media-rich electronic learning materials. To facilitate access to OER and other electronic resources, in 2009 and 2010 both KNUST and UG made substantial investments to improve their information and communication technology (ICT) infrastructure, including their bandwidth capacities.

Doctors can provide content, but they do not possess acute technological skills. Training doctors to be experts in multimedia production would be an expensive and inefficient use of their time. Thus, both universities have sought alternatives to relieve the CHS faculty of having to do both content development and technical production.

At KNUST in early 2009, the health OER co-ordinator was introduced to a lecturer in the Department of Communication Design (DeCoDe) within the College of Arts and Social Sciences. The two agreed that the photography, video editing and web design expertise of DeCoDe would be great assets for OER production. In late 2009, CHS and DeCoDe explored having recent graduates and teams of enrolled students work with lecturers to co-develop OER. In the OER production process that has emerged (Figure 4.1), CHS faculty still develop the educational content, but an OER media specialist or team of DeCoDe students assists with photos, videos, sound and packaging for the learning modules.

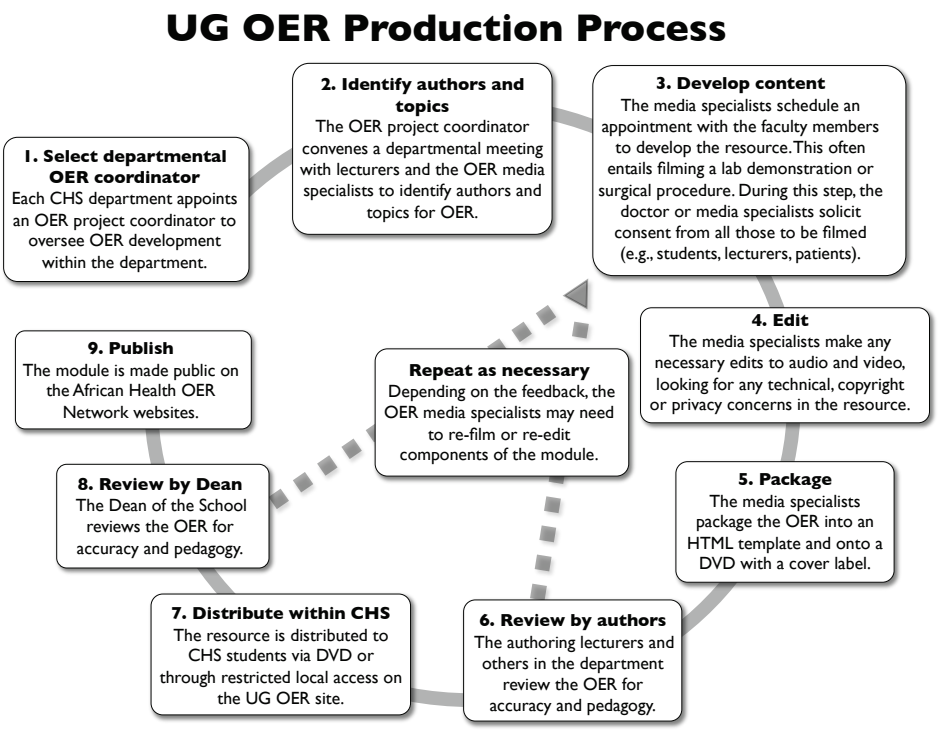
Figure 4.1: KNUST OER production process



The relationship with DeCoDe continues to grow, with two paid media specialists as well as 20 to 30 third- and fourth-year students and select faculty now involved in multimedia production for OER.

UG adopted a similar approach (Figure 4.2). In January 2010, the OER co-ordinator at CHS decided to hire a media specialist who had worked in the commercial film and television industry in Accra, to provide professional media support for OER. In the following two years, UG hired two additional full-time media specialists to support OER.

Figure 4.2: University of Ghana OER production process



At both institutions, lecturers seem grateful to have the technical support offered by media specialists. Due to the involvement of the author(s) in the design phase and again during the review stages — which may be repeated as needed — academics are able to maintain ownership of the content to ensure quality and accuracy. All contributing authors must sign off on materials before they are made publicly available.

Policy Support for Open Publishing

As is the tradition in many universities, faculty performance evaluation at UG and KNUST was originally based largely on publication in high-impact, proprietary, peer-reviewed scholarly journals. Each institution had to introduce formal and informal incentives for lecturers to devote their time to developing OER. For lecturers to be willing to take time away from their other teaching, research and service responsibilities so as to create targeted eLearning materials (which was a new concept for many), the university had to offer some recognition or reward.

I think that if a university adopts a policy specifically for the development of OER in that institution, it will be a giant starting point. That way they won't depend on the willingness and desire of faculty because the faculty would know from the beginning that their inputs will be recognised by the statutes of the university and they would get the appropriate credit for that activity.

Ohene Opare-Sem, Professor of Internal Medicine, KNUST

In 2009, the OER teams at the two universities each established a small committee of lecturers, support staff and librarians to examine existing university policies regarding intellectual property and performance reviews. The committees drafted two new policies and began the process of moving these through three committees at different levels of the university administration. Both policies reaffirm the universities' copyright to materials produced by teaching and support staff, but establish the CC Attribution (CC BY) license as the default for all OER, whilst giving authoring faculty the right to select an alternative CC license.

At UG, the OER policy efforts coincided with the university's regular policy reviews, which are conducted every three years. The draft policy proposes the creation of a production unit for OER, staffed by technology professionals, and a server to host the completed OER. Lastly, it suggests that OER be reviewed by contributing departments prior to publication, that faculty get time earmarked for creating OER and that authoring faculty receive academic recognition for their OER. At the time of this writing, the draft policy is with the academic board, in its third and final stage of approval.

Open educational resource material produced by faculty members should be seen as intellectual products which count towards career advancement. It is recommended that three OER materials be considered equivalent to a peer-reviewed publication. However, this equivalence ratio should be guided by the level of complexity of the material produced ... a faculty member should not be promoted solely on the production of OER material in lieu of peer-reviewed publications.

excerpt from UG draft OER policy

At KNUST, the OER policy establishes a reward structure for OER production. It proposes that faculty receive the same credit for OER modules as for peer-reviewed publications, and that the university allocate time for faculty to create OER. The policy recommends that the university continue to seek external funding for this work, and also encourages departments within CHS to earmark within their budgets some funds for OER production. The policy was approved in August 2010 and made public in May 2011. As the policy states:

The purpose of this OER Policy is to:

- Guide the development and review of OER materials prior to sharing them on a worldwide scale.
- Clarify publication rights and licensing issues.
- Outline policies regarding the use of required infrastructure (information technology, libraries, etc.) and other support services.

- Identify human and other resources to support faculty in developing OER for teaching and learning.
- Define collaborations within and outside of the university and the intent to allow access. (KNUST, 2011, p.6)

Achievements

Completed and Published OER Modules

When originally presented with examples of OER in 2008, several CHS faculty at KNUST and UG were intimidated by the level of technical sophistication and by the content-clearing process. A few even questioned their own abilities to produce such materials. Both institutions have now demonstrated that it is possible for their lecturers and support staff to produce high-calibre, media-rich, interactive learning materials.

> *I think the greatest achievement has just been the fact that we have shown that this thing can be done. The students are using the materials and find them helpful. But the biggest thing is just overcoming that barrier of, "Can we really produce such things?" And now the answer is clearly "yes".*
>
> *Richard Adanu, Vice Dean, School of Public Health, UG*

To date, KNUST has completed 15 OER modules, which have been posted on the KNUST OER site. Another 21 are currently in development. At UG, lecturers at the medical school have authored comprehensive learning modules for the four basic clinical examinations (obstetrics and gynaecology, internal medicine, surgery and paediatrics), whilst additional modules for dentistry, community health and internal medicine are currently in progress.

Distributed OER to Students

In a small 2009 pilot study, one UG professor distributed a module on total abdominal hysterectomy to 19 final-year medical students. The following year, the same professor distributed four obstetrics and gynaecology OER modules on CD to 80 second-year medical students. In 2010, two dental lecturers loaded several OER videos from U-M onto the computers in the Dental School student computer laboratory. In 2011, two professors distributed the surgery and gynaecology clinical examination modules to all 180 second-year medical students.

At KNUST in 2010, one professor showed videos from his obstetrics examination module to students during class. Another professor mentioned his automated blood cell count module in class, and directed students to the KNUST OER website. Some other students also accessed other modules from the KNUST OER website: the glucose tolerance test, laboratory methods for clinical microbiology, and the mental state examination. One KNUST student interviewed had learned of the Caesarean section and of clinical examinations from surgery OER modules provided by a friend at UG Medical School. Recently, a professor of pharmacology at KNUST has projected several laboratory demonstration videos, in the background of his laboratory sessions, on the same topics.

Based on four focus groups and on surveys conducted at each institution between 2009 and 2011, students have given largely positive feedback on OER, finding it to be a useful complement to classroom instruction. Some students at KNUST offered rough estimates of the understanding gained from having instructional materials readily available in digital formats. One student remarked that the video for polymerase chain reactions, "a very difficult concept", helped him to "now understand it very well". Another student offered that the OER material on the mental state examination improved her understanding of the topic by 90 per cent, and the material on the automated blood count by 50 per cent. A different KNUST student said that, for some topics, having a video or animation could improve understanding up to 300 per cent, because the concepts are hard to visualise based on lectures alone or are too difficult to see during ward rounds.

Increased Awareness of and Support for OER on Campus

Many of the early participants in OER at KNUST and UG have now become advocates for OER. Those who have created OER are keen to produce additional modules. At KNUST, support for OER has spread across CHS, with gradual growth of awareness in other colleges within the university. At UG, several lecturers in the CHS have been inspired to create their own OER after seeing the initial materials developed.

Some students have also come to see OER as a way to supplement their classroom learning. However, few interviewed students understood that the learning modules given to them by their instructors were openly licensed, and that they were allowed — and even encouraged — to copy, share, adapt and redistribute them. Many interviewed students agreed that having educational materials created by their own lecturers was very beneficial and assisted them in preparing for clinical examinations.

> *[Having OER produced by your own lecturer] can sometimes be a bit interesting in the sense that when you have issues with anything he says in the video, you can always go back and question him or her about it. But if our lecturers are not [creating OER for particular topics], then there is no problem bringing it from outside.*
>
> *anonymous 2011 MD graduate, KNUST*

But students also deemed educational materials produced from other institutions to be valuable, as these could reveal both important similarities and variations in techniques. For example, UG medical students who were given the obstetrics examination module produced by KNUST remarked that, even though it had been authored by a lecturer at another institution, the material was for the most part relevant to them. In that particular module, there was only a small difference (in one step) in how it was covered at KNUST versus at UG.

Introduced Instructional Design Principles into OER

In August 2010, a DeCoDe lecturer from KNUST completed a six-month research fellowship at U-M to study instructional and interactive design principles. Following his fellowship, he proposed that the KNUST OER adopt a RADDIE

approach — Research, Analysis, Design, Development, Implementation and Evaluation — for the packaging of media-rich and effective OER. The introduction of the RADDIE model has fostered discussions around quality assurance for health OER lesson modules. Although the RADDIE model is yet to be fully implemented at KNUST, its initial exploration has resulted in an enabling atmosphere that emphasises monitoring of quality and pedagogy within the OER production process.

Exchanged Knowledge Between Institutions and Regions

The free sharing of materials as OER, and in particular the consortium of universities involved in the African Health OER Network, led to the exchange of educational materials and other tacit knowledge between KNUST, UG and other universities. Specifically, it has facilitated multidirectional knowledge sharing between individuals and universities in the Global North (i.e., "developed countries") and those in the Global South (i.e., "developing countries").

North–South

Two U-M staff were able to spend extended periods at KNUST and UG for onsite collaboration in OER training, production and awareness. One professor spent a year-long sabbatical at KNUST in 2008–2009, with occasional trips to UG. He also returned for a one-month follow-up visit in September 2010. A technology project manager from the U-M OER team was at KNUST and UG for two months in 2009 and has made annual follow-up visits since then. Through onsite consultations, the two were able to share lessons learned from the OER activities at U-M as well as other aspects of education at U-M.

South–North

Upon return from his sabbatical, the aforementioned U-M professor used the Buruli ulcer module and two polymerase chain reaction animations in his internal medicine and microbiology classes at U-M in 2009–2010. The obstetrics and gynaecology modules developed by KNUST and UG have also been added as supplemental materials for the reproductive health sequence at U-M. Staff members at U-M have also learned additional techniques for video and audio editing, and additional instructional design skills that they have incorporated into OER activities at U-M. In particular, U-M had, for convenience, previously focussed on static resources like syllabi and PowerPoint lectures, but was inspired by KNUST and UG to put more effort into media-rich resources such as narrated lectures.

South–South

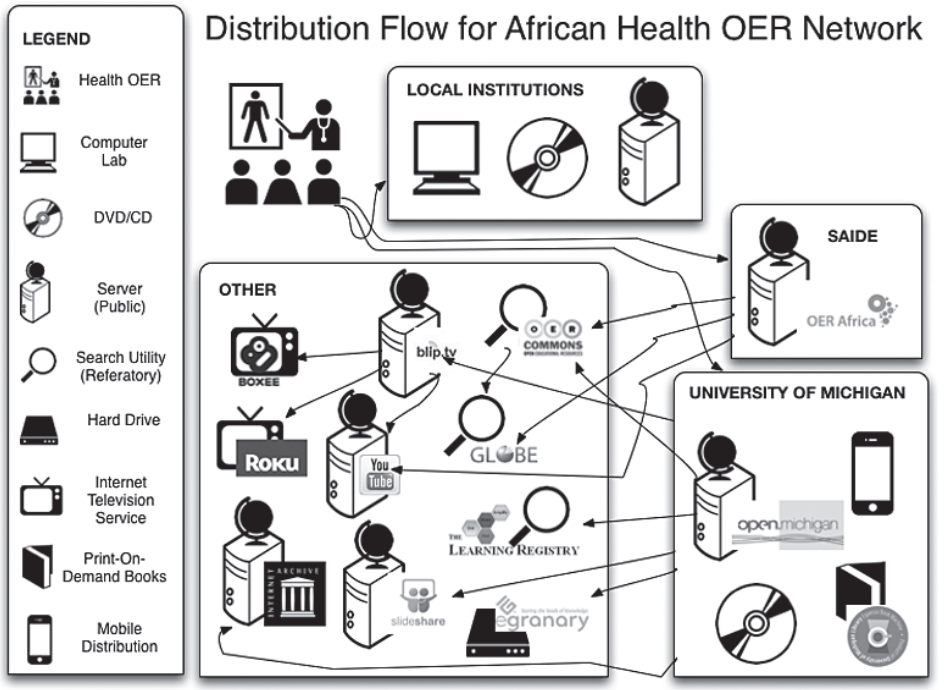
The OER developed by UG and KNUST has been used in other African countries. In April 2011, U-M demonstrated the Caesarean section module co-developed by UG and U-M to the Minister of Health of Ethiopia, who immediately distributed it to several community healthcare workers upon his return. The module co-author from UG is now advising on how to integrate OER into clinical maternal health education at a new medical school in Ethiopia. Additionally, two UG alumni happened across the total abdominal hysterectomy and Caesarean section modules from UG whilst doing online searches, and have since used them with fellow residents in Nigeria.

As previously noted, there has also been occasional exchange of OER between KNUST and UG. Since late 2010, U-M has facilitated health OER technology conference calls every other month with African Health OER Network participants. In October 2011, a number of Ghanaian and U-M participants were able to convene in Kumasi for a two-day joint workshop on OER production and support. This workshop sparked conversations around more co-ordinated OER efforts between the Ghanaian institutions.

South–North–South

The OER produced by KNUST and UG are shared through multiple distribution methods for ease of OER access across the university, the continent and the world. OER produced through the African Health OER Network is distributed through various offline and online channels, as Figure 4.3 illustrates.

Figure 4.3: Distribution flow for the African Health OER Network



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By posting the videos on mainstream websites like YouTube, the OER produced by KNUST and UG has received global recognition. In the past 11 months, the laboratory methods for the clinical microbiology module have been viewed nearly 150,000 times on YouTube, with two videos being viewed over 40,000 times each. The videos have been viewed across Africa, North and South America, Asia and Europe, with the most views in South Africa, Sudan, India, Brazil and the USA. The videos have received many positive ratings and comments, such as: "Many thanks for this simple yet excellent video explaining PCR and RT [real-time]-PCR."

Conclusion

KNUST and UG have demonstrated that it is possible for resource-constrained African institutions to create effective, world-class electronic learning models that are relevant to their students' needs and also beneficial to other universities. Using adjectives such as "innovative", "transformative", "collaborative" and "cost-effective", interviewees at UG and KNUST reaffirmed their belief in the potential benefits of openness, and encouraged other institutions to join the global OER movement. Both institutions view OER as a means to streamline health education, not as an end in itself.

> *[OER] allows exchange of knowledge between different institutions. When I watched the [UG] Legon [OER] videos, it gave me a new perspective on some of those examinations because there were things they said which our [instructors] probably didn't say, and in their phrases and language. So I think it's helpful to package the videos or distribute them in such a way that the students from different universities can have a video from other universities as well.*
>
> *anonymous 2011 MD graduate, KNUST*

Over the past three years, both institutions have undertaken significant changes in policy and skills development to support the creation of openly licensed materials. These changes required creativity, flexible cross-departmental co-ordination, and realignment of certain resources within the institutions.

Financial sustainability is a concern for many institutions that produce OER. This is especially true at KNUST and UG, where internal funds are already constrained and OER activities to date have been largely funded by external grants. In addition to their OER policies, each university has taken actions to incorporate OER into the main health science education activities on campus. For example, all of the media specialists at UG are general media specialists who assist with other ICT activities, not just OER. Two of the UG media specialists are roughly half grant-funded, with the other media specialist doing a one-year volunteer internship. KNUST is able to keep salary costs low by pairing OER authors and media specialists with student volunteers in DeCoDe who provide multimedia support as part of class projects. Both institutions plan to include an OER clause in future health education grants that include materials development. KNUST has already implemented this approach with a new emergency medicine education partnership funded by the U.S. National Institutes of Health. UG has taken a similar approach in an HIV/AIDS education project with Brown University.

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CHAPTER

5

Collaborative Materials Design, Adaptation and Take-Up: A Case Study of a South African Mathematics Teacher Education OER project

Ingrid Sapire, Yvonne Reed and Tessa Welch

Abstract

In South Africa, the poor performance of learners in mathematics across the school system has resulted in a number of initiatives designed to address this problem. In this chapter we present and discuss findings from a case study of one such initiative. Under the leadership of the South African Institute of Distance Education (Saide), mathematics teacher educators from nine tertiary institutions worked collaboratively in designing OER based on an existing module selected by the group. The case study investigated (i) whether collaborative designing and redesigning of materials can enhance quality whilst containing time and resource costs and (ii) whether such collaboration encourages "buy-in" to the use of OER and also further redesigning to accommodate the needs of particular teacher educators and students. Whilst some constraints to participation in the design process and the take-up of the OER were identified (e.g., communication breakdowns, logistical and time constraints and limited understanding of the potential of OER), the chapter provides evidence to support our key argument: expert-led, inter- and intra-institutional collaboration in materials designing and use can result in high-quality, cost-effective OER and in their take-up in diverse educational contexts.

Keywords: *collaboratively designed OER, communities of reflective practitioners, expert leadership, mathematics teacher education*

Introduction

"[T]he OER movement is breaking down barriers that have blocked access to academic content" (Albright, 2005, p. 3). The case presented and discussed in this chapter is an example of opening access to high-quality mathematics teacher education materials through an expert-led, collaborative materials design process. The outcomes of a collaboration amongst mathematics teacher educators from nine South African universities have included sourcing, design and ongoing redesign of materials, and increased take-up five years after the initial collaboration.

The chapter begins with a description and discussion of a design process which resulted in a module for mathematics teacher education, and continues with a brief account of three distinct types of adaptation, and the varied forms of take-up of this module across South African tertiary institutions. In the final section, we reflect on what enabled or constrained these adaptations, and discuss the potential of the design and dissemination process as a model for the development of OER.

Collaborative Materials Design and Redesign

We locate our description and discussion of the collaborative designing process within a communities of practice framework (Lave & Wenger, 1991; Wenger, 1998; Wenger, McDermott, & Snyder, 2002; Barton & Tusting, 2005). "Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et al., 2002, p. 4). One of the fundamental principles of a community of practice is that learning takes place through participation (at various levels). Wenger et al. (2002) argue that one should not "launch communities for their own sake, but ... build the organization's overall capacity to learn and innovate" (p. 190–191). They suggest:

> The best way to develop a knowledge organization is through a guided evolutionary process that tests multiple approaches and builds on experience over time.... The important thing is to start something, see what energy it elicits and build from there. (p. 191–192)

When materials are openly licensed as OER, they can facilitate the development of "a knowledge organisation" because their flexibility affords individuals and groups opportunities for critical reflection and ongoing adaptation of shared materials. In the course of this study, we identified three distinct types of shared adaptation which resulted in the production of OER[1] that are available on the OER Africa site:[2]

- Initial collaborative adaptation of sourced materials (designed at a series of workshops) — the first version produced as an OER, piloted and disseminated.
- Reflective practitioner adaptation after use of the collaboratively designed materials — three further versions "shared back" to the community.
- Adaptation by new users who were not part of the original network — one further version "shared back" to the community.

The Initial Collaborative Design Process

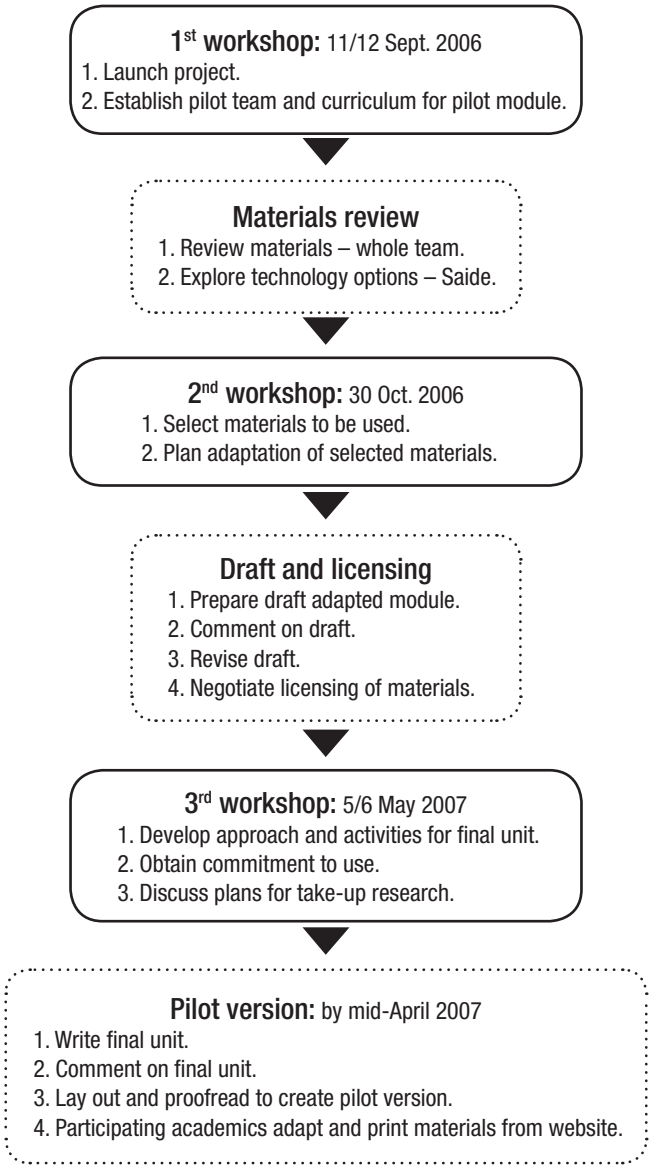
In 2006 the South African Institute for Distance Education (Saide) initiated an OER research and development project[3] in response to a Department of Education call for national, large-scale provision of teacher upgrading in South Africa. The specific goal of the initiative was "a set of collaboratively designed modules supported by a common set of materials for use in Advanced Certificate in Education programmes for serving teachers in South African schools" (Saide, 2006, p. 1). Saide outlined the proposed project and invited participation in a letter sent to the head of the Faculty or School of Education at all South African universities. Fifteen teacher educators[4] from nine universities who responded positively to the invitation formed the initial collaborative group that participated in the activity cycle outlined in Figure 5.1. The activities of this group were facilitated by one materials design expert and one mathematics teacher education expert.[5]

At Workshop 1, these participants decided to focus on the teaching of mathematics at the primary school level (pedagogy) and to design a module for this purpose. During the six weeks between Workshops 1 and 2, they were asked to contribute existing print materials from their institutions, for review by group members. These materials varied from complete modules to workshop activity handouts.

At Workshop 2 the decision was taken to (i) adapt a core module from one institution and (ii) to include some material from each participant. The specific core module was selected both because of its comprehensive treatment of the subject and because the underlying teaching approach resonated with the approach adopted by most of the mathematics teacher educators in the group. The institution holding the copyright on the core module agreed that Saide could co-ordinate the adaptation and release of the adapted module under a Creative Commons license.

Between Workshops 2 and 3, the mathematics teacher education expert prepared a draft adaptation of the module, integrating the additional materials and implementing the decisions made at Workshop 2. This draft was circulated to all group members for comment. To make provision for the sharing of "track changes" comments on a common document, this draft was a Word document. The draft was then revised in response to these comments prior to Workshop 3. The purpose of Workshop 3 was to use the community of mathematics teacher educators to facilitate the development of activities for the module.

Figure 5.1: Activities in the first six months of the ACEMaths project



Source: Welch & Sapire (2008, p. 4).

The process was informed by the following principles, as articulated on the ACEMaths project website (www.oerafrica.org/acemaths/ACEMathsProjectHome/PrinciplesUnderpinningtheProcess/tabid/872/Default.aspx):

- *Use a team approach to adapt the materials, with a team of teacher educators from different institutions*. If institutions work together and agree to share materials and approaches, not only will the time involved in adaptation be reduced, but the opportunity for learning from sharing of resources will be maximised. The goal in a project of this kind is not only to get a good product, but to engage teacher educators in discussions about what is good.

The investment cannot only be in materials; it must also be in the people actually teaching teachers, day by day.

- *Find existing "good enough" materials and adapt these for immediate use*. Development of materials from scratch requires a lead time of 12 to 24 months, but very few materials development initiatives have the luxury of this time frame. However, a number of institutions/organisations have "good enough" existing materials, and the time involved in adapting/customising them for the context and programme purpose will be less than that involved in developing them from scratch.
- *Aim for a single module that can be adapted and used in a variety of programmes, rather than whole programme development*. This is advisable for two reasons. One is that it is more cost-effective, but the second is that institutions are responsible for the development of their own programmes, and there is — correctly — resistance to a pre-packaged, received curriculum, even if that curriculum is determined by and with respected peers. A single module, on the other hand, is perceived as a resource rather than as a blueprint for delivery.

At the conclusion of the design process, the materials consisted of a six-unit module, totalling 215 A4 pages. An additional 150 pages of readings supported the content of Units 5 and 6. Whilst it was acknowledged that the materials would be used in some contact programmes, they were designed for distance education. Given that one of the major goals of the ACEMaths project was to increase openness and accessibility of educational resources, it was agreed that the license would be a Creative Commons Attribution-NonCommercial-ShareAlike 2.5 License.[6] The materials were made available electronically as print-ready Word documents which teacher educators could download and adapt in their institutions.

The module *Teaching and Learning Mathematics in Diverse Classrooms* is divided into six units, described briefly below (Saide, 2007, p. i–ii):

Unit 1: Exploring what it means to "do" mathematics

This unit gives a historical background to mathematics education in South Africa, to outcomes-based education and to the national curriculum statement for mathematics. The traditional approach to teaching mathematics is contrasted with an approach to teaching mathematics that focuses on "doing" mathematics, and mathematics as a science of pattern and order, in which learners actively explore mathematical ideas in a conducive classroom environment.

Unit 2: Developing understanding in mathematics

This unit explores constructivism, the theoretical basis for teaching mathematics. A variety of teaching strategies based on constructivist understandings of how learning best takes place are described.

Unit 3: Teaching through problem-solving

In this unit, the shift from the rule-based, teaching-by-telling approach to a problem-solving approach to mathematics teaching is explained and illustrated with numerous mathematics examples.

Unit 4: Planning in the problem-based classroom

In addition to outlining a step-by-step approach for a problem-based lesson, this unit looks at the role of group work and co-operative learning in the mathematics class, as well as the role of practice in problem-based mathematics classes.

Unit 5: Building assessment into teaching and learning

This unit explores outcomes-based assessment of mathematics in terms of five main questions:

(i) Why assess? (the purposes of assessment)
(ii) What should be assessed? (achievement of outcomes, but also understanding, reasoning and problem-solving ability)
(iii) How should assessments be done? (methods, tools and techniques)
(iv) How should the results of assessments be interpreted? (the importance of criteria and rubrics for outcomes-based assessment)
(v) How should assessments be reported? (developing meaningful report cards)

Unit 6: Teaching all children mathematics

This unit explores the implications of the fundamental assumption in this module — that *all* children can learn mathematics, whatever their background or language or sex, and regardless of learning disabilities. It gives practical guidance on how teachers can adapt their lessons according to the specific needs of their learners.

At a final workshop in February 2008, the collaborative group gave feedback from their experiences of using the pilot materials, discussed the six units in detail and came to an agreement about revisions to the module. The discussion was also guided by an external critical review from an internationally recognised mathematics teacher educator.

Most of the available budget was spent on writing, adaptation and meeting time — investing in conversations, integrating contributions from the group and enhancing the core module. As mentioned above, the investment was in the materials as well as the people using the materials. Time and money was saved on layout and design by using the instructional design template made available as an OER on the website of the Commonwealth of Learning (COL). A further advantage of the COL template is that it is a Word document, easily customised by writers without special layout and design expertise.

Interviews with those who piloted the materials indicated that they appreciated the opportunity to work collaboratively, as these two comments illustrate:

> We all have common understandings, but we don't have shared understandings.... We don't communicate, we don't have a collegial kind of thing, and this created that opportunity to be able to meet everyone ... it was wonderful!

> I think it is a brilliant idea that we finally got to this stage where some universities get together and work in a direction to try and get sort of a more generic message in this country.

We suggest that comments such as these are an example of participants speaking reflectively about aspects of practice, and it is to this aspect of the study that we now turn.

Participants as Reflective Practitioners

Contemporary writers on reflective teaching (e.g., Loughran, 1996; Farrell, 2004; Pollard, 2005) acknowledge the distinction made by Dewey (1916; 1933) between "routine action", which is relatively static, and "reflective action", which "involves a willingness to engage in constant self-appraisal and development" and which "implies flexibility, rigorous analysis and social awareness" (Pollard, 2005, p. 13). To the distinctions between reflection-in-action and reflection-on-action first developed by Schön (1983), Farrell (1998) adds reflection-for-action, which he describes as proactive in nature: teachers (in our case study, mathematics teacher educators) can use ideas from their reflections in and on action, to plan for future teaching or other professional activities. For Pollard, the process of evidence-based reflection "feeds a constructive spiral of professional development and capability" (2005, p. 5). He suggests that the value of reflective activity is likely to be enhanced through collaboration and dialogue with colleagues because "collaborative, reflective discussion capitalizes on the social nature of learning" (2005, p. 21). We argue that such collaboration and dialogue is not restricted to teacher educators but is possible in any discipline in higher education, so long as there is a common interest in improving the quality of what is offered to students.

Reflective activity, facilitated by the mathematics and materials design experts, was a key element of each of the workshops, of the tasks undertaken between the workshops and of the piloting of the collaboratively designed module. At the first "think-tank" workshop, participants reflected on their own teaching programmes and the materials they used. Between the first and second workshops, participants were required to reflect in more detail on their institutional materials and to send to Saide selected parts of these which they thought could be used in the ACEMaths module. At the second workshop, the reflective discussion led to decisions about what to include in the module and to plans for the adaptation of the selected material. At the third workshop, the initial group discussion established that to address issues of diversity in a mathematics classroom, the material contributed by the participant with expertise in learners with special educational needs (LSEN) would need further work of two kinds: (i) adaptation of the theoretical component, to be undertaken by the materials design and mathematics teacher education experts and (ii) inclusion of carefully scaffolded activities which would assist teachers in applying theory to the practice of teaching mathematics to learners with diverse learning styles and needs. These activities were collaboratively designed at the workshop.

With the permission of the participants, the materials design and mathematics education experts visited each of the pilot sites to observe classes in which the materials were used and to interview the teacher educators who used them. Analysis of audiotape recorded data from the interviews indicates that most of the teacher educators' reflections could be assigned to one of four categories:

- Reasons for selecting parts of the module (e.g., "I looked at last year's course book and this one was miles ahead of that one, I think because it is so much

more focussed on maths"; and "I took the part about the problem-based classroom because that fits with the idea of maths literacy").

- Suitability and accessibility of the materials for their students (e.g., difficulty with the text: "many don't like reading and so I am not sure how much they actually read and comprehended"; enjoyment of the text: "they all said to me at the end of this ... 'this was the best thing that we have done'").
- The value of the collaborative designing process (e.g., "I was very excited about the whole module ... we've been trying to do this for a long time, many years ... and we didn't have maths specialist knowledge. So these are all the things that came together"; and "in the undergraduate BEd modules that [we] teach, we too have become more aware of the diverse needs of our students").
- The affordances of OER for reversioning (e.g., "I took the part about the problem-based classroom because that fits with the idea of maths literacy. So I took Unit 4 but then I had to pick bits out of Unit 3 because they spoke about the three-part lesson and I needed that. I also used bits of Unit 1 and Unit 2 which fitted with what I wanted").

At the final workshop of the pilot phase, participants reflected individually and collaboratively on their experiences of using the pilot module. The individual reflection involved responding to a three-part questionnaire which focussed on: selections made from the OER; the differences, if any, between their intended and actual use of the material; and their mediation of the material. These reflections are discussed below as we turn to take-up of the module.

Take-Up of the ACEMaths OER

Following Adler (2002, p. 9), the term "take-up" is used to refer to the varied forms of reuse of the module materials by mathematics teacher educators. To maximise the institutional spread of the pilot implementation, "an understanding was established from the outset that if an institution sent representatives to the workshops and received the adapted materials, there would be a requirement to engage with, adapt, and use the materials in some way in courses during 2007" (Welch & Sapire, 2008, p. 4). The data presented in Table 5.1 illustrate varied take-up in terms of the range of programmes in which the materials were used between 2007 and 2011.

Table 5.1: Take-up of ACEMaths, 2007–2011

Site	Programme	2007	2008	2009	2010	2011
A	ACE FET (Maths Literacy) Course 1	15	591	404	65	25
	ACE FET (Maths Literacy) Course 2	15	591	404	56	343
	**ACE GET (Maths, Science, Technology)	n/a	n/a	300	70	75
	**PGCE (Foundation Phase)	n/a	n/a	44	51	n/a
	*BEd Primary Mathematics Education 210	n/a	n/a	n/a	n/a	295
B	ACE GET (Maths) 1st year only	45	45	40	37	9
	ACE GET (Science) 1st year only	n/a	35	n/a	28	n/a
	BEd (in-service)	n/a	n/a	7	n/a	44
	**BEd 1 (in-service)	n/a	n/a	n/a	n/a	37
	*PGCE	n/a	4	3	n/a	n/a
C	**1st year BEd for GET	n/a	82	90	96	95
	**2nd year BEd for GET	n/a	43	64	75	80
	3rd year BEd for GET	20	13	n/a	66	10
	4th year BEd for GET	6	6	13	11	12
	*ACE	n/a	n/a	n/a	25	18
D	ACE LSEN (Special Needs)	35	150	209	122	86
	*ACE Foundation Phase (Numeracy)	n/a	n/a	65	100	75
	*BEd (SP methodology) 2nd year	n/a	n/a	n/a	n/a	80
	*BEd (FET methodology) 1st year	n/a	n/a	n/a	n/a	120
	**PGCE (Maths and Mathematical Literacy)	n/a	18	n/a	n/a	n/a
E	ACE GET (Maths)	30	45	65	67	46
	ACE FET (Maths)	60	65	45	30	30
	**Short Course (Limpopo Maths Educators)	n/a	n/a	49	50	50
F	ACE SNE (Special Needs Education)	40	45	106	25	n/a
	**2nd year BEd FP	n/a	65	44	65	82
	**3rd year BEd FP	n/a	43	63	45	65
H	**BEd (Learning Area Didactics)	n/a	n/a	198	322	418
	**Mathematics Certificate Programme (FET)	n/a	n/a	20	46	86
Total		**266**	**1841**	**2233**	**1452**	**2181**

Key:

FP: Foundation Phase (Grades R–3)

SP: Senior Primary Phase (Grades 4–6)

GET: General Education and Training (Grades R–9)

FET: Further Education and Training (Grades 10–12)

LSEN: Learners with Special Educational Needs

ACE: Advanced Certificate in Education

BEd: Bachelor of Education

PGCE: Post-Graduate Certificate in Education

Shaded rows indicate new courses in which ACEMaths is being used.

* Uses by people who were not involved in the development of the materials.

** New uses by people who were involved in the development of the materials.

As the table indicates, the 2007 pilot materials were used in both pre-service and in-service mathematics teacher education courses and also in courses which focussed on LSEN. This variation in use necessitated adaptation right from the start. Lecturers selected the parts of the OER that suited their institutional needs and the requirements of the curriculum they were teaching. The use of single units varied across the research sites: at two sites, Units 1, 3 and 6 were used, and at another site, Units 2 and 4. At three sites, these single units were used without adaptation (and in combination with other materials) and at two sites they were modified (and used in combination with other materials). Overall, this varied usage demonstrates the flexibility of the pilot OER module for inclusion in a range of courses which differed in overall design.

In the pilot phase, lecturers at six of the sites followed through with their plans[7] to use the materials, with three of them using the whole module exactly as they had proposed. At the other three sites, lecturers used some of the materials selected in one of the two programmes which they had earmarked for the pilot implementation. During the pilot phase, the materials were used predominantly in ACE programmes, but in a range of specialisations: one was used for Mathematical Literacy, two for LSEN, another two for GET Mathematics and one for FET Mathematics. It is interesting to note that both teacher educators who participated in designing a module for flexible use (predominantly in ACE courses) and those who have subsequently had access to the OER are finding a place for it in a wide range of BEd degree courses.

The number of student users increased from 266 in 2007 to a peak of 2233 in 2009. Although there was a slump in 2010, numbers increased again in 2011. The slump in 2010 can be attributed to the phasing out of ACE in-service professional development programmes, in which large numbers of previously underqualified teachers had been enrolled between 2006 and 2009. In South Africa, a BEd degree is now the minimum qualification for entry into the teaching profession, and at most universities it is offered to students who wish to specialise in teaching learners in one of the three phases of schooling. The increase in users in 2011 can be mainly attributed to the greater use of the module in BEd courses, and the shading of new courses indicates that mathematics teacher educators are now using the materials in a greater range of courses than was the case in the pilot phase.

We now turn to a brief reflection on factors that in our view have enabled and/or constrained the take-up of the ACEMaths materials.

Factors Enabling or Constraining Take-Up of the ACEMaths OER

Findings from the case study suggest that the largely positive response to and the sustained use of the ACEMaths OER can be attributed to the following: expert facilitation of the designing workshops, inclusion of materials from all participants, focus on a single module, quality of the OER, choice of license and choice of electronic format (Sapire, 2010).

Central to Lave and Wenger's (1991) work on communities of practice is the concept of "legitimate peripheral participation": learners participate in the practices of an expert (or experts) but with limited responsibility for the ultimate product as a whole. Observations of the participants at work during the pilot

phase workshops, and comments made during interviews with them, suggest to us that the leadership offered by the mathematics teacher education and materials designing experts as well as the availability of a core module for adaptation played a key role in the success of the project.

Also very important was the inclusion in the module of some material (in either original or reworked form) contributed by each participant. These participants, whilst apprentices in the new "field" of designing an OER for mathematics teacher education, brought to the project varied levels of expertise in mathematics and mathematics teaching. The project's acknowledgement of this, through the valuing of each one's materials, made an important contribution to "buy-in", both in regard to participants' own use of the materials and in regard to encouraging colleagues to use them. The participants became ambassadors for the product. We argue that the decision to use materials from within the consortium of participants has had positive outcomes for take-up, but we do not exclude the possibility of drawing on external resources.[8]

The decision to focus on the collaborative design of a single module was productive for at least two reasons. Firstly, it contained the task and the costs: designing a single module was more easily managed than designing an entire curriculum would have been, and encouraged commitment to the process. Secondly, the inclusion in the design team of teacher educators who could envisage using the module in a range of courses contributed to the production of a flexible module with multiple applications.

The agreement amongst participants that Saide would take charge of the final editing and presentation of the ACEMaths material also proved to be a productive one. The institute is widely acknowledged throughout Africa as a leader in distance education, and its resources and expertise enabled the production of an OER which users have recognised to be of high quality. However, in other cases of collaborative materials designing, the leadership role played by Saide could be taken by any institution, or by a department within an institution that has credibility amongst the anticipated community of users and capacity within its budget to allocate staff to this work.

The choice of license agreed on by workshop participants has enabled different uses of the ACEMaths modules because there is no limitation on how much (or how little) of the material is used. The choice of electronic format (separate units and readings as individual Word files) has meant that users without sophisticated ICT skills have been able to use and reversion the materials, and thus has contributed to the accessibility of the OER.

The following obstacles to take-up were identified: communication breakdowns, logistical and time constraints, limited understanding of the affordances of OER, text density and limited student access to computers (Sapire, 2010).

In some institutions, the initial invitation to participate in the project did not reach the appropriate people (the mathematics teacher educators). Whilst it is necessary in terms of protocol to communicate with senior university staff such as faculty deans, ways of communicating directly with those likely to be most interested in an OER project need to be found. In the ACEMaths project, participation, and thus subsequent take-up of the materials, was inhibited to an extent from the outset by communication failures.

With reference to logistical and time constraints, lecturers at four sites did not implement the pilot materials, although they had been involved fully or partly in the development process. At one site, lecturers chose parts of the material to implement and had wanted to participate in the pilot implementation but were prevented from doing so because the courses for which they had earmarked the materials were not yet operational. Lecturers from a second site were unable to use the materials because at their institution the lead time between materials design and materials production is a minimum of six months. This made implementation impossible in 2007, although the module was used in two courses in subsequent years. Lecturers from two other sites found the time commitment to the materials development process impossible to meet, given their existing workloads.

In writing about the UK Open University's OpenLearn project, McAndrew et al. (2009) state that "it has proven surprisingly hard to convince people that OpenLearn material is free, and that it can be re-used" (2009, p. 61). Since the Creative Commons licenses were new to some users, the lack of restrictions on use was not well understood by some project participants and some senior management in their institutions. Limited understanding of the affordances of OER was evident in the responses of some participants in the pilot project and in the further take-up of the materials, both within the pilot project sites and at additional sites in 2008–2009. For example, Saide received requests for permission to use the ACEMaths materials, even though the license clearly indicates that the materials are freely available on an attribution, noncommercial, share-alike basis.

At all participating sites, lecturers and students expressed some reservations about students managing to read and respond to the materials within the time allocated to a particular course. This applied particularly to the extensive readings that were part of Units 5 and 6. Whilst this is only an example of an obstacle to take-up, if these teacher educators decided to reject the module because of its length and/or complexity, this challenge would need to be addressed.

The Potential of the ACEMaths OER Project as a Model for Cost-Effective Quality Improvement

Bateman suggests that "one of the major monetary costs to African educational systems is that of acquiring pedagogically sound educational materials" (2008, p. 43). OER can help to alleviate this problem in Africa and elsewhere, since they facilitate cost containment and potential for optimal use, through adaptation. OER utilise public funding effectively because they allow materials to be reused. Whether they are developed through external funding or institutional budget allocations, there is a higher return on money spent in this way than on money spent on single-application materials development (Geser, 2007; Hylén, 2007; Joyce, 2006).

Three important dimensions of the ACEMaths project were:

- The decision to contain costs by adapting and enhancing a core module.
- The spur to quality improvement created by putting together minds, experience and materials from different institutions located in different contexts.

- The freedom — created by the open license — for these teacher educators to reuse and adapt as their contexts demanded.

Although the project did not set out to track costs systematically, an account of expenditure was kept. This reveals that approximately 100 days (or 800 hours) were spent on the materials adaptation process (as distinct from the time spent on background research and negotiations leading to the formulation of the project, and time spent on the pilot research). For a module of approximately 200 notional learning hours, this means four hours of design time for each notional learning hour. As Tony Mays points out (2011, p. 25ff.), this is below the international norm of between 20 and 100 hours of design time for each notional learning hour. However, current South African practice used as a basis to determine design time for paper-based distance education in Tony Mays's Nadeosa study is four hours of design time for each notional learning hour. The argument for cost-effectiveness cannot therefore simply be built on reduced amount of design time. The amount of time and work involved in quality adaptations of existing material should not be underestimated — even if the material is written for redesign.[9]

The argument for cost-effectiveness has to be built around the collaborative dimension of this project. It can be argued that if all eight sites had embarked on materials development independently of each other, the separate amounts of design time involved would have amounted to much more than 100 days. Furthermore, it could be argued that the project opened the eyes of participants to the variety of courses in which the materials could be used. Table 5.1 demonstrates that in most institutions, the materials were used after the pilot in three or four more courses.

Cost-effectiveness is clearly a function of quality. The conventional distance education logic of amortisation of course design costs over time and with large numbers is applied slightly differently: the courses in which the materials are used can be small, but the fact that the materials are OER means that they can be various. In addition, over time, the number of courses in which they are used can expand.

Finally, if there is a process whereby reversioned materials are shared back to the community, it can be argued that the five-year revision cycle that is usually required for distance education materials is handled by the community, rather than by the original owners of the materials. However, in this project there was an interesting twist. One of the adaptations shared back to the ACEMaths project space on OER Africa was from the distance education institution that contributed the module which formed the core of the ACEMaths units. Because the ACEMaths units were released as OER, the original institution could both use the improved version for its original target audience and adapt it for another course and target audience. The ACEMaths project has created an imagination for how a distance education institution can both contribute to quality improvement in other institutions and use input from a cross-institutional community of practice to improve its own courses.

The ACEMaths project also suggests how such an approach can be implemented at a national level. In South Africa, national "take-up" has already begun. Informed by the ACEMaths model, the *Integrated Strategic Planning Framework for Teacher Education and Development in South Africa, 2011–2025* has made a commitment to

the development of a teacher education ICT support system, and to the availability of continuing professional development (CPD) courses "as open source materials to be utilized by providers across the system" (Department of Basic Education and Higher Education and Training, 2011, p. 7). In addition, there is commitment to national co-ordination of CPD, "taking advantage of expertise from across the system, including those NGOs and organisations with specialist knowledge of the specific focus areas" (Department of Basic Education and Higher Education and Training, 2011, p. 6).

This commitment is not only in the policy — it is also being enacted through a Department co-ordinated research and development project focusing on the strengthening of foundation-phase teacher education, funded by the European Union (Department of Higher Education and Training, 2011). A requirement for successful bids for EU funding by higher education institutions was preparedness to collaborate with other institutions and/or NGOs. In addition, all materials produced with the funds have to be made available as OER. Saide has been asked to ensure that there is not unnecessary duplication in the nine projects involving 16 higher education institutions. For example, if one project is producing videos that could be used in another project, there is no need for further video development. The national Department of Education has recognised that it is important to share scarce expertise and financial resources across the system, and to make materials available as OER, in order to facilitate sharing, avoid costly duplication and improve quality.

To conclude, we argue that whilst the democratic orientation of the OER movement may be at odds with the predominant consumer culture of society, including that of much mainstream education, there is increasing awareness that OER enables what Boyte (2011a) would call "public work", or

> sustained efforts by a mix of people who make the commons, or things of lasting civic value, [which put] the citizen at the center of public creation. As citizens create a commonwealth of public goods, they become a commonwealth of citizens. (p. 325)

In its call for sharing and collaboration, the OER movement provides an opportunity for participation in education — which in the case of the ACEMaths module has had a number of productive outcomes. What we have suggested through the ACEMaths case study is that the collaborative design and redesign of OER have the potential to "deepen the relationships among now parallel but often separate higher education efforts" (Boyte, 2011b, p. 1).

Notes

1. Given that ACEMaths is an OER, there may be other adaptations of which we are unaware.
2. www.oerafrica.org
3. Funded by the Royal Netherlands Embassy.
4. Thirteen of these were mathematics teacher educators and two were specialists in the field of Learners with Special Educational Needs (LSEN).
5. We are aware that the distinction between expert and participant sets up a false binary, given that the two "experts" were also participants and the participants had expertise, particularly in relation to their teaching contexts. However, we use the labels to distinguish different roles played in the process.

6. To view a copy of this license, visit creativecommons.org/licences/by-nc-sa/2.5/za. However, the license that Saide now recommends is Creative Commons Attribution, the most open of the Creative Commons licenses.
7. At the closing session of Workshop 3, all participants completed a form outlining how they would participate in the piloting of the materials at their institutions, and committed to using at least part of the module in at least one teacher education course.
8. With the increased availability of OER, materials design teams have access to an extensive range of adaptable resources.
9. As in the case of the TESSA materials (www.tessafrica.net), which were written according to a strict template in order to facilitate reversioning and translation for a variety of African countries.

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CHAPTER

6

OER Production and Adaptation through Networking across Sub-Saharan Africa: Learning from TESSA

Freda Wolfenden

Abstract

Educational reforms, as driven by the United Nations' Millennium Development Goals, envision schooling wherein all children and young people participate and have opportunities to succeed. To achieve this vision across Sub-Saharan Africa requires large numbers of new teachers as well as access for existing teachers to professional opportunities relevant to their contexts and the specific realities of their schools — teacher education institutions need to focus greater attention on their students' development of effective classroom practices.

The Teacher Education in Sub-Saharan Africa (TESSA) project described here is one initiative working to address these challenges. Through the creation and use of contextualised open resources to support classroom-focussed teacher education, TESSA has achieved some initial success in a number of different cultural contexts. This chapter reflects on various stages of project activity, and analyses factors which have influenced the form and extent of take-up of the resources at partner institutions across the region.

These experiences and insights suggest that realisation of TESSA project goals in such diverse contexts is strongly linked with the strategy of promoting collaborative work, dialogue and the process of bridging cultures and practices. This strategy supported different orientations and variations in the project framework in each context. In particular, the use of a highly structured template for the production of TESSA resources, adaptation of the resources for nine country settings through a defined process, and local ownership of the implementation strategy are seen to have been significant. However, as with many OER projects, ensuring sustainability and deepening community engagement remain ongoing challenges.

Keywords: *adaptation, consortium, OER, Sub-Saharan Africa*

Introduction

This chapter provides an illustration of how international co-operation over several years led to the creation and use of a large resource bank of OER designed to support teacher development across a range of contexts in Sub-Saharan Africa.

In many contexts in Sub-Saharan Africa, learning materials are scarce. OER, with their facility to be amended or modified, make viable the production of educational materials which have relevance across a large region whilst also being appropriate to the cultural context and heritage of each particular locality, thus avoiding the need to create wholly new materials in each different learning situation (OLCOS, 2007). The project described here, Teacher Education in Sub-Saharan Africa (TESSA), was started by a group of international and African institutions, led by The Open University, in the UK, who came together to harness these affordances of OER to the challenges of the Millennium Development Goals — in particular, to the aim of universal primary education for all children, expressed in Goal 2. The specific aim of TESSA is the provision of OER for teacher education, OER that can be drawn on to expand teacher education provision and to improve the quality of programmes offered. TESSA activity over the last six years has focussed on production and implementation of a large bank of multilingual OER, supported by grants from a range of philanthropic trusts and government funds. The original TESSA OER are designed in a highly structured template. OER generated in this template have subsequently been adapted for use in different contexts across the region and are now being deployed in a range of teacher education programmes in nine countries across the region.

The present study problematises issues of culture and context in TESSA OER creation and use, exploring the possibilities and tensions in this regional–local interface. How can OER be designed so that they address a shared challenge whilst also celebrating diversity through embracing the voice of the "local"? Is it possible for OER to be sufficiently flexible and "open" to support appropriately authentic and meaningful experiences in a range of settings? To what extent can adaptation be pre-planned and executed, or does it emerge in an unplanned way? And how can quality be assured and defined during these processes? These are the questions that have exercised our thinking and planning in TESSA, and the present chapter describes how collective and individual solutions have been devised and implemented.

The chapter is divided into three sections. The first describes the setting for the TESSA project — its historical roots and purpose within teacher education in Sub-Saharan Africa. The second section offers a summary of the planning, processes and outcomes of the development and use of the TESSA OER, drawing principally from participants' viewpoints. The third section raises issues concerned with the adaptation and adoption of the TESSA OER for different environmental and cultural contexts, and with challenges of sustainability.

The TESSA Context

Many issues preoccupy policy makers and other stakeholders involved in the provision of schooling, including the perennial challenge of funding, but two issues predominate: the quality of teaching and the recruitment and retention of good teachers. Our concern in TESSA was with the first of these issues,

providing support to teachers to enable them to develop the knowledge, skills and dispositions to encourage learning in all their pupils.

The scale of the challenge around quality teaching in Sub-Saharan Africa is vast; approximately a third of primary teachers are either unqualified or underqualified, and to achieve universal primary education, an estimated 1.1 million additional teachers are required (UNESCO, 2011). Existing teacher education institutions do not have the capacity to train greater numbers of new teachers or to offer extensive professional development to serving teachers. These facts necessitate innovative and cost-effective solutions, workable across vast geographical areas where infrastructure is weak and availability of learning resources is inadequate or non-existent.

In 2005, TESSA brought together experts from a range of African and international institutions to address these challenges; our solution centred on the creation of a rich set of open resources which could be adapted for multiple contexts and cultures to support classroom-focussed teacher development. Many teacher education institutions in Sub-Saharan Africa are not in a position to commission or produce high-quality learning materials themselves; capacity is stretched, facilities such as libraries are limited and there is a deficit of skills to write or adapt materials and to use ICT effectively (O'Sullivan, 2006). Teachers, both those registered on formal programmes and those engaged in more informal learning, frequently have few materials to support them in addressing complexities in the particular setting of their own classroom. The TESSA OER address these needs, working within current policy agendas and institutional frameworks but drawing on the most up-to-date international thinking around learning and the ideas of the "open" movements, such as open licensing.

The TESSA OER offer a model of teacher development grounded in an understanding of learning as a social and collective phenomenon in which the notion of participation is key (Lave, 1996). Learners, both teachers and their pupils, are seen as agentive, proactive, creative and curious; learning belongs not to individual learners but to the conversations in which they take part (Bruner, 1996). In this model, new teacher learning and professional knowledge is supported by gradual and highly structured *participation in the practice* of teaching, rather than by internalisation of discrete, prescribed teaching skills and competencies (Leach & Moon, 2008). Participation is not limited to discrete teaching activities but also encompasses broader engagement in different arenas of practice — in the classroom, school, local community and college or university.

At the heart of the TESSA OER are highly structured sequences of classroom activities, related to the primary pupil curriculum, for teachers to integrate into their teaching. These encourage teachers to engage in ongoing conversations with their practice, moving towards the possibility of solving problems within their classrooms through analysis of their experiences and development of a more critical understanding of their practice (Freire, 1970). This is in contrast to the approach of many existing college or university methodology courses, in which lecturers often use an acquisitional frame of learning (knowledge transmission) with student teachers to "teach about" different classroom strategies, in preparation for testing through decontextualised examination questions (Glennie & Mays, 2008).

The TESSA OER aim to support teachers in achieving more effective engagements with their pupils through negotiation of shared meanings and deepening of understandings. Thus, the TESSA professional development units are not separate from the teachers' daily practice but integral to it and organised around the core areas of the primary school curriculum: 15 study units in each of numeracy, literacy, science, life skills, and social studies and the arts. Each study unit is written to a common template, comprising activities for teachers to carry out with their pupils, case studies sharing associated repertoires from teachers in different contexts (e.g., multigrade classes), supporting resources (lesson plans, examples of pupil work, subject knowledge for practice and classroom materials), and a linking narrative which offers an interplay of these core practices and theoretical ideas. The units have been modified for the setting of each partner institution and are available in four languages (Arabic, English, French and Kiswahili) for nine country contexts.

Crucially, the approaches embedded in TESSA are in accordance with the mission of partner institutions and the frameworks of values expressed in national policy documents. Across the region, governments and donor agencies are engaged in promoting a pedagogical paradigm shift to improve pupil attainment — a classroom with pupil–teacher co-construction of the learning experience. TESSA does not represent an externally imposed agenda but is seen as acting in support of policy priorities and identified needs; our colleague at the partner institution, Kigali Institute of Education, in Rwanda, has commented that

> the Ministry of Education, in its teacher education reform and professionalisation, is emphasising the learner-centred methods and approaches.... The Ministry of Education and TESSA have the same ultimate goal of improving teacher education standards. (Rutebuka, 2010)

Sally Essuman, TESSA co-ordinator at the University of Education, Winneba (UEW), Ghana, clearly links the participation of her institution in TESSA with the aims of the university:

> UEW was motivated to join TESSA so that it will be able to create a transformational teaching force, build teachers' capacity to use internet resources in their teaching and learning , build teacher-capacity to create their own resources in addition to the TESSA OER and create the culture of collaboration and networking with other teachers. (TESSA, 2011)

TESSA colleagues at the Open University of Tanzania (OUT) identified a need for higher professional qualifications, specifically for primary school teachers; existing opportunities forced primary teachers who wished to upgrade to specialise in secondary school teaching. Participation in TESSA afforded materials for OUT to use as the core of a Diploma in Primary Teacher Education (DPTE), launched in 2009 by the Institute of Continuing Education at OUT. At the University of South Africa (UNISA), engagement with TESSA coincided with the release of a national literacy evaluation revealing poor learner results, particular for Grade 3 learners' reading scores; the TESSA literacy OER were explicitly chosen by UNISA to use with their student teachers in an attempt to address this problem.

This synergy with national and institutional aims, and the potential for TESSA OER to address current concerns and challenges, has played a critical role in ensuring both continued motivation of individuals within the TESSA consortium and engagement of key stakeholders — institution leaders, ministry officials and government ministers. In some cases, progress has been slow, suffering setbacks with changes of government and/or key personnel in ministries and institution leadership teams. And at times, TESSA advocates have found their influence over and access to sponsors reduced, or they have been diverted by other priorities and hampered by external economic factors (TESSA, 2011).

Eighteen institutions were members of the original TESSA consortium; 13 of these institutions are currently directly engaged in delivering teacher education in nine countries of Sub-Saharan Africa.[1] The consortium is comprised of institutions, but membership often had its origins in prior collaborative professional work. Personal engagement of the lead champion (known as a "TESSA co-ordinator") at each partner institution has been a significant element in the sustainability and success of TESSA to date. Individual engagement has been strengthened through regular consortium face-to-face meetings, workshops and conferences, and some electronic discussions — the latter have been challenging to initiate and sustain, as only slowly are colleagues in African higher education institutions securing easy, robust and affordable Internet access and fluency in use of Web 2.0 tools. Through such interactions, colleagues have gained professional support, energy and motivation. One colleague comments:

> Participation in the TESSA consortium has ... afforded the UFH [University of Fort Hare] academics ... access to communities of practice within the institution, across institutions, across countries, and generated a new discourse of finding, adapting and sharing educational resources. (TESSA, 2011)

Teacher Educators as Content Developers

Threaded through TESSA is the interplay of the regional and local — in the processes of OER design, content selection and forms of use. To date, the OER field has been heavily dominated by a few producers, mainly from North America and Europe, whose resources are based mainly on the Western canon. In TESSA we were keen not to position Western (or global) knowledge in opposition to local knowledge but to strive for an equilibrium between the two throughout the resources. Colleagues from TESSA partner institutions were not seen as consumers of imported educational material, expected to adopt ideas or materials wholesale, but as collaborators in the processes of content production and utilisation. They brought awareness of the current priorities, opportunities and constraints in their institutions, alongside their own personal experiences of working with teachers in such environments — their own cultural scripts, to inform all stages of the writing, adaptation and integration process.

Over 100 academics from across Sub-Saharan Africa were involved in the writing of the original TESSA OER. Many of these authors had little prior experience of writing this type of learning material, and only a small minority had previous knowledge of OER. Improving individuals' and institutions' skills to evaluate, write and adapt OER was not an overt aim of the project but has become a highly valued secondary benefit:

> [through TESSA,] materials development in the department of distance education has been enriched, and guidance to writers is much more thorough than was the case before. (Jessica Aguti, University of Makerere; TESSA, 2011)

Drawing on our previous work at scale (Hutchinson & Wolfenden, 2006), TESSA adopted a template for OER. The template was argued to support writing to scale — scale in both the quantity of material to be written and the number of authors involved, who have diverse perspectives, values and styles. It was hoped the template would make it easier to maintain quality standards and the same pedagogic approach and purpose across all the materials. Framing parameters for the template included:

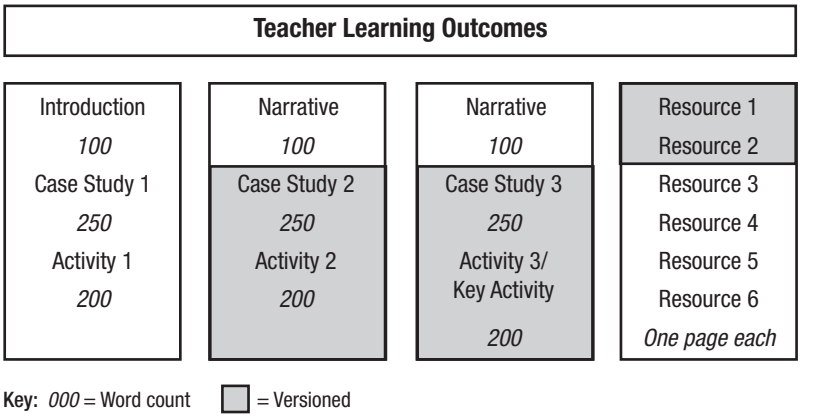
- A high degree of interactivity to optimise learning and create bridges for teachers, from generalisations about practice to specific contextualised instances of learning that they will encounter in their classrooms.
- Learning activities managed into accessible smaller "chunks" that teacher educators or teachers can knit together in different pathways to meet their personal needs in their own contexts and at different stages in their careers.
- Content organised principally through "subjects" of the school curriculum to ensure that they are relevant to the demands on teachers and also speak to teachers' professional identity (as teachers of science or mathematics, for example).
- Materials easily adaptable so that the representation of ideas is meaningful to each teacher's context or situation but without *reworking of the entire unit*, recognising a range of resource and capacity constraints in many partner institutions.

This last factor required the template for each unit to consist of two content categories: global or regional content identical across each version (known as generic content), and local content to be modified and/or replaced for each particular context of use. Negotiating a balance between these two categories was not easy. Authors were anxious to offer teachers and their pupils engagement with "the world beyond", educating them to be global citizens. But equally important was the inclusion of local knowledge and its validation as legitimate — both codified knowledge and that which arises from teachers' and pupils' real-life experiences. A high priority was to rectify the situation common in many textbooks, which in the absence of formally documented knowledge about the local (flora and fauna, for example), use global or foreign information.

Finally, a limit of 40 per cent content adaptation, or local knowledge, in each unit was agreed. Crucially, this 40 per cent was restricted to certain parts of the study unit template: the second and third activities and case studies, and any two of the six supporting resources (Figure 6.1). The remaining parts of the template, such as the learning outcomes and the first activity and case study, comprised global knowledge and remained consistent across all versions.

Following completion of the initial set of TESSA OER, formal adaptation or versioning was undertaken at each of the participating institutions supported by TESSA programme funding. In three countries, Sudan, Rwanda and Tanzania, translation into Arabic, French and Kiswahili, respectively, was an integral part of the process.

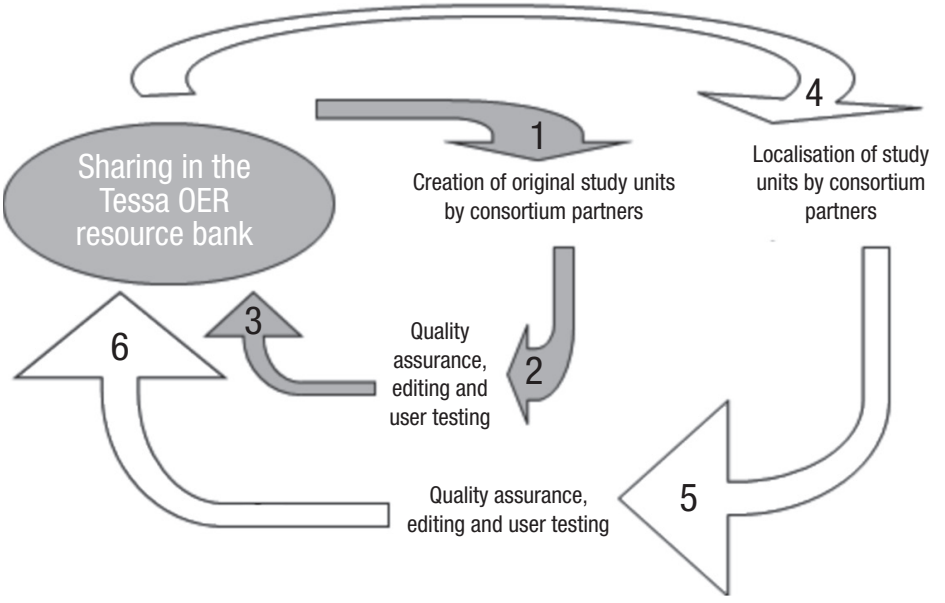
Figure 6.1: The TESSA Template for a Section



For some years, publishers, advertising agencies and film makers have been engaged in adapting their outputs for audiences in different parts of the world. But as yet, there are few examples or blueprints for OER adaptation (Harley, 2008). TESSA colleagues developed guidance for the adaptation process, which included consideration of the following within the sections of the units to be localised:

- Environmental aspects (physical, political and technological).
- Curriculum (mapping to both the pupil curriculum and the teacher education curriculum).
- Language (both medium for the entire unit and local idioms and phrases).
- Learner attributes (in particular, prior learning and achievements).
- Cultural heritage (including myths, dances, songs, herbal remedies).
- Cultural beliefs.

On a practical level, the adaptation process followed a similar pattern across each TESSA partner institution, shown in Figure 6.2 as steps 4 to 6.



At each partner institution, subject specialist lecturers were recruited to undertake the adaptations and participated in an initial two- to three-day workshop co-led by the TESSA Curriculum Director, in collaboration with the institution's TESSA co-ordinator. Subsequent actions depended on the number of staff involved, ICT facilities available and skills of participants (Wolfenden & Buckler, 2012). A rigorous quality assurance process was applied, involving both in-country and regional critical readers, editors, and development testing at numerous sites. In retrospect, perhaps greater attention might have been paid to facilitating peer review of the adapted materials, particularly across countries, to grow a greater collective understanding of the process.

The TESSA adaptation process can be seen as multilayered; within the TESSA consortium, we undertook this formal, quality assured adaptation of the TESSA OER for the nine country contexts in which partner institutions were working. But further modifications of the TESSA OER are taking place, both by teacher educators as they integrate the OER into their courses and programmes, and by teachers themselves. For teachers, the adaptation occurs as they experiment with activities (or case studies) from within TESSA units, for classroom use with their learners; such classroom mediation — the social and cultural setting — of the OER activity is currently being studied by the TESSA team at institutions in Kenya, Ghana and South Africa.

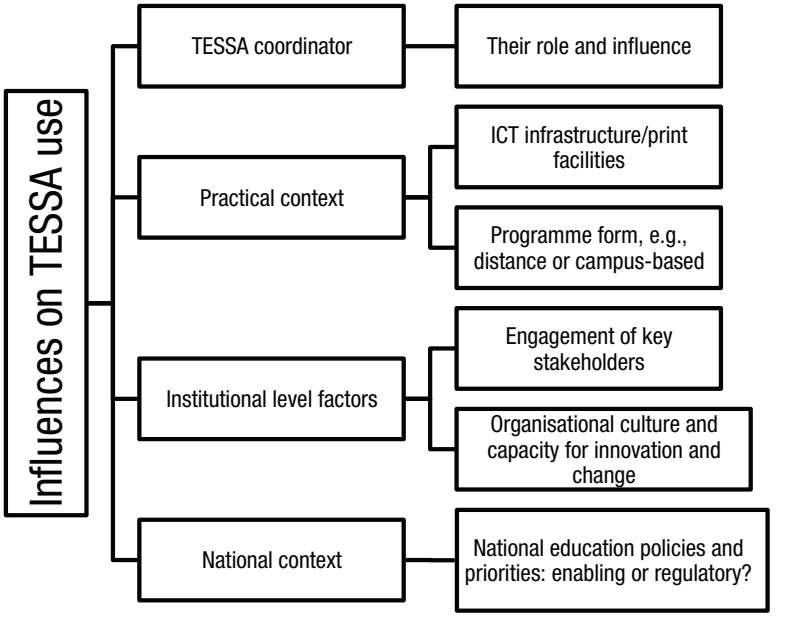
We have encouraged teacher educators and teachers to return their adapted OER to the TESSA webspace — to TESSA Share. After a simple registration, users can upload adapted or associated resources in a wide range of file formats. The resources within TESSA Share do not go through a formal quality assurance process, and an initial scheme for peer rating of resources was removed from the site after negative feedback in development testing — users were uncomfortable and felt it was inappropriate to be passing judgement on colleagues' work. However, so far there has been little activity on TESSA Share; in the absence of any explicit incentives or rewards, teacher educator colleagues appear reluctant to make their adaptations publicly available, despite their familiarity with colleagues within the TESSA network, and there are concerns over the copyright of material interwoven with the TESSA OER. For teachers, an additional constraint is access; few have easy access to the Internet other than in local cybercafés, and in the absence of a known or familiar community of users, the low priority they accord to this activity is understandable. Cultural as well as technological constraints, and understandings of rights issues, appear to inhibit the OER cycle of adapt, adopt and share.

Since the completion of the adaptation in 2008, the TESSA OER have been integrated into numerous teacher education programmes according to local needs and to cultural, financial and policy environments. It is not possible to know exactly how many teacher training institutions are drawing on the resources to enhance their provision, or the full extent of their use by teachers, but 2010 data from TESSA's 13 partner teacher education institutions shows:

- TESSA OER in use in 19 programmes (including BEd, diploma, certificate and unaccredited continuing professional development programmes).
- 690 teacher educators familiar with TESSA OER; in addition, the Open University of Sudan reports awareness amongst 1,935 teaching supervisors.
- 303,300 teachers enrolled in programmes which deploy TESSA OER.

Each partner institution made an autonomous decision about how they would utilise the TESSA OER within their programmes to address identified areas of need — there was no collective decision to use the OER only within certificate programmes or in pre-service courses, for example. Discussions and analysis to inform these implementation decisions were undertaken during the production and adaptation phases of the TESSA OER rather than after completion of the OER, as frequently occurs in many OER projects. Hence, emerging issues around implementation have fed into the writing process (for example, about the amount of local content in the template) and the adaptation process — crucially ensuring that the OER refer to the appropriate curriculum. A number of factors have been identified as influencing TESSA OER use in each institution; as shown in Figure 6.3, their relative influence varies at each institution.

Figure 6.3: Factors influencing TESSA OER use



Three short vignettes illustrate how these factors play out at different institutions. The Open University of Sudan (OUS) has been mandated by the Government of Sudan to "upgrade" all primary school teachers to BEd level, and key players at the OUS identified TESSA as a tool to support them in realising their ambition of increasing the importance of practice in relation to theory. Thus, the focus of the OUS TESSA activity was in the teaching practice cycles of the distance learning BEd programme, and OUS funded the printing and distribution of large numbers of TESSA OER, organised in book form for use by teachers located across Sudan; teachers on the programme work in environments with low levels of Internet connectivity, but the university has established channels for production and distribution of print materials. Teachers are expected to work through the OER book in a fixed period of time, recording their experiences and reflections. Importantly, the teaching practice cycle of this BEd was an area of the teacher education curriculum that had no government-endorsed curriculum materials, so introduction of TESSA OER was seen by the relevant government agency as complementing their own materials rather than as a competing alternative.

However, at the Kigali Institute of Education, in Rwanda, interplay of these factors has led to very different outcomes. Despite the efforts of the TESSA institutional co-ordinator and public statements of commitment to TESSA from institutional and political leaders, use of the OER has yet to become embedded and sustained. The TESSA co-ordinator has used the OER on the campus with his own students in the BEd (Teacher Education) programme. A small number of his colleagues are similarly using the TESSA materials to support their lectures and seminars, and there has been some dissemination of the project to the teachers' colleges in Rwanda, including distribution of CDs of the OER for use in their face-to-face programmes. However, other priorities within the institution, often in response to new government initiatives such as the shift in the language of instruction, have taken precedence, and integration of TESSA more systematically into institutional working has been characterised by stop-start progress. Low levels of access to computers in the linked teachers' colleges has limited use of the TESSA CDs, and early in the process TESSA activity was paused for nearly a year whilst a National Vetting Committee ascertained whether TESSA aims, materials and approaches were in line with the Rwandan National Education Policy; policy here acted in a regulatory function, prevailing over teacher educators' professional judgement.

In Ghana, at the UEW, colleagues involved in writing and adapting TESSA OER have been engaged in developing pioneering early childhood and mentoring programmes. This institution has an open approach to innovation, and individual lecturers are encouraged to experiment with new ideas. Thus, although high-level institutional support has been relatively modest and TESSA champions do not hold positions of authority, we have seen use of TESSA OER by all the early childhood lecturers and many colleagues across a number of other programmes at UEW, in both campus and distance modes. Lecturers map the TESSA OER onto the curriculum for their own courses and then integrate the OER with other materials. They use the TESSA OER as exemplar material for their lectures, or to stimulate micro-teaching and to model practices with their students, often in classrooms at the campus schools. Student teachers are encouraged to use the TESSA OER activities during their teaching practice, accessing them through CDs and print copies.

The diversity of implementation models and modes of use throughout the TESSA partner institutions is a reflection of the everyday realities of practice within these institutions and the communities they serve.[2] TESSA has aimed to empower the TESSA institution co-ordinators to develop and initiate policy around TESSA at their institutions rather than impose a common framework for use across all partner institutions. In the model, each TESSA co-ordinator is able to work out his or her own meaning for the implementation of the OER, working through conflicts and disagreements with colleagues to achieve clarification and a shared understanding of the change. Thus, how they themselves experience the change becomes part of the planning for enacting the change. Success is dependent on the TESSA co-ordinators' strength of moral purpose and their understanding of how change can be driven forward in their own context (Fullan, 2002). TESSA co-ordinators have been supported by the TESSA consortium in implementing problem-solving, sometimes through site visits, but cultural differences in organisational working can limit the effectiveness of these dialogues. However, over a period of several years we are seeing developmental change in many of the TESSA partner institutions.

Emerging Patterns and Issues

The interplay of "the local and the global" has been a consistent feature of TESSA, not only through consideration of content but also through negotiation of local forms of practices within a wider Africa context. We suggest that the management of this interface has been supported by three key features of TESSA OER activity: (i) the use of the highly structured template to guide the writing of the OER, (ii) the organisation (and funding) of formal adaptation of the OER to each country context and (iii) the consideration of use, which was a constant theme of the discussions from the earliest days of TESSA working and which informed OER design and adaptation.

Use of the TESSA template, with its strict word limits and focussed sections, minimised the chance that content would be repeated within each unit, both in the initial writing and in the adaptation. Breaking down the content into these discrete units reduced the time commitment required of each author and meant that a large and diverse community of authors could be involved. Equally importantly, it provided structure and transferability, and ensured consistency and coherence was preserved both within each discrete study unit and as part of the module and subject areas. Its use enabled one design to be used throughout over 800 units, decreasing the resource spending on design and layout and allowing funds to be allocated towards new illustrations, critical reading and editing. Availability of the study units as designed PDF documents permitted easy printing with a high-qualify finish, whilst the Word versions of the same units facilitated integration with other materials and the use of small sections of each study unit. The template structure allowed adaptation or localisation to be focussed on particular parts of the units, retaining coherence and relevance of the original learning outcomes and constraining the scale of the modification required for each new context.

But the template also brought challenges. For some colleagues, the very "finished product" appearance of the study units acted to limit further adaptation or modification. In other instances, the innovative nature of the materials offered within the template was so different to that of more conventional materials that there was uncertainty over how they might be used. Sometimes this led to TESSA OER being perceived foremost as a source of ideas for the teaching of a particular area of the primary school syllabus, rather than as a pedagogic tool to support teachers' movement deeper into practice. Of course, the two are not mutually exclusive. But a focus on the first purpose can lead to a fragmented learning pathway through the study units.

Furthermore, the template was originally designed for use on the Web with multilayered text — links between different pages and links to a set of generic materials known as "key resources" — and employed colour diagrams and images. Translation of this format to the more linear arrangement of a print book has been challenging, demanding changes to illustrations and the printing of large numbers of pages, and users have not always found it easy to locate particular resources within the print manuals.

The design of the study units was highly flexible, enabling them to be used in a myriad of different programmes — face-to-face, distance, accredited, non-accredited — and at different levels: the entire unit, one or two activities or case

studies from within a unit, or one or more "resources". Entry can be through the subject-specific modules or through the key resources, which link to all the study units, providing background detail on particular aspects of teaching such as pupil assessment; this latter approach has been used in several institutions as a frame for engagement with the materials. Further work is needed to explore the extent to which the resources retain their usefulness, coherence and integrity when used at a highly granular sub-unit level.

Certain features are common across all the sites of use; in particular, access to the OER by teacher-learners without the structuring usually provided by a teacher mediator is only rarely observed. Issues of access (lack of computers and Web connectivity) and the need for institutional "validation" of the OER have led to most users encountering the OER in a highly directed manner, mediated by lecturers or other course/programme leaders. Arguably, social and cultural factors are playing a larger role in the form of engagement than economic ones, although there are very real issues of funding for Internet use, printing and distribution. Materials being freely available does not in itself enable people to successfully engage with more open educational provision. The openness needs to be instantiated to meet both the demands of the system (recognition as "legitimate" materials) and the needs of the learner (here, the teacher) (Lane, 2009). Selection of TESSA OER has often been through the appropriate national curriculum lens — only classroom activities which feature in the curriculum are deemed appropriate to share with teachers, rather than those OER which address the needs of the learners.

Analysis of the "products" (i.e., the versions) of the TESSA adaptation process across different sites revealed that the overall number of changes or adaptations captured in the formal process was modest (Wolfenden & Buckler, 2012). There are a number of possible explanations for this. Awareness of the key features of OER — how they are defined, developed and used, and in particular the OER iterative cycle of adapt, adopt and share — was very low across all the partner institutions prior to the TESSA workshops. Publicly modifying the work of academic colleagues (as opposed to using material without acknowledgement) appeared unfamiliar, uncomfortable, daunting and almost "illicit" to many of the participants; they perceived it as insulting to the original writer, and they needed much reassurance that this was a legitimate activity. For many, the process was a steep practical and cultural learning curve, and may have restricted the number and type of changes they made to the materials. An additional constraint was convincing colleagues of the validity of local knowledge. Given their own experiences of education (often within the colonial tradition and at universities in Europe or the USA), this is not surprising. But as Okere, Njoku and Devish (2005) advocate, if there is to be an equilibrium of local and global knowledge in OER, Africans must first be familiar with their own local knowledge trajectories and then promote them.

In much of the writing and activity around OER, use of new technologies is axiomatic. Our experience in TESSA challenges this. In some institutions, adaptation of the TESSA OER was entirely digital — workshops used soft copies and subsequent support was through email. At the other extreme, where access to technology was sparse, the entire process was undertaken on hard copy, with lecturers travelling long distances to meet for face-to-face discussions on progress. Interestingly, the latter process resulted in a greater number of changes

to the material; we are unclear whether there is a correlation. Across all TESSA institutions (with the possible exception of those in South Africa), lecturers' low competency levels with ICTs, and in particular with the Web, were evident. This frequently hindered their use of the Web as a tool to support adaptation — for example, using the Internet to locate examples and verify facts. But fear and a sense of inadequacy are not shared by many of the trainee or in-service teachers; for them, the frustrations are around a lack of appropriate opportunities to improve their ICT skills for teaching (university courses often focus on the theoretical), and a lack of access to the Web and to specific materials within the TESSA site — locating these is not always intuitive.

So was the formal adaptation process a good use of project funding? We suggest that its value lay in the process itself, the shared experiences of the participants and their subsequent engagement with the OER, rather than in the tangible content outputs. Through the TESSA workshops, lecturers engaged in a joint enterprise with a shared repertoire; this shaped their learning of the nature of OER and fostered ownership of the TESSA OER — a blurring of the division between content producer and content user (Downes, 2007). The process offered a "practical space" for teacher educators to develop and exercise professional expertise and to "bridge" content and pedagogy within the context of a subject or discipline curriculum (Grimmett & Chinnery, 2009). Arguably, involvement in the adaptation process led to greater use of the TESSA OER by individual lecturers, it familiarised them with the OER, and through participation in the process they were much better placed to discuss integration and use of the OER in their programmes (TESSA, 2011).

In a project such as TESSA, issues of cost are critical; working across multiple sites absorbs considerable funding, but overall the unit cost of production of TESSA OER was small, which gives particular advantage to smaller institutions without access to funds or the capacity to develop such resources on their own. In this first phase, the housing of all the TESSA OER on one site obviates the need for institutions to develop, maintain and promote their own OER sites — they are able to upload further adaptations and related materials to the central repository, thus avoiding content fragmentation and investment in their own OER repositories. However, sustainability is inevitably an issue for an OER initiative such as TESSA — maintaining the infrastructure to ensure continued access to the growing body of OERs. Our first step must be to build further the user community, reaching and retaining a critical mass of loyal and dynamic teacher educators and teacher users who offer user feedback as well as iterative content improvement and adaptation. Understanding the value that TESSA engagement brings to such users will be key to developing a sustainability model; this might include, for example, charging for additional related services or developing a more distributed system of linked repositories to spread the cost of maintaining access to the content.

Defining these options and the subsequent path forward requires exploration of further options, but through working collaboratively to facilitate the continual re-interpretation of learning resources, the TESSA OER will, it is hoped, support movement towards the broad goal of enabling more teachers to develop their expertise and capabilities to meet the needs of all their learners.

Notes

1. Ghana, Nigeria, Kenya, Rwanda, South Africa, Sudan, Tanzania, Uganda and Zambia.
2. Details of the programmes in which TESSA OER are being used can be found in the TESSA case studies on the TESSA website, www.tessafrica.net.

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Vignette

Teacher Education in Sub-Saharan Africa

Catherine Ngugi

The Teacher Education in Sub-Saharan Africa (TESSA) Project commenced in 2005. Its aim was to research and develop open-content, high-quality resources and support systems for school-based models of teacher training, to contribute to improving the quality of teaching and classroom practice in the basic education sector in Sub-Saharan Africa. Five curriculum areas with three modules per area were designed so that the first part of any section would be generic to fit the context of any Sub-Saharan African country. The second and third parts of the section comprised a case study and an activity that were both adapted to suit the contexts of different countries and the different needs of teachers. In addition to the contextual versioning, the teacher materials were created in five languages: Arabic, English, French, Isi-Xhosa and Kiswahili. This vignette focuses on the use of TESSA materials in Kenya, a context in which English is the medium of instruction, whilst Kiswahili is the national language and a compulsory subject throughout primary education.

In April 2009, Freda Wolfenden, then Director of TESSA, invited Liz Levey, a senior advisor to The William and Flora Hewlett Foundation, and myself, Project Director of OER Africa, to accompany her on a field visit to the Rift Valley in Kenya. Situated in the small town of Njoro, about 6,000 feet above sea level, is Egerton University, a member of the TESSA consortium. There, Professor Fred Keraro and his team have introduced students in the BEd Primary, a four-year programme for practising teachers, to both the existing TESSA materials and the notion of open educational resources (OER) that can be used, adapted, reused and shared, without the need to pay a royalty fee to a publisher.

Accompanied by Professor Keraro and his team, we visited a small community-funded primary school on the banks of the escarpment. The surrounding community, comprising mainly smallholder farmers, was by no means a wealthy one, and the school appeared to receive little government support in the form of either infrastructure or teaching materials. Although the small stone building with its tin-sheet roof was unadorned, the ten- and eleven-year-old students who

welcomed us were immaculate in their green checked uniforms. Their eyes shone with enthusiasm. We soon learned why.

Invited by Jacinta,[1] the class teacher, to sit in for a Kiswahili language class focussed on grammar and vocabulary, we Kenyan adults expected the usual rote learning that had been part of our own primary school experience. In Jacinta's classroom, however, exposure to TESSA had resulted in not only localisation and adaptation of existing materials, but also the joint creation, by teacher and students, of new learning materials. The class was interactive, making use of hand-written cards to test word recognition. When a student accurately surmised the missing syllables to complete the word on a selected card, she stood up and confidently articulated a definition of the word and then made up either a brief sentence or even an anecdote that put that word into its appropriate context. As students worked in pairs, all of this activity encouraged collaboration. Good humour, gentle teasing and an eagerness to get through their tasks were striking aspects of all that we saw that day.

In this environment of "no resources", Jacinta had created a resource centre. Within it, we found mobiles dangling from the roof to remind her students of the different grammatical classes, and along the walls, bright charts with clearly written examples of how these classes should be applied. That was not all. Unconcerned by an absence of story books, the students had written their own stories, in English and in Kiswahili, as an exercise in writing from different viewpoints or perspectives. Jacinta gave us samples to read. The handwriting was neat and the stories — which told of ogres, or black dogs in the night with scary red eyes — were created to steer the children towards an understanding of the impact of making scapegoats of those who do not look, behave or speak as "we" do. The Rift Valley of Kenya is a melting pot of every ethnicity, every race represented in Kenya. The beauty of its escarpments, the clouds that reflect from the lakes nestled in its valleys, and the crisp air make it one of the loveliest places in Kenya. It is also the scene of some of the most horrendous crimes Kenyans have perpetrated against one another in the name of politics. These children, young as they were, would have witnessed the post-election violence that had occurred barely four months before our visit. Through a problem-based creative writing project originating from one of the TESSA literacy resources (Module 1, section 5: "Ways of being a critical reader and writer"), slightly older children than those whose class we observed had been afforded an opportunity to discuss together and analyse what they had written and come to an understanding of tolerance: a new paradigm.

At a different community primary school close by, Professor Keraro introduced us to another of his graduates, a teacher named Jonas,[2] who had also been exposed to TESSA through his course at Egerton. Jonas, like other teachers before him, had struggled to teach his students abstract concepts such as temperature and velocity.

Browsing through TESSA materials he had discovered online, John had hit upon the notion of adapting the materials to build a weather station. At this school, we met students — and teachers — who had learned by doing. OER is infused with the notion of collaboration, and this OER endeavour was no different. Materials for the station were contributed by a teacher and some of the parents; a piece of land was loaned by the high school next door, whose older students joined with Jonas and his class to build and erect the various structures.

The students proudly assembled within their fenced off weather station and explained to us the workings of a windsock. They noted that, however counterintuitive it may appear, if the sock points in a particular direction, the wind is coming from the opposite direction. To reinforce the point, they had also assembled a wind vane that showed whether the wind was blowing towards the east, west, south or north. They had fashioned air and liquid thermometers, and explained their workings to us. And they even had a Stevenson Screen, or instrument shelter, built to shield meteorological instruments (in this instance, thermometers), against precipitation and direct heat, whilst allowing air to circulate freely around them. In a school so far removed from the capital and so distant from any major town, to find such a rich set of resources so creatively used was a wonderful experience. Pedagogy had been transformed by an enthusiastic teacher whose creativity had been fired by exposure to TESSA OER.

In both the schools we visited, we found teachers who had transformed their practice through exposure to and adaptation of TESSA processes and resources. Their efforts had been rewarded by the keen participation of their students, the improved results of those same students and the resulting support from their head teachers and communities. We left the Rift Valley content in the knowledge that for some teachers — Jacinta and Jonas being examples — engaging with the concept and the practice of OER had allowed them to realise *their* potential to transform teaching and learning. No doubt they continue to inspire not only their own students but also their fellow teachers.

Notes

1. Not her real name.
2. Not his real name.

CHAPTER

7

Integrating OER into Open Educational Practices

Gráinne Conole

Abstract

Open educational resources (OER) have been debated inside and beyond the OER movement, and considerable investments have been put into the creation of OER and OER repositories. A challenge remains: learners and teachers are still not using OER extensively. Reasons for this are complex and multifaceted (pedagogical, technical and organisational). The present chapter extrapolates components of a technological framework and considers a strategy that can be used for integrating OER more effectively into both formal and informal learning contexts. This strategy was adopted by the Open Educational Quality Initiative (OPAL).

This initiative demonstrates the worldwide trend to include "practice" as part of OER. After arguing that better understanding and implementation of OER at individual, institutional and national level are needed, the chapter describes the set of guidelines that OPAL produced. These guidelines draw on an extensive review of worldwide OER initiatives undertaken as part of the EU-funded OPAL project, including examples from both developed and developing contexts. The guidelines aim to facilitate the promotion and take-up of OER in two ways: first, by providing stakeholders with a framework against which to benchmark their current OER work; and second, through a matrix to encourage and support them to develop a vision and an implementation plan. Together, these tools can enable individuals and organisations to make more effective use of OER and help them embed OER throughout the curriculum.

The chapter concludes by describing how OER practices are recorded as "best" practices and receive recognition through the OPAL Awards.

Keywords: *framework for technological intervention, OEP guidelines, OPAL, OPAL metromap, open educational practices, open educational resources*

Introduction

The open educational resource (OER) movement has emerged relatively recently (UNESCO, 2002). Atkins, Brown and Hammond (2007) provide a useful overview of the movement's development, key characteristics and important initiatives. The concept of OER and the work of the OER movement draw on the principle of ensuring the right to education for all (as stated in the United Nations' Universal Declaration of Human Rights) (Wilson-Strydom, 2009). Therefore, the OER movement argues that educational materials should be freely available for learners and teachers as a fundamental human right.

In the early days there was a naïve assumption that making these OER available would ensure that learners and teachers would use them. OER take-up is thus a key and topical issue issue for discussion and research. As will be seen below, the evidence suggests that widespread take-up has indeed not taken place. More recently, the tendency is to include "practices" as part of OER (Geser, 2007; Hodgkinson-Williams, 2010; Butcher, 2011; UNESCO & Commonwealth of Learning, 2011).

The OPAL initiative described in this chapter was established with the intention to address this issue, through focusing on the articulation of the practices around the creation and use of OER. As the chapter will show, the initiative developed dimensions derived through analysis of 60 OER initiatives worldwide. These dimensions were then extensively validated through a number of expert peer events and used as the basis for creating a series of guidelines to enable stakeholders to make more effective use of OER.

The Research–Policy–Practice Technological Intervention Framework

One could argue that the OER movement has now reached a critical mass, with institutions worldwide engaged in the creation of OER (Atkins et al., 2007), but despite the opportunities, OER developments also have associated challenges of take-up and use (Hylén, 2006). These are linked to a more general concern also found in the take-up of technology in education. For example, although the Internet has now been around for over 20 years, the impact on teaching and learning practice is far less than might have been expected. Molenda (2008) argues that technologies are not being used extensively to support learning and teaching.

The importance of connecting teaching and learning practice with ICT in education/eLearning/eEducation policies is now well recognised (DCSF, 2009; NSF Task Force on Cyberlearning, 2009; Culp, Honey, & Mandinach, 2005; Attwell, 2009; Guri-Rosenblit, 2006; Conole, 2007). Nonetheless, making this connection meaningful and effective is far from trivial. Blin and Munro (2008) argue that although most institutions now have technology infrastructure, easy-to-use virtual learning environments (VLEs), and learning management systems (LMSs) in place, with a range of tools to support the delivery and management of student learning, there is still significant resistance from academics to adopting technology for teaching and learning. Concomitantly, there is a resistance to the adoption of open education practices (OEP), which are defined by the International Council for Open and Distance Education (ICDE) as

> practices which support the production, use and reuse of high quality open educational resources (OER) through institutional

> policies, which promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path. OEP address the whole OER governance community: policy makers, managers and administrators of organisations, educational professionals and learners.[1]

Conole (2010) argues that the critical success factors for technology adoption (evident throughout the above-mentioned literature) can be adopted and applied to OEP. These include:

- Access to technology, including not only the skills to access it, but also related skills, such as working with information.
- Understanding and demonstrating the added value of technologies (pedagogy).
- The need to understand and take account of existing practices and cultures.
- The complexity of the relationship between models for change and their impact on practice (management, support, sustainability).
- Recognition that technologies will continue to change and to have new impacts, and hence flexibility needs to be a cornerstone of any policy perspectives.

In addressing these factors, a conceptual framework for technology intervention was developed and used as part of the UK Open University's Learning Design Initiative, which captures these factors and in particular which aims to make the link between research, policy and practice in relation to eLearning more explicit. The framework illustrates that effective implementation of technologies can be achieved only if policy, research and practice are considered in conjunction. Practice is further subdivided into teacher- and learner-practice. These elements need to inform each other and are interrelated.

Without an understanding of the interrelationship between research, policy and practice when technology applications are being used for teaching and learning, and despite the rhetoric behind the potential of technologies for teaching and learning (Cuban, 1986), there is little evidence of learning transformation (see Figure 7.1).

Figure 7.1: A framework for technological intervention

According to McAndrew et al. (2008) in their evaluation of the OpenLearn OER initiative, there are similarities between technology integration and the take-up and use of OER. Similarly, Ehlers (2011) argues, specifically with respect to OER, that:

> [a]lthough open educational resources (OER) are high on the agenda of social and inclusion policies and supported by many stakeholders in the educational sphere, their use in higher education (HE) and adult education (AE) has not yet reached a critical threshold.

Applying the Technological Intervention Framework to OER

The previous section introduced a framework for technological integration into educational practices and argued that there is a link between the motivation for technological integration and the take-up of OER. This section describes how this framework can be used to ensure that OER and OEP research can impact on policy and practice.

Several analyses of OER integration practices have also identified critical success factors to fully exploit the potential of OER (Thakrar, Zinn, & Wolfenden, 2009; Butcher, 2010). These include:

- Access to different OER repositories using appropriate technologies, skills to find, evaluate and repurpose OER, and also the ability to share resources.
- Understanding by government leaders, policy makers, organisational leaders and practitioners of OER's potential for positive impact on quality education.
- Impact of OER on practice (management, support, sustainability).
- Existing resource practices and the culture of teaching and learning within the institution.
- Sustainability, including policy perspective and support, enabling environments and funding models.

These factors represent the following four interrelated and mutually influencing elements:

- Social factors — aspects such as understanding the benefits of OER, being willing to share, contribute and open up, and seeking quality education and ethical behaviour.
- Policy and enabling environment — this includes issues such as sustainability and support.
- Skills and support — development of specific and related skills to find, use, repurpose and reuse OER, and the environment that support these activities.
- Technical aspects — e.g., lack of access to technologies such as broadband and other technological innovations, and insufficient interoperability to fully exploit OER.

From the above it is evident that to implement OER effectively, a framework of research, policy, and teacher and learner experiences has to be in place that informs and shapes practice, as defined in the technological intervention framework. It is important to know and understand (i) how learners and teachers are using and/or can benefit from OER and (ii) their overall perceptions of the importance of OER to support both formal and informal learning. This has also been highlighted as an emergent theme in OER take-up (OECD, 2007; Hodgkinson-Williams, 2010). Better understanding can then inform policy and practice. Research networks are also providing valuable contributions to research on understanding OER phenomena.

An example of such a network is the OLnet initiative,[2] which provides a global socio-technical network for researchers, users and producers of OER, alongside a series of face-to-face events. It aims to better articulate the design and evaluation of OER and to support and foster the transfer of good practice through sharing and debate.

However, Alevizou, Galley and Conole (2011), in their description of how participants in a social networking site, Cloudworks,[3] discuss and share OER and OEP, conclude that research about OER and OEP must be based on valuable empirical evidence:

> it is too early in our research to generalise such an argument, and demonstrate empirically more than glimpses of emerging patterns, of what we would like to call "a mediated model in the networked landscape of practice." (p. 95)

Furthermore, research on OER and associated practices needs to be accessible and translated into pragmatic guidelines for governments and institutions, guidelines that can inform policy and practice. The COL-UNESCO guidelines for OER in higher education (UNESCO & COL, 2011) translate this relationship at a high level. The OPAL guidelines described further in this chapter provide a more detailed and pragmatic example of linking policy and practice, based on research at the institutional level.

To capitalise on the latest research in the field, it is also important to keep abreast of ongoing OER developments. The annual *Horizon* reports provide a useful lens through which to examine emergent technologies.[4] Although a number of databases and clearinghouses, all over the world, have been developed for OER, annual reports on global surveys to the extent of the Horizon project for technology interventions do not yet exist.

The Open Educational Quality (OPAL) Initiative

The OPAL initiative is a useful practical illustration of the use of the technological intervention framework (described above) to go beyond promoting and fostering OER, so as to focus on innovation and quality in teaching and learning through OEP. The initiative is based on the principle that to address the lack of OER take-up, there needs to be understanding about the practices around the creation and use of OER.

The OPAL initiative first analysed 60 existing OER initiatives to gain an understanding of how OER were being created and used in practice (OPAL,

2010). It furthermore focussed on exploring the reasons for the lack of take-up of OER, as outlined in the introduction to this chapter, by identifying dimensions of OER practice (OEP) around the creation, use, repurposing and management of OER. This evidence base was then used to create a set of guidelines for benchmarking existing OER practices, as well as promoting and fostering OER practices for individuals and organisations, thereby to transform both policy and practice in OER use and take-up. This would ideally result in developing a vision and implementation plan for fostering the promotion and use of OER.[5]

The next section will elaborate on the OEP dimensions of the OPAL initiative.

The OPAL OEP Dimensions

From the survey of OER initiatives, the following eight dimensions were constructed as categories for the analysis of OEP:[6]

- Strategy and policy in the use of OER.
- Barriers and enablers (success factors).
- Tools and tool practices.
- Innovations.
- Quality assurance models.
- Partnership models.
- Skills development and support.
- Business models/sustainability strategies.

Each of the dimensions was applied to different stakeholder groups, such as national and institutional policy makers, management and administration, educational professionals and learners. These dimensions were later defined at three levels: macro (national), meso (institutional) and micro (individual).

The dimensions were validated through an extensive consultation process, via a series of real and virtual events that culminated in an expert policy forum at UNESCO headquarters in Paris in November 2010. As a result, the initial eight dimensions were distilled into four dimensions:

- Strategies and policies.
- Barriers and enabling (success) factors.
- Tools and tool practices.
- Skills development and support.

These dimensions link directly to the four interrelated and mutually influencing elements outlined earlier. Figure 7.2 illustrates how OPAL has related each of these dimensions to individual (micro), institutional (meso) and national (macro) levels.[7]

Figure 7.2: Four OPAL dimensions

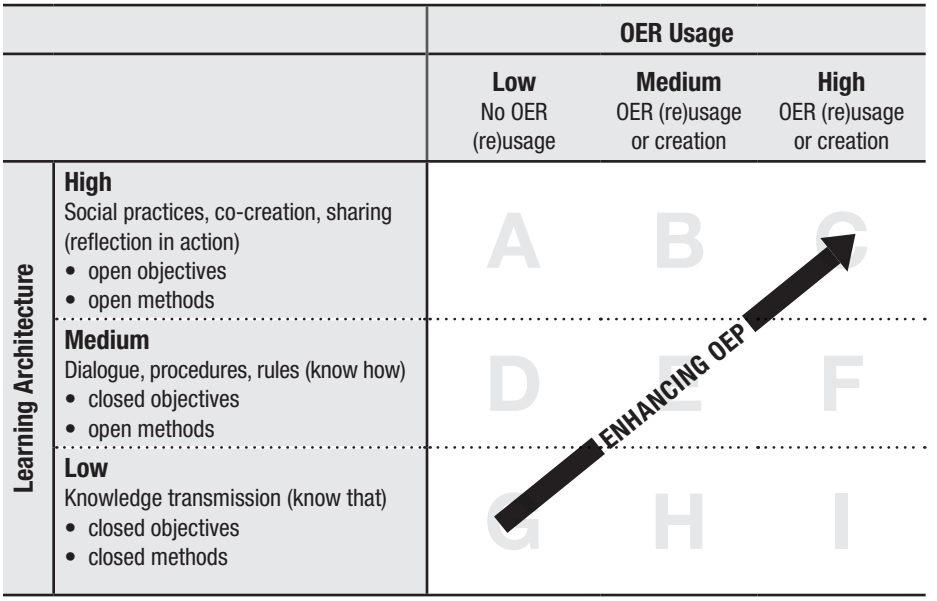
Dimensions	Micro	Meso	Macro
Strategies and policies	Personal motivations and goals	Institutional strategies and policies in place	Embedded in national policy and funding
Barriers and success factors	Tension between research and teaching	Lack of appropriate structure	Lack of funding or rewards
Tools and tool practices	Use of Web 2.0 tools to discuss OER	Institutional OER repository	National repository available
Skills development and support	Peer review and discussion	Institutional workshops on OER	Hewlett OER projects and OCW

As these dimensions were applied at different levels, they were collectively referred to as OEP. The OEP concept of openness therefore refers to practices of opening and enabling access to resources at different levels of an education system.[8] The vision behind it is to achieve a situation in which resources are no longer the sole focus of education; rather, the practices within a specific domain or level are also a focus.

OEP Guide: Guidelines for Open Educational Practices in Organisations

The consultative validation process of the dimensions described above fed into the development of a set of guidelines for the key stakeholders, namely: learners, teachers, support staff and policy makers.[9] The purpose of the guidelines is to improve OEP in organisations. In the guidelines, organisations are introduced to the concept of OEP and provided with a guide on how to improve practices. The guidelines are designed as a maturity model and are based on different stages of progression towards OEP, as outlined in Figure 7.3.

Figure 7.3: Stages of OEP



The guidelines allow organisations to position themselves according to the degree of maturity for each of the individual dimensions that have been outlined and described, in the form of well-formulated questions. These have been translated into three matrices. The first matrix provides an opportunity against which individuals or organisations can benchmark their current status in terms of OEP maturity. The second matrix, explained above, also enables organisations to develop a vision for embedding OER, and the third assists in the process of implementation.

The questions are organised as follows:

Step 1: Positioning organisations in the OEP trajectory:

1. To what extent are you using and repurposing OER in your organisation?
2. Do you have a process for creating OER in your organisation?
3. To what extent are you sharing OER and OEP in your organisation?
4. To what extent is your organisation working with open learning architectures?

Step 2: Creating a vision of openness and a strategy for OEP:

5. Is a vision for OEP shared across the organisation?
6. Are OEP included in existing strategies and policies?
7. Are OEP embedded in the organisation's business models?
8. Are you involved in any partnerships in relation to OEP?
9. Are OEP perceived as relevant across the organisation?

Step 3: Implementing and promoting OEP:

10. Is an intellectual property right (IPR) and copyright regulation for OER in use?
11. Does a motivational framework for OEP exist?
12. Are OEP used?
13. Do you have tools to support the sharing and exchange of information about OEP?
14. Do you apply any quality concepts to OEP?
15. What level of knowledge and skills do teachers have in relation to open learning architectures and OEP?
16. What level of digital literacy skills do learners and teachers have in your organisation?
17. Are support mechanisms in place to support the development of OEP?

Table 7.1 presents the first matrix. For each question there is a series of indicators denoting the level of maturity of OEP that institutions can benchmark themselves against to determine their OER maturity.

Table 7.1: Part of the OPAL OEP matrix

	Not yet started	Early stages/ awareness	Developing/ commitment	Established	Embedded/ advanced
1. To what extent are you using and repurposing OER in your organization?	No use/ repurposing of OER takes place.	Individuals are informally starting to use/ repurposing OER.	Some departments or teams are using/ repurposing OER.	OER are used/ repurposed in the whole organization.	The use/ repurposing of OER is embedded into the everyday practice within the organization and supported through an OER policy.
2. Do you have a process for creating OER in your organization?	No process of creating OER is in place.	Indivduals are starting to create OER.	Some departments or teams have created OER.	The organization's tools for creating OER are largely accepted and used in the organization.	A process for creation of OER is in existence, tools for creation are used and regularly maintained and tool use is supported by a policy.
3. To what extent are you sharing OER and open educational practices in your organization?	No OER and experiences are shared.	Individuals are informatlly starting to use tools for sharing resources or OEP.	Some departments or teams have started to use tools for sharing OER and OEP.	The organization's tools for sharing OER and OEP are accepted and used in the organization.	Tools for sharing OER and OEP are accepted and used organization-wide, and supported through a policy.
4. To what extent is your organization working with open learning architectures?	No experience with open learning architecture.	Individuals are starting to use open learning architectures.	Some departments or teams are using open learning architectures.	Open learning architectures are used organization-wide.	Open learning architectures are embedded into the organization at all levels; learners are encouraged to choose their own learning objectives and methods for learning and are supoorted through facilitation and coaching.

In the guidelines, organisations can also use the three matrices as tools for benchmarking, visioning and implementing OER to assess the maturity of the organisation in relation to its adoption of OEP.

Apart from using the guidelines as a self-assessment tool to position the organisations according to their degree of maturity, the three matrices/tools mentioned expand the use of the guidelines. The first matrix/tool helps individuals or institutions to benchmark their level of OEP maturity against other institutions. The second provides guidance on the development of a vision statement for future OER practice. The third can be used as a reflective tool and helps institutions articulate an implementation plan for the vision statement.

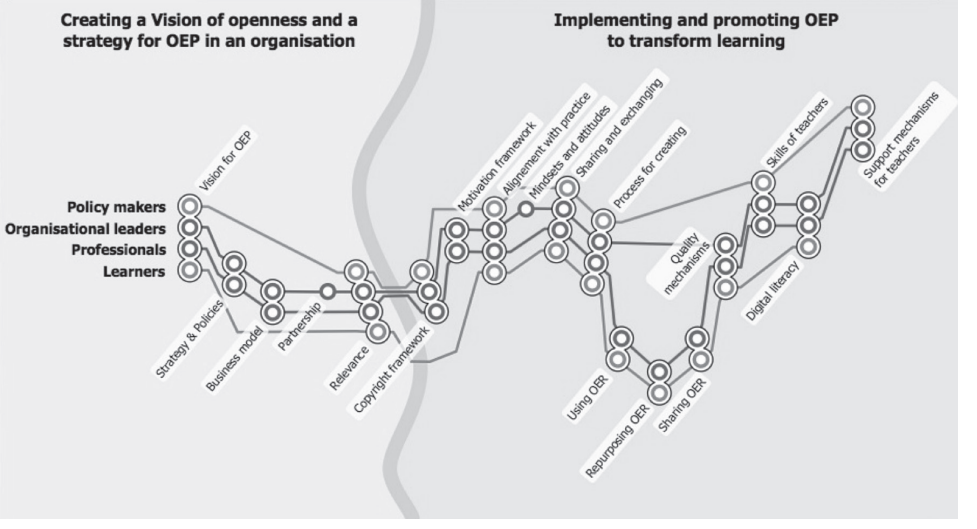
OPAL sees a number of benefits in focusing on OER practices and using the guidelines. Firstly, the guidelines help users understand how to think about the key issues in relation to OER practice. Secondly, they are designed to be flexible enough to cover multiple stakeholders. Thirdly, they can be related to illustrative examples of existing practice. Fourthly, they can be used as a mechanism to guide institutions to self-benchmarking/referencing.

OPAL further developed the guidelines as an interactive metromap.[10] The OEP metromap enables learners, educational practitioners, organisational leaders and policy makers to plot their trajectory on the path to OEP. This begins with assessing their current position, through the creation of a vision for openness and a strategy for open practices, and finally to implementing and promoting OEP.

For each of the four stakeholders (learners, teachers, institutional managers and policy makers), the metromap indicates which of the factors need to be described and links to the relevant section of the guidelines. For example, clicking on the first node on the policy makers' graph links to the relevant section of the document on creating a vision for OEP from a policy maker's perspective. Similarly, clicking on the support mechanisms for the teachers' node details what policy makers need to consider for putting in place relevant support and staff development.

Figure 7.4 shows a screenshot of the interactive version of the guidelines.

Figure 7.4: The OPAL metromap of OER practices



OPAL Clearinghouse

OPAL also recognises the importance of keeping abreast of ongoing OER developments. In addition to the guidelines, the OPAL initiative has also set up a clearinghouse of OEP best practices;[11] this is a dynamic platform where individual organisations can describe and submit their own OEP and other data. Examples include: the Finnish AVO and SOMETU (Avoimet Verkostot Oppimiseen – Suomen eOppiMiskEskus avaa ovet uusille TUulille oppimisessa) Open Networks for Learning initiative, CCCOER (Community College Consortium for OER), LORO (Languages Open Resources Online), LeMill community, the OLnet initiative, and the SCORE (Support Centre for Open Resources in Education) initiative, to name a few.[12]

These "best" practices demonstrate the rich landscape of OEP and evidence the ways in which different communities (at both national and discipline levels) are being encouraged and supported to better use and integrate OER across formal and informal learning contexts.

OPAL Awards

The importance of incentives and rewards to promote the use and take-up of OER was a key finding from the analysis of the enabling factors in OER initiatives. As a result, OPAL has developed an awards scheme for quality and innovation through OEP. These awards recognise outstanding achievements in the fields of OER policy, promotion and use, providing exposure and recognition for successful OEP that have improved quality and innovation in educational organisations. There are three categories of OPAL awards:

1. **Bodies that influence policy** — defined as any global, regional or national body or organisation providing the political or financial conditions or resources for, or encouraging or promoting excellence in, open educational practices through policy, funding, research, lobbying or technical developments.
2. **Institutions** — defined as institutions with a policy of encouraging OEP through the provision of resources, time allocation and support for (i) development of OER, (ii) sharing of knowledge, (iii) peer review, (iv) training courses and (v) participation in research and development, and which motivate professionals through internal recognition and require adherence to standards of openness and sharing of work.
3. **Learning contexts** — defined as learning professionals producing OER, sharing their work, and being actively involved in peer review, possibly also motivating and inspiring colleagues; and where they successfully incorporate student feedback and imbue their students with an understanding and appreciation of openness, which involves their students reworking, repositioning and publishing their own work.

Award winners receive significant international exposure through the OPAL Initiative website and publications, and through the networks of each of the consortium members, including the United Nations Educational, Scientific and Cultural Organization (UNESCO), the ICDE and the European Foundation for Quality in E-Learning (EFQUEL). They also receive a unique logo and animated graphic for self-promotion.

Conclusions

As a result of the emergence of OER, we are seeing changes in practice. Application of the technological intervention framework through approaches like the one adopted by OPAL can help facilitate these changes and enable practitioners and organisations to make more effective use of OER.

As this chapter has argued, the potential of OER to have an impact on learning and teaching practice has not been taken up as widely as was expected. The OPAL initiative was developed to address this deficit in OER take-up and use. The OPAL guidelines provide a mechanism for individuals or institutions to benchmark themselves in terms of their current OER practices, and then to create a vision and implementation plan. The OPAL Clearinghouse, containing a description of OER initiatives, provides different examples of good practice in setting up and promoting OER. These include examples of using OER, examples of innovation in the creation and use of OER, the use of OER to support learning, mechanisms for improving the quality of OER and a number of other factors. Each example has a short description and then a link to a more detailed text describing how the example demonstrates different aspects of the OPAL dimensions. OPAL also advances OEP through their awards.

The OPAL guidelines described in this chapter have built on the OEP we have identified, through reviewing international OER initiatives and translating them into a practical set of tools to enable the stakeholders of OER (learners, practitioners, institutional managers and policy makers) to both benchmark their existing practice and develop a vision and implementation plan to take things forward. It will be worthwhile to study the extent to which this approach improves the impact and updating of OER in the future.

Notes

1. www.icde.org/en/resources/open_educational_quality_inititiative/definition_of_open_educational_practices
2. www.olnet.org
3. http://cloudworks.ac.uk. See Conole and Culver (2009), and Conole and Culver (2010) for a description of the development and evaluation of Cloudworks.
4. www.nmc.org/horizon-project
5. www.oer-quality.org/wp-content/uploads/2011/12/The-Open-Education-Quality-Initiative-Final-Report.pdf
6. http://cloudworks.ac.uk/cloudscape/view/2086
7. http://cloudworks.ac.uk/cloud/view/4763
8. www.oer-quality.org
9. www.oer-quality.org/wp-content/uploads/2011/03/OPAL-OEP-guidelines.pdf
10. www.oer-quality.org/news/the-oep-metromap-and-examples-of-best-practice/attachment/metromap2
11. www.oer-quality.org/clearinghouse/browse
12. www.oer-quality.org/oep-register/?frm_search=UNESCO

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CHAPTER

8

Finding Relevant OER in Higher Education: A Personal Account

Lisbeth Levey

Abstract

OER take-up and reuse depend critically on the practical and legal issues involved in searching and finding OER for particular purposes. In this chapter, these issues are addressed against the backdrop of an exhaustive search for OER to support a post-graduate university course in agriculture. After yielding almost no readily available OER, the search was broadened to include freely available — but copyrighted — resources on the Internet. This in turn led to considerations about how copyright and various forms of licensing inform understandings on key questions like: What is free? What is open? Clarification of these issues provides a foundation for discussion on strategies for searching and finding OER across all disciplines. A review of the environment for "openness" in Africa concludes with consideration of the role of users, funders and researchers in advancing the OER and open access agenda.

Keywords: *Africa, copyright, OER repositories, OER search strategies, open access*

Setting the Stage

The genesis of this chapter lies in work I did for the AgShare pilot project, an initiative facilitated by OER Africa and Michigan State University focusing on improving post-graduate training and research in the agricultural sciences in African universities.[1] My job was to identify appropriate open educational resources (OER) to use for AgShare courses in agricultural economics; the dairy value chain, including management and veterinary sciences; and agricultural extension.

I searched OER Commons, Connexions and other gateways; visited the website of every likely member of the Open Courseware Consortium; carried out numerous Google searches, using different combinations of keywords; and finally went to the websites of universities in the United States and Europe known to be strong in various disciplines associated with the agricultural sciences. I found almost no OER resources suitable for a post-graduate university course, although I found many for a general, non-specialist audience. Nor could I find any freely available textbooks, which some AgShare members requested. It was not for lack of trying.

Instead, I tried a different tack. Textbooks published by commercial publishers are expensive, beyond the reach of most African students, but there were no free texts available. In addition, students, particularly at the post-graduate level, need to learn how to read analytically. I decided to search for freely available, albeit copyrighted, resources on the Internet that could both compensate for the lack of textbooks and also serve as research literature to complement the OER Creative Commons course modules being created in AgShare. By broadening my search parameters to include free resources, I was overwhelmed with possibilities, but equally confused about the plethora of licenses and terms under which these materials were published. I assumed that the authors or publishers intended for them to be free and widely used. Otherwise, why mount them on the Internet at no charge? But the terms of use were sometimes at variance with that premise. What is free, what is open, and where do copyright and other licenses fit in? Upon the conclusion of this exercise, I wrote an AgShare annotated resource guide (Levey, 2010).

Building on my AgShare experience, this chapter concentrates on university-level resources and Africa, and covers the following topics:

- Defining the terms.
- Searching for relevant resources.
- Learning more about how to search the Web.
- The environment for openness in Africa.
- Summing up: questions and recommendations for advancing the OER and open access agenda.

Defining the Terms

The licenses or conditions under which resources may be used represent a continuum, with unrestricted access at one end and circumscribed use at the other. Some of these terms are discussed in greater detail elsewhere in this collection.

Copyright is defined by Wikipedia (n.d.) thus: "Copyright is a legal concept, enacted by most governments, giving the creator of an original work exclusive rights to it, usually for a limited time." Any form of writing, music, art or video can be covered by copyright. In most countries, copyright is automatic; creators do not need to register or even mark their work with a © symbol to be granted copyright. Therefore, it is likely that most works are copyrighted, unless otherwise indicated. In some instances, authors sign over their rights to publishers, as is often the case when a researcher wants to publish in a scientific journal. Because copyright is

complicated but essential to understanding OER production and use, OER Africa has drafted an excellent *Copyright and Licensing Toolkit* (n.d.).[2]

Copyright and licensing wording can vary enormously. Some publishers use very restrictive language; others are more permissive in what they allow users to do. This is particularly true in the case of academics and research organisations that wish their resources to be widely disseminated for scholarly purposes. You will frequently find a statement such as this on papers presented at professional conferences: "Readers may make copies of this document for noncommercial purposes by any means, provided that this copyright notice appears on all such copies" (Ortmann & King, 2006). Another example, this one pertaining to a research organisation, is from an online handbook, published by the International Center for Tropical Agriculture (CIAT), on business skills for small-scale seed producers (David & Oliver, 2002), which includes the following statement: "CIAT encourages institutions and organizations to translate, reproduce or adapt this publication. Please send information on the translation, reproduction and adaptation of this publication to CIAT."

Publishers such as these make their resources freely available, including for distribution, without requiring permission, through the use of modified copyright language. Thus, it is essential that those wanting to use a resource as an OER read carefully the publisher's copyright and licensing statements. If there is no wording that licenses the use of a resource, it must be assumed that the work is strictly copyrighted (i.e., that the copyright holders have reserved all the rights for themselves). In this case, the resource may not be used in an OER without permission.

Creative Commons is a licensing system that permits people to copy, adapt and distribute materials without requesting permission from the resource creator or paying license fees. These licenses do not conflict with the copyright principle; they are a modification to "all rights reserved" copyright.

Fair use is a term that librarians frequently use, sometimes in the same breath as copyright. It is an important concept for anyone wishing to use someone else's work, such as a research article or newspaper article, in the creation of an OER. Fair use allows *limited* use of copyrighted material without requesting permission from the copyright holder or publisher. This allows you to cite or quote a few paragraphs, for example, but not an entire article or more substantial parts of it without explicit permission. Although fair use usually allows librarians and academics to place one copy of an article or other resource on reserve in the library, it does not normally allow multiple copies or redistribution — unless the work has a Creative Commons license or some other kind of statement accompanying the copyright.

Freely available is where we frequently run into trouble. Many publishers — newspapers; research organisations, such as the African Economic Research Consortium (AERC); the World Bank; UN agencies and others — mount documents online free of charge because they hope for maximum readership. However, resources may not be downloaded for use in an OER unless the license explicitly allows for this. Instead, the OER may provide an Internet link to these resources. Many times, however, publishers will allow OER use if the purpose is explained to them. During the AgShare pilot, we wanted to create CD-ROM and

intranet libraries of the research articles and case studies described in the resource guide because Internet connectivity can be problematic in some African countries and universities. It was better to provide these materials offline rather than request students to download them through an unreliable online connection. I contacted some of the major publishers — the World Bank, the Food and Agriculture Organization (FAO), the International Food Policy Research Institute (IFPRI), and a few others — to ask for permission to use their resources as supplemental reading in the AgShare OER modules. No one refused, and we worked out appropriate language for each resource. To minimize the possibility of misunderstanding, the AgShare resource guide includes copyright and licensing information for each entry, including for those that are freely available but fully protected by copyright, as well as for those that are copyright protected but for which the publisher granted permission for the full text to be used in an OER. In every instance, full attribution is required.

Open access publishing is a form of publishing, usually scholarly and on the Web, which provides free online access without any licensing fees. Users may read, download, search, index and link to open access resources without financial, legal or technical barriers. Although journals are the most typical kind of resource classified as open access, the term can also refer to textbooks, databases, monographs, maps, image collections, theses and dissertations, amongst others. But open access does not necessarily give the right to redistribute without requesting permission, unless the resource also carries a Creative Commons license or some other explicit statement granting this right. Once again, it is essential to read the licensing conditions carefully and contact the author or publisher if there is any doubt about what is allowed.

Open data is a concept meaning that data should be freely available for anyone to use and redistribute, as is the case with an OER. There is an excellent Wikipedia article (n.d.) on open data.[3]

Searching for Relevant Resources

It can be more efficient to use and adapt existing resources than to create new ones. Two useful presentations on finding and evaluating OER are provided by Welch (2011a and b). These presentations cover licenses and their impact on OER; search strategies, including how to search specifically for materials with a Creative Commons license; and OER repositories. Although focussed on teacher education, much of the material covered is relevant to other disciplines. Sometimes, however, there are no existing resources and it is necessary to create an entirely new OER. AgShare partners employed the second strategy, for the most part.

Whether building on an existing OER or starting from scratch, there are a few essential steps. First is to check repositories and gateways that try to provide guidance on how to locate quality OER materials. The operative word is “try”, because sites sometimes include non-OER resources, such as materials that are fully copyright protected or bear no license information at all. In addition, not every site is appropriate to the culture, age or academic level of specific students. Nor is every site equally strong in every discipline. With an idea of what is available, it is possible to determine where the gaps are.

Good examples of relevant OER repositories and other sites are outlined by Welch (2011a and b) and in the annotated guide to finding OER produced by the Commonwealth of Learning (COL) (n.d). Appendix Six of *A Basic Guide to Open Educational Resources* (Butcher, 2011) is a third excellent resource to consult on OER in general and searching in particular. In addition, although Welch, COL and Butcher do not mention this, it is often worthwhile to visit the websites of some of the academic professional societies. The following are a few examples:

- *The Economics Network*,[4] sponsored by the Royal Economic Society and the Scottish Economic Society, was established to provide resources for the teaching of university-level economics. There are openly licensed statistical resources for social sciences; math resources used in the teaching of economics; and links to texts and notes, assessment materials and tutor guides. Not every link takes the user to an OER, so patience and vigilance are essential.
- *The American Association of Physics Teachers*[5] maintains a number of teaching resources, including AAPT Advanced Labs, which makes available a range of materials, including for college and university faculty who teach upper-level undergraduate laboratories. The materials on this site are freely available, but the copyright status is not always defined. In the area of physics, it is also worth visiting the comPADRE digital library,[6] a network of free online resource collections supporting faculty, students and teachers in physics and astronomy education. Many of these resources carry a Creative Commons license.
- *The National Science Digital Library* (NSDL),[7] which is supported by the U.S. National Science Foundation, is a gateway relying on participation from U.S. teachers and scientific societies. The NSDL website links to many websites in the sciences, such as the Biology Corner,[8] that are relevant to OER creation or use.

What about digital media? The Biology Corner has wonderful photographs of biology subjects, such as on frog and other dissections, as well as videos, which were filmed in part by students, including one on transferring fruit flies. Given the focus on African agricultural commodity markets in AgShare, the TED[9] Conference Collection provided an excellent lecture from Eleni Gabre-Madhin (2011), describing her work in building Ethiopia's first commodities market. TED, which can be searched by keyword or subject, is an excellent source for videos because they are usually high-quality and all bear a Creative Commons license. The Joint Information Systems Committee (JISC),[10] an important gateway in the UK on information and digital technologies for education and research, has a page with links to multimedia resources, and advice on how to find and evaluate them. However, some of the subject-specific sites JISC describes are copyright protected. ITunes University[11] is another good repository of multimedia content at the university level.

Although some initiatives publish OER textbooks for primary and secondary school, not as much is available for university students in every discipline, unfortunately. However, it is always worth conducting a Google search. Of course, specifying the search terms to be used is an essential part of making this work successfully. For example, using the keywords "OER textbooks biology" elicited

very little at the tertiary level. But substituting "free" for "OER" retrieved many more citations, including a conservation biology textbook published in 2010, which costs $65.00 if purchased in print form, but is free if downloaded.[12] In addition, it is possible to restrict searches more rigorously, according to license terms, by using "Advanced Google Search", where usage rights can be specified.[13]

Because I could not find appropriate textbooks for AgShare, I searched for handbooks and other publications to substitute for textbooks. Admittedly, this was not an ideal solution, rather a coping strategy. But through careful searches, it was possible to identify textbook "substitutions" and background reading for each subject area. Subject-specific searches in Google[14] and Google Scholar[15] can determine whether appropriate textbooks exist, after which one can look for other types of reference materials to compensate for deficits. It is a good idea to search both Google and Google Scholar because the latter is restricted to scholarly publications.

In addition, Flat World Knowledge[16] is an excellent publisher of Creative Commons textbooks at the university level in business and economics, humanities and social sciences, mathematics, and the sciences. It calls itself the world's largest publisher of free and open college textbooks, all of which are published by academics, more than half of whom have already written a textbook. Flat World has an interesting business model. Reading books online is free of charge; copies of each chapter may be made, adapted and distributed with attribution without requesting permission, but for a small fee. Faculty and students can also purchase a PDF version for $24.95 or in print, which is more expensive. Purchasing the textbook entitles the buyer to access supplementary material.

Scholarly publishing is complicated, but important if journal articles are used as an adjunct to OER modules. An excellent article by Schmidt (2010) highlights the importance of open access to academic freedom and global scholarship, as well as its drawbacks. An increasing number of internationally peer-reviewed journals covered by the major indexing and abstracting databases are now open access and sometimes carry a Creative Commons license. In the biomedical sciences, these include the seven journals associated with the Public Library of Science (PLOS).[17] In the multidisciplinary sciences, the Nature Group[18] is now publishing an open access journal called *Scientific Reports*. Both the PLOS journals and *Scientific Reports* are published with a Creative Commons attribution license. In addition, some fully copyright protected journals allow authors to designate their articles as open access. The American Physical Society (APS) has adopted this policy, which permits authors to affix a Creative Commons attribution license to their articles. Additionally, APS is now publishing a new online journal, *Physical Review X*,[19] a primary research journal covering all of physics and its applications to related fields. As for commercial publishers, both Springer and Elsevier permit authors to designate their articles as open access, even if the entire journal is not. Elsevier also allows authors to self-archive their articles as an open access resource on a personal or institutional website. This is not the PDF file that Elsevier publishes, but rather the final draft of the article, just before publication.

There are a few good sites to browse for open access journals. The Directory of Open Access Journals (DOAJ)[20] is maintained by the University of Lund in Sweden. The DOAJ repository has worldwide coverage, and includes more than 7,000 journals in English, French and Turkish, spanning a range of scientific and

scholarly disciplines. It is possible to search by keyword and also to browse the list of journals, organised by subject. Clicking on the "Open Access Journals" tag leads to a link with excellent documentation on the open access concept.

Academic Journals,[21] a company that publishes all of its journals with a Creative Commons license, aims to give users unrestricted access to world-class scholarly literature. Its journals are internationally peer-reviewed. Many of them are indexed and abstracted by the major academic indices, including by the ISI science and social sciences citation indices.

Bioline,[22] a "scholarly publishing cooperative", was established in 1993 to provide access to quality open access research journals, primarily in the life sciences, published in the southern hemisphere. Journals from 16 countries in Asia, Africa and Latin America are represented in Bioline. All are internationally peer-reviewed, many of them included in indexing services.

A last cautionary note about searching: it is not always straightforward, and it frequently takes far more time than initially anticipated. Starting with repositories and gateways is recommended because it may save time and effort. The real trick, however, is to understand the importance of constructing a good search strategy and using precise terms. The world of the Web is large and getting bigger every day. Even a good search may result in an overwhelming number of results, although skimming the first few pages might be sufficient. In addition, a good search result from one site might lead to finding another resource from the same place. As an example from AgShare, Haramaya University in Ethiopia wanted a textbook for its agricultural extension course, but there were no relevant freely available textbooks to hand. But with a precise Google search using the terms "agricultural extension" and "Africa" and "manual or source book", Google returned a citation for *Concepts and Practices in Agricultural Extension in Developing Countries*, an open access source book published by the International Livestock Research Institute (ILRI) on behalf of its initiative to improve productivity and market success in Ethiopia. A search of the site led to discovery of additional pertinent publications for both this course and one on agricultural economics. Thus, a well-crafted search and a little curiosity led to numerous resources, not just one. It is relatively easy to find tutorials on constructing effective search strategies, including selecting concepts, keywords and Boolean operators, such as "and", "or" and "not". Northampton College in the UK, for example, produced an excellent tutorial, "Basic Web Searching" (2011), which is available through Jorum.

But for those with patience and an open mind, searching the Web is just like roaming through the stacks in a library. Sometimes there is a serendipitous discovery right next to the book for which one is searching. This was my experience in AgShare; it was also true in working on this chapter. Many valuable resources were located purely by accident, in part because the sites are not indexed in any of the usual repositories, for one reason or another, but also because of simple good luck. Of course, the websites discussed in this section represent only a handful of instances where good university-level materials can be found. And it is best to search for OER, open access and freely available materials. Each type of license can have a place in work and studies.

Learning More About How to Search the Web

The Intute website[23] is worth visiting because of its straightforward guidance on navigating the Internet. Intute was established by a consortium of seven UK universities to provide services at the tertiary level on finding, evaluating and using Internet resources. Although the site lost its funding in 2011 and no new materials will be added, it will remain up and running for three years. Moreover, the Intute consortium is seeking new homes for everything on its website. The Virtual Training Suite[24] has taken over the tutorial on developing Internet research skills. These tutorials, written by UK subject-specialist lecturers and librarians, are subdivided by discipline. Each one covers similar subject matter, but from a disciplinary entry point. All may be used in OER creation. The "Internet Detective: Wise up to the Web", published by Intute in 2006 and available from the Virtual Training Suite website, is also excellent. Concise and written with good humor, it was written by Intute and university staff to help students develop the searching skills necessary to use the Internet effectively.

All of these tutorials bear Creative Commons licenses. Users may want to ask the librarian to place the tutorials on the library website. In addition, instructors could combine training students in information literacy with the assistance students provide in identifying important resources. Two purposeful tasks for students would be completing the Northampton, Intute and Virtual Training Suite tutorials, after which they would search the Web using keywords given to them.

A further useful resource is "Five Criteria for Evaluating Web Pages", from the Olin and Uris Libraries at Cornell University (2010), which gives five criteria that can be summarized as: accuracy, authority, objectivity, currency and coverage. The guide does not have a Creative Commons license, however, and cannot be distributed without permission. Knowing how to evaluate Internet resources is important because not every one is peer-reviewed in the same fashion as is a textbook or a journal article.

Finally, using the Internet appropriately may also entail knowing how to track and to cite the resources we find on it. Because the Internet is dynamic and can change from day to day, it is important to note the date on which the article was accessed. This allows anyone to trace the correct version of the article by going back through the editorial changes to the page. When in doubt about how to cite, the University of Pretoria has an excellent style guide.[25]

The Environment for "Openness" in Africa

The websites below enumerate a few examples of major African initiatives and gateways making use of "openness". The list is small, but provides a powerful demonstration that Africa is becoming a partner in the global knowledge pool and a champion of openness. For ease of organisation, they are roughly grouped into three categories: data, OER and repositories.

Data

- *African Soils*[26] — The Africa Soil Information Service (AfSIS) was established to provide researchers, academics and policy makers with a practical, timely and cost-effective way to map soil conditions, set a baseline to monitor

change, and provide options for improved soil and land management in Africa. AfSIS uses open source software.

- *Kenya Open Data*[27] — This site offers the public unlimited access to data from Kenya on education, energy, health, population, poverty, water and sanitation. These data are free to be shared, manipulated and disseminated. According to the World Bank (2011), it is Africa's largest government dataset on the Web.

OER

- *African Virtual University*[28] — This now houses 73 Bachelor of Education modules in mathematics, physics, chemistry and biology. Available in English, French and Portuguese, modules bear a Creative Commons Attribution-ShareAlike license.
- *OER Africa*[29] — Established by the South African Institute of Distance Education (Saide), OER Africa aims to play a leading role in the development, use and management of OER, in support of improved teaching and learning on the continent. OER Africa works at the tertiary level, sometimes at the post-graduate level, in four areas: agriculture; health; teacher education and foundation programmes, such as English and literacy, learning and thinking skills, and life skills; and subject-specific foundation courses.

  OER Africa's initiative in agriculture, AgShare, is noteworthy, in part because its modules are not only created *for* students, they are also created *by* them. In AgShare's pilot phase and as part of a learner-centred approach and engagement with local communities, AgShare students conducted case studies with farmers as part of their assignments, after which these case studies were incorporated into OER modules.

  If my searches are anything to go by, the participating universities are amongst the first anywhere in the world to produce OER content at the post-graduate level in agriculture.
- *Teacher Education in Sub-Saharan Africa*[30] — This major initiative, currently working with institutions in nine Sub-Saharan African countries, and offering modules in English, French and Arabic, is reviewed in detail in this volume (see Chapter 6).

Research and Other Repositories

- *African Journals Online*[31] — A non-profit organisation based in South Africa, AJOL is the world's largest peer-reviewed repository of scholarly journals published on the continent. AJOL hosts more than 400 journals on its website, covering twenty-five disciplines and spanning almost the full range of the sciences and social sciences.
- *Digital Information South Africa*[32] — Created and maintained at Rhodes University, DISA is a freely accessible, online scholarly resource that focuses on the socio-political history of South Africa, especially the period of Apartheid from 1950 until the first democratic elections in 1994. DISA is copyrighted with what appear to be flexible "fair use" guidelines.

- *Improving Productivity and Market Success of Ethiopian Farmers*[33] — This research project is designed to impact on market-oriented agricultural development, including private sector involvement. Published materials are available under a Creative Commons Attribution-NonCommercial-ShareAlike license (P. Ballentyne, personal communication, 16 December 2010).

As noted above, some journal publishers and other academic presses now permit authors to deposit the final draft of their manuscripts in disciplinary, institutional or individual repositories. The Directory of Open Access Repositories (OpenDOAR) includes annotated links to more than 2,000 such repositories worldwide in its annotated directory.[34] OpenDOAR is especially helpful because copyright policies are included for each entry. In Africa, the Association of African Universities (AAU) has been collaborating with member universities for several years on the rationale and methodology for establishing repositories that allow free online access to the scholarly output of faculty staff.[35] Although the number of African university repositories is still very small in comparison to the rest of the world, the number and quality is slowly growing. Some noteworthy examples include: Addis Ababa University,[36] Rhodes University,[37] Kwame Nkrumah University of Science and Technology (KNUST)[38] and Makerere University[39] — which is also a sponsor of the Africa Portal, a full-text, online resource for policy-related issues on Africa.[40] With the exception of KNUST, which has a Creative Commons policy for the university, all are freely available, but copyrighted.

Recommendations for Advancing the OER and Open Access Agenda

Making Resource Identification Easier for Academics

Despite numerous gateways, it is not always easy to identify appropriate resources. How a resource is tagged or labelled is one problem. Poor information retrieval skills is another. Furthermore, academics are busy. Is it possible to share the burden of finding quality resources with others? In many U.S. universities, the library is responsible for creating a gateway for eResources, both those that require a subscription and are password protected and those that are free. Many African academic and research libraries already maintain a database of electronic journals to which they subscribe. By the same token, if subject specialists in the library were to devote a day or two to searching for appropriate OERs and other resources for selected courses, it would be a service to the entire university community. In addition, as part of their class assignments, students could be assigned to work in small groups, each one charged with searching for appropriate resources on the Web on a different topic, either through Google searches or using some of the gateways described in this chapter.

Encouraging Funders to Adopt Open Access Policies

Many donors and international organisations fund research. Through the AgShare project, I identified pertinent case studies, research reports and journal articles, either commissioned or carried out in-house by the Food and

Agriculture Organization, research centres affiliated to the Consultative Group for International Agricultural Research (CGIAR), the World Bank, the Bill & Melinda Gates Foundation, the Rockefeller Foundation, and the United States Agency for International Development (USAID), to name only a few. The resources are freely available, but only some organisations have adapted Creative Commons or other wording in their licenses to remove the need for copyright clearance. How can we persuade our partners to encourage researchers to publish their work in an open access format, preferably with a Creative Commons license? Some agencies are already moving in that direction, but they are small in number. For example:

- As required through legislation by the U.S. Congress, in 2008, the U.S. National Institutes of Health (NIH) mandated that all research it funds become publicly accessible upon acceptance in a peer-reviewed journal, sometimes after a 12-month embargo. PubMed Central[41] is the repository maintained by the NIH, where the research literature it has funded is deposited. The law requires the work to be freely and publicly available only, but there is also a separate section on the website for journal articles published under a Creative Commons license.[42] This was the first such rule by a major public funding agency in the United States. According to the Scholarly Publishing and Academic Resources Coalition (SPARC), the language used in this legislation is very strong (Suber, 2008) and could be used as a model for other agencies. Moreover, following the example of the United States, the UK has mounted a parallel website called UK PubMed Central,[43] which serves as a mirror site and also adds its own content.
- At a workshop in May 2010, convened by the U.S. William and Flora Hewlett Foundation and the UK Wellcome Trust, 17 signatories committed to collaborating on increasing open access to research data in the biomedical sciences and population. These organisations agreed to establish a Public Health Research Data Forum to plan and co-ordinate activities to promote the objectives articulated at the workshop.[44]
- The International Development Research Centre of Canada (IDRC) "permits reading, downloading, copying redistributing, printing, linking and searching for non-commercial or academic purposes, of any of its content, provided that credit and reference is given to IDRC." For redistribution or linking, IDRC requests that the user inform the centre on how the material is being used. (IDRC, n.d.)

Encouraging Researchers to Publish in Open Access Journals or Publications with Creative Commons Licenses

Academics are promoted and receive tenure based in large part on their publication record, including where they publish. The list of prestigious and high-impact journals with full or partial open access policies is growing, as is the list of less well-known publications. For their part, although many researchers know about open access publishing and have signed on to it, either because they are required to do so or through conviction, even more have not. In considering where to publish, academics should be encouraged to take into account whether the chosen journal will agree to open access together with a Creative Commons license or its equivalent. In addition, senior administrators should encourage their

faculty to publish in these journals, even when there are page charges, as is the case with some journals (both copyright protected and open access). Four prominent U.S. universities, the Massachusetts Institute of Technology, Dartmouth, Harvard and the University of California at Berkeley, have introduced a fund to reimburse faculty specifically for article processing fees for eligible peer-reviewed open access journals, when funds are not available from any other source.

For scholars who are self-publishing their research, it is possible to affix a Creative Commons or equivalent license statement to their work. In the AgShare initiative, for example, we identified many authors of research and conference papers who permit verbatim copies for noncommercial purposes and with attribution.

As a final thought, publishing research in an open access format is consistent with quality as never before. Furthermore, open access can enhance a scholar's visibility within the global knowledge pool because everyone will have access to the scholar's research, not just a limited few able to subscribe to a journal or buy a book.

Stimulating Growth in Archives, Repositories and Self-Archiving in Africa

Finally, the environment for African repositories is better now than heretofore, but requires far more attention. Collaboration is required between institutional leaders, who set intellectual property rights (IPR) policies; academics and students, who conduct the research; and librarians, who maintain the archives. AAU, universities such as the ones described in the previous section, and OER Africa could all be helpful in providing assistance on appropriate IPR policies and database infrastructure.

Editors' note: *As this chapter had its origins in the author's search for web-based resources for the AgShare project, it is pertinent to add a postscript on how effective that project was. The AgShare Impact Study (forthcoming) concludes that:*

> *The AgShare Resource Guide served the development of original OER in two ways. In the accounts of academics, it served as an orientation and induction into the new world of OER, providing also a sense of how much "is out there". Resources from this guide were also built into the OER being developed as recommended supplementary readings for students.*

As the primary material for the new AgShare OER was based on research carried out by students and faculty staff on farms, OER content for the new modules was thus drawn appropriately from both local and global contexts.

Notes

1. See www.oerafrica.org/agshare/AgShareHome/tabid/1290/Default.aspx
2. www.oerafrica.org/copyright/CopyrightandLicencingToolkit/tabid/1781/Default.aspx
3. http://en.wikipedia.org/wiki/Open_data
4. www.economicsnetwork.ac.uk
5. http://advlabs.aapt.org
6. www.compadre.org
7. www.nsdl.org
8. www.biologycorner.com
9. www.ted.com
10. www.jiscdigitalmedia.ac.uk/crossmedia/advice/finding-video-audio-and-images-online/#creative-commonsFirefoxHTML%5CShell%5COpen%5CCommand
11. www.apple.com/education/itunes-u
12. www.mongabay.com/conservation-biology-for-all.html
13. www.google.ca/advanced_search
14. www.google.com
15. www.scholar.google.com
16. www.flatworldknowledge.com
17. www.plos.org
18. www.nature.com/srep
19. http://prx.aps.org
20. www.doaj.org
21. www.academicjournals.org
22. www.bioline.org.br
23. www.intute.ac.uk
24. www.vtstutorials.co.uk
25. http://upetd.up.ac.za/authors/create/plagiarism/electronicsources.pdf
26. http://africasoils.net
27. http://opendata.go.ke
28. http://oer.avu.org/community-list
29. www.oerafrica.org
30. www.tessafrica.net
31. www.ajol.info
32. www.disa.ukzn.ac.za
33. www.ipms-ethiopia.org
34. www.opendoar.org
35. www.aau.org
36. http://etd.aau.edu.et/dspace
37. http://eprints.ru.ac.za
38. http://dspace.knust.edu.gh:8080/jspui
39. http://dspace.mak.ac.ug
40. www.africaportal.org/library
41. www.ncbi.nlm.nih.gov/pmc
42. www.ncbi.nlm.nih.gov/pmc/tools/openftlist
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CHAPTER 9

Design and Development of OER: A Student Perspective

Andy Lane

Abstract

Open educational resources (OER) are largely developed by teachers who expect to share them with and see them (re)used by other teachers. Many claims are made as to how this gifting culture will support teachers and educational institutions to provide students with teaching resources that cost less and/or are of higher teaching quality through that shared endeavour, either done alone or through formal collaborations. It is also believed that such OER will lead to improved learning experiences for students through these lowered costs and/or higher teaching quality for the educational resources they use in their studies. However, such improvements are unlikely if teachers do not take account of the ways in which students might view and engage with a greater range and variety of OER, not just those offered to them by their own teachers or institutions. The open availability, accessibility, affordability and acceptability of OER is likely to change the teacher–student and student–student relationships away from the more traditional, teacher-centred, "sage on the stage" face-to-face mode to a more learner-centred, "guide on the side" blended learning mode. In this chapter, these developments are primarily explored using examples from The Open University in the United Kingdom.

Keywords: *community, engagement, learning experiences, open educational resources, students, teaching quality*

Introduction

Open educational resources (OER) offer many potential benefits to higher education,[1] which are summarised in a briefing paper I wrote for UNESCO (Lane, 2010a). I have variously written in more detail, in a number of publications, about the changes that OER might bring to educational systems. I have also placed those

changes within the general *modus operandi* of those educational systems. Thus, I have discussed: the way that OER can open up educational resources normally kept within institutions to a much wider set of audiences (Lane, 2008b; Gourley & Lane, 2009); how educational resources[2] are primarily a mediating agent between teachers and learners, and the consequences of that for teaching and learning practices (Lane, 2008c: Lane, McAndrew, & Santos, 2009); how OER act as agents of innovation in teaching and learning practices (Lane, 2010b; Lane & McAndrew, 2010; Lane, 2011; Van Dorp & Lane, 2011); and how OER offer ways to reduce educational divides and widen participation in, or engagement with, higher education study (Lane, 2009; Lane & Van Dorp, 2011).

Throughout all these articles, a defining characteristic has been how open licensing[3] changes the nature of the relationships that teachers, learners and institutions have with each other, and changes the role that educational resources play in mediating those relationships. A much wider review of one OER initiative that I directed for its first three years — OpenLearn, from The Open University (UKOU) in the UK (McAndrew et al., 2009) — is particularly drawn upon throughout this chapter to exemplify some of these changing relationships, and in itself gives greater details of the users of that particular site. The aim is to show how students in particular and learners in general might gain from the flexibility and empowerment of a learner-centred rather than a teacher-centred approach to (open) educational resources.

The Role of Educational Resources in Education

To understand the potential role of OER for education, it is necessary first to review what role educational resources currently play in education. As I have summarised elsewhere:

> Consider also how universities make educational resources available to learners. In a traditional, campus-based, or "closed" university, the educational resources are only available to registered students within the perceived walls of the University, and yet most learners are outside these walls, and only available to a few of these learners in the university's hinterland served by extra mural activities. Universities also limit the number of students they enrol, and determine the students' entry through selection methods such as previous educational achievement.... The students must come to the campus to participate in the educational experience. The methods of teaching used are also very limited (and limiting): Students attend professors' lectures, along with some seminars, workshops, and laboratory, or other practical activities. Educational resources are housed in a physical library or bookstore. (Lane, 2011)

The principal features of such a system of education are scarcity and exclusivity of resources, coupled with an increasing variety of types of resources.

Types of Educational Resources

Academic texts and articles published by and through academic publishers have long been the mainstay of more permanent, duplicated and distributed

educational resources, rather than the ephemeral, one-off, place-bound writings on chalkboards or whiteboards in lecture halls. The emergence of visual technologies (e.g., cameras, overhead projectors) and digital technologies (e.g., computers, the Internet) has gradually changed the medium in which those more ephemeral resources are developed, the places they may be found, and the ability to make multiple copies for distribution, thus converting them into more permanent educational resources. However, from the perspective of students, all these resources are notable for coming from known and/or reputable sources, namely academic publishers or their own lecturers, with many of the other academic writings they use also having been selected or recommended by their lecturer. The implicit trust and authority of these sources is one aspect of the assumed quality and relevance of the educational resources available to students on a particular course at a particular institution.

Accessibility of Educational Resources

In some higher education institutions (HEIs) it is possible for students to attend the lectures of any other course as well as their own, so experiencing some of the ephemeral resources I noted above. But generally, students only experience the resources of their own lecturers and those permanent resources in the university library, or that they are able to buy from bookshops or other sources. The scarcity of these resources means that usually they have to be paid for, including the notes and handouts produced by their own lecturers. So students may be paying to attend an HEI and also paying more for some of the key educational resources they need to study for their course. Equally, in this digital age, they usually have to pay for the privilege of having a computer and accessing the Internet. So even when a particular educational resource itself may be freely available to access and/or free to download, there are still costs and issues of affordability associated with doing so. Or it may be that such a resource is in the second or third language of the student, or may refer to different cultures and norms, and so be less acceptable to study. And this is without considering many of the other factors that create educational divides in access to educational opportunities (Lane, 2009).

Another factor to note is that officially and/or openly published educational resources are also accessible to people other than the students studying a course being taught by the author of that resource, whereas the ephemeral resources are very inaccessible. This is important because open publishing opens up those resources to more uses than just for study by students on a particular course.[4] In fact, it opens them up to prospective students, past students, students on other courses at the same or different HEIs, and finally a wide and diverse set of public audiences. Even so, we should strike a cautionary note, as something being "open" does not necessarily mean people will enter it. A recent study in the UK on the impact of OER (Masterton & Wild, 2011) found, albeit from a sample of 17 students:

- A low level of awareness of OER, and a need for them to understand intellectual property rights issues in general.
- A preference for online over printed materials, and materials that are up to date.

- Appreciation of the "walled garden" of online resources provided by their teachers, but a continuing need for training in searching for and evaluating online materials (information literacy).
- Reluctance to make their own work publicly available on the Web, especially where it is formally assessed. (p. ii)

Similarly, another recent study in the UK (Bacsich, Phillips, & Bristow, 2011) reviewed relevant literature on learner use of online educational resources (whether openly licensed or not) and found it to be immature, with a lack of meta-reviews and most studies not generalising beyond their particular context. The lesson here is that OER are new to all concerned, including students, and students may be as confused as others as to what OER are and what they can do with them. This is particularly true in relation to copyright. For most students, just being able to access a resource online may be enough for their studies. They may not worry about downloading copyrighted material if they feel it is just for their own studies. And few are bothered about being able to modify a resource in accordance with the open license conditions attached to it, particularly as there are many myths and issues surrounding copying, plagiarising and proper referencing of sources. Nevertheless, here are some of the uses that students have made of OER that have been noted and recorded at UKOU and in the wider literature. I have also divided those different uses of OER between three main groups: prospective students (those seeking to register for a degree), registered students (on a degree course) and alumni (students who have graduated and now are working or seeking work).

How Prospective Students Use OER

Most HEIs are interested in attracting students to enrol. Most are also interested in attracting those students whom they think will be able to cope with and benefit from that study. They usually manage that process through selection procedures, normally using previous educational achievements as a major factor.

OER as Showcase

HEIs often have distinctive missions and different histories in terms of their teaching, research, and community or public service profiles. Those missions and histories are reflected in the publications and informational literature that they produce to "market" their courses and the institutional ethos, publications that sit alongside the academic outputs of the institutions, such as research papers and public lectures. OER from an HEI are another academic product that highlights something about that particular HEI. This can be seen in the way that MIT OpenCourseWare (OCW) reflects MIT's desire to share knowledge globally,[5] how OpenSpires reflects the campus-based, research-led ethos of intellectual debate at Oxford University,[6] and how OpenLearn reflects the open and distance learning, social justice mission of UKOU.[7] The latter can be seen in this forum posting from "Jim" soon after the launch of OpenLearn:

> Fantastic!
>
> As a graduate of the OU and continuing learner I am so pleased to see the launch of such a fantastic resource.

> To my thinking, anything that opens up the benefits of the OU's materials and learning opportunities to the masses is great. I commend the OU to anyone I can at every opportunity; now I can refer them to a site where they can see for themselves the wonderful world that is the Open University.

I am certain other institutions have had similar responses to their OER initiatives, both external and internal. Shigeru Miyagawa was at the heart of the decision to start MIT OCW, and at the ten-year anniversary of its launch in 2011 he said:

> I am most proud, however, that MIT OpenCourseWare is truly an achievement of the entire MIT community, a site that shares the voluntary contributions from nearly 1,400 MIT professors and teaching staff, and a similar number of MIT students. It is a collective act of intellectual philanthropy that truly reflects the MIT community's commitment to the dissemination of knowledge for the public good.[8]

OER as Guide

A corollary to OER being a showcase is the way that they also offer different insights for potential students into what it might be like to study at that institution. The effect of such insights is that it can make people who had not considered that particular HEI consider it more seriously. I have been told that the demographic background of students applying to MIT has changed in the past ten years, and many of those new students cite MIT OpenCourseWare as influential in their decision to apply (Miyagawa, personal communication, 2010). At UKOU in OpenLearn's open forums we continually get student comments like this one from Daniel:

> I have recently started the OU course M150 Data, computing and information after studying parts of the course in OpenLearn ... I have had an interest in IT and Computing since I was 14 however I never went to University and my interest has mainly been as a hobbyist.... Being 26 and a bit unsure of my study skills I started the Open Learn units in M150 to see how I would cope or at least know what they were referring to!

OpenLearn has also run a small pilot project that investigated how high school teachers in philosophy and religious studies could use OER from OpenLearn to enrich and supplement their studies, but also to help those students decide whether they wanted to go on to university, and whether they would study philosophy or religious studies.[9] Some of these ideas about OER acting as guides to future study are also central to another project UKOU is involved in, named Bridge to Success[10] in the USA. Often the usefulness of OER is apparent to advisory staff as much as to the prospective students:

> My experience of OpenLearn is that it adds a new dimension to enquirers and students who want to get a real feel for a course before registration ... It allows them to gauge and confirm an appropriate level of study. (UKOU regional support staff member)

OER as Community

This last point about the use of OER as a guide to studying also relates to the way that OER can act as outreach or supplement outreach projects that an HEI may undertake within its local community. Such projects may be reaching out not just to individual students, but also to their parents, families and communities:

> We have a series of "taste" events and awareness sessions in community centres where we are using OpenLearn as a conduit into and catalyst for the Open University. We show the materials to groups of students (and individuals) for them to be able to see how electronic engagement works, and what our materials look like and what is expected of them ... it is also an academically sound approach as our potential learners (and their families) can make informed decisions about their learning journeys. (Billy Khokar, Assistant Director, UKOU in Yorkshire, personal communication, 2008)

This has been done a number of times and in a number of ways at UKOU (see Lane, 2008a).

How Registered Students Use OER

Most educational resources have been designed and developed for use by students registered on a particular course, so naturally they are a prime audience for OER. However, as I noted above, that very openness means that not only can other students at the same HEI see (and use) those resources, but students at other HEIs, whether studying different or similar courses, can do so as well. Recent surveys at MIT OCW reveal that 46 per cent of student visitors to their site visit it to enhance their personal knowledge, 34 per cent to complement a current course and 16 per cent to plan a course of study,[11] with many of those students being from other HEIs, such as Aristotle University of Thessaloniki student Maria Karimatsou:

> This coming semester I'm taking some courses on concrete. I have already searched for this on OCW, and found many courses in this area, so I'm sure that that is going to be a big help.[12]

So students can use OER in a number of ways.

OER as Reinforcement

Firstly, some types of OER, such as videolectures for their course, mean that the students can not only participate in the live event but also later review that same lecture. They may do so for reminders, to go over difficult concepts or for revision: "I am just about to take an exam (A210) and need all the help I can get" (UKOU student).

They can also do so even if the videolecture on record is from a different semester or year, as it will still most likely be relevant to their study of that particular course. It may be not only the videolectures themselves but also handouts and other material produced by the lecturer that are more readily accessible as open rather than closed resources.

OER as Fallback

Secondly, those same OER can be a fallback if the student missed the actual lecture. A lot of anecdotal evidence in the USA,[13] as well as more formal studies (Brecht & Ogilby, 2008), have suggested that where lectures are recorded, actual attendance does often fall because there is the opportunity to catch up at a later date with the recording. But recordings can also be a fallback for students doing similar courses at other HEIs where there are no such local recordings to use.

OER as Primary Source

OER come in many different levels of size and sophistication, from single assets, such as a slide presentation from a teaching assistant, to extracts of pedagogical texts written by teams of academic authors, such as some of the study units on OpenLearn's LearningSpace. The latter can be considered equivalent to other academic texts as primary sources of information and quoted or referenced in students' assignments (many such texts are co-published with academic publishers and so are available in libraries anyway). Of course, the acceptability of such sources to the students' teachers will depend on the perceived authority and trustworthiness of the authors and/or the authors' institutions:

> So I'm studying psychology at Uni and thought I would do some further research of my own and found this brilliant course online!
>
> I started working through it but then exams came up and I forgot all about it. But hey, I'm back now! I find it all very interesting, the different variations, the different affects and the different branches of autism. I never really understood Asperger's until I started reading this. (non-UKOU student)

OER as Enrichment

One of the potential benefits of attendance at an HEI is the ability to attend lectures or seminars in topics other than the one the student is studying. Whilst this benefit varies greatly between HEIs, OER offer students an easier way to broaden or enrich their studies by being able to access material from a wide range of courses. We found very quickly after the launch of OpenLearn at UKOU that many of our students were studying units in between the modules for their qualification pathway, because the units were on topics they wanted to study but could not fit into their chosen qualification pathway or helped them get up to speed with their new studies:

> Have just found this [OpenLearn] on the OU site — so far as OU (& arts) courses am v much a newby — have just signed up for "Making sense of the arts" from March, with maybe long term aim of history & philosophy modules. Because I have so little formal humanities & arts education I am wanting to prepare from where I am, which in arts terms would be poetry & drama, in the reading & appreciation of which I have dabbled in a fairly amateur way and to a lesser extent history. (I am a medical doctor but in psychiatry which of course has long and strong links with arts & humanities). (UKOU student)

OER as Community

A corollary to the personal gain of enrichment is the way that OER can potentially be a focus for a community of students in different locations. The University of Nottingham, for instance, has overseas campuses in Malaysia and China, and some of the OER on their U-Now website[14] has enabled students studying similar courses on both campuses to appreciate and understand what each is doing and how they might be better connected (Andy Beggan, personal communication, 2011). Similarly, distance learning students may want to make contact with other students studying similar things, and can do so through the many open forums on OpenLearn's LearningSpace (and some also do so through a dedicated Open University area in Facebook[15]):

> Hi all I am in the last year of my open degree and for my sins I have decided to go back to my chemistry days. Is there anyone that has done the S104, S205 or the S346 course to give a bit of advice? (UKOU student)

OER as Public Product

Most OER are produced by teachers but they can also be produced by students. In some subjects, like art and design, there is a tradition of students sharing the works or artefacts they develop for peer as well as teacher critique, as part of the "studio" or "atelier" approach to teaching and learning. Now those same works or artefacts (or at least pictures of them) can be shared with everybody who can access them. In areas such as fashion design and fine arts, such public viewing of a student's work can be valuable for gaining external recognition and hopefully employment. The following is an example of someone studying a "start writing fiction" unit who is doing some of the in-text exercises in their OpenLearn Learning Journal[16] and making the materials visible to all users:

> **Rounded characters**
>
> *Visible to all OpenLearn users*
>
> I slipped into the shop, squeezing past an old woman laden with bags, and quickly looked around for the manager.
>
> It wasn't a big place, and the neighbourhood wasn't one that had a crime problem — there was no security guard and the cameras over the door were dummies, just for show.
>
> I meandered through the aisles, looking like I was just browsing, keeping one eye out for the staff at the same time. I wandered down to the aisle where I knew I needed to be, checked that the staff were distracted by other customers, grabbed a bottle and hid it in my bag. I held my breath, waiting a few seconds before taking a second and then third bottle.
>
> Three was enough, I decided. I could always come back for more, I rationalised as I walked out slowly. I had to force myself not to hurry, and told myself that hurrying would only draw attention to me.
>
> **Tags:** start writing fiction character exercise

OER as Training Ground

Whilst some students may want to have some of their own works published as OER, other students may prefer to help get their teachers' works published as OER. In fact, this is a strategy, known as dScribe,[17] developed at the University of Michigan[18] as a cost-effective way of getting OER published, and at the same time giving students the opportunities to practice various publishing and editorial skills and gain some academic credit for doing so. Over 70 students have acted as "dScribes" at the University of Michigan since the programme was launched in 2007.[19]

How Alumni Use OER

Many students hold a strong attachment to the HEI from which they have graduated. As they progress through their career, they may want to keep in touch with their HEI and their fellow students. OER now offer new ways to do so.

OER as Refresher

Recent graduates may not immediately apply what they have learned on their course to their work. But a few years later, it may be that they need to do so but feel they need a refresher on the subject. Where they once may have looked for a textbook to do so, now there are OER, and particularly they may look for OER from their own teachers. This seems to have been the case with Gene Sprouse (MIT alumnus, class of 1963), who had this to say about MIT OCW:

> I find the OpenCourseWare site to be rich with content, and when I was teaching at Stony Brook, I used it often when preparing my lectures and class notes. In particular the visualizations of electromagnetic fields in 8.02T are just fantastic teaching tools that should be shared widely.[20]

Some alumni may even want to financially support an OER initiative. Equally, they may be working on a project that needs specialist knowledge and may find the expertise they require through the OER a particular professor has published, as much as through that professor's research publications.

OER as Enrichment

There are always topics that students did not have time and space to study during their course, as "Lesley", a UKOU student, has said about OpenLearn:

> I've been studying with OU on and off for many years but I'm going to be retiring soon and with less money I will have to cut back on the courses I take. So it will be a wonderful opportunity for me to dip into other courses I can't afford to take.

OER now offer an alternative way for people to study things that they want or need to learn but could not when they were students.

Empowering Community Engagement

As noted earlier, it is not only the students themselves but also their families and friends who take an interest in what they are studying and what their HEI does. Until recently, only family and friends who lived very close to the HEI might have been able to benefit from extramural activities such as public lectures or informal adult education classes. Now, OER offer new ways for family and friends to see something of what the student they know is studying, and also to study selected topics for themselves.

OER as Public Engagement

The ability of OER to engage a public audience beyond prospective students, actual students and alumni widens the feedback to the teachers of those OER (or to the students themselves, if it is their own work, as noted above), which may lead to improvements in or extensions to those OER so as to benefit those students or future students. There are many anecdotal reports about the numbers of people who contact the teachers responsible for the OER, wanting to engage in intellectual conversations about the subjects of those OER.[21]

OER as Open Courses

More recently, the idea and practice of open courses has been developed. In some cases, an open course is developed in the open by some teachers but with the input of students. In this way, students can learn by co-creating the course, and the educational resources are open for all to see. Teachers are then free to take the resources and use them in a formal course they are teaching. In other cases, a course may include OER as the educational resources, but the course is delivered in the open with a mix of formally registered students studying for credit and informal course followers studying for interest. These massive open online courses (MOOCs), such as the course on Connectivism and Connective Knowledge, from Athabasca University (Fini, 2009), blur even further the assumed roles of teachers and students, and the context in which studying takes place, opening up HEIs in new ways.

Conclusions

Educational resources act as a mediating agent between teachers and students for parts of the teaching and learning process (Lane, 2008c). Teachers select resources they want their students to use, students go on to use those resources, and then the students and teachers may discuss or assess what knowledge is embedded in those resources and what skills are needed to use that knowledge and other types of knowledge, often demonstrating those skills in assignments.

OER change the dynamics of that relationship, with more students being able to use those resources as a mediating agent for their studies, not just those students at the HEI from which the OER originated. Nevertheless, it can take time for such changes to have significant impact, and often it is difficult to predict which changes will be most important. However, even the internal changes within a single HEI that OER enable can be reason enough to publish and use OER, as summed up again in the words of Shigeru Miyagawa from MIT:

> Over the past 10 years, OCW has moved from a bold experiment to an integral part of MIT. Currently, more than 93% of undergraduates and 82% of graduate students say they use the site as a supplement to their course material or to study beyond their formal coursework. Eighty-four percent of faculty members use the site for advising, course materials creation, and personal learning. More than half of MIT alumni report using the site as well, keeping up with developments in their field, revisiting the materials of favourite professors, and exploring new topics. Open publication of course materials has become an ordinary element of scholarly activity for MIT faculty, and the ubiquitous availability of that curriculum to our own community has become the everyday reality of teaching and learning at MIT.[22]

Notes

1. Whilst I talk about higher education in this chapter, the arguments do have relevance to other levels of education.
2. By "educational resources" I mean both the content and the tools that are used for handling that content, as per the most widely used definitions of OER.
3. Most often Creative Commons licenses: http://creativecommons.org
4. See, for example, the collective report on users of different open courseware sites, at http://ocwconsortium.org/en/community/documents/cat_view/102-ocwoer-research/110-ocw-user-feedback-surveys
5. http://ocw.mit.edu/about/next-decade
6. http://openspires.oucs.ox.ac.uk/about
7. www.open.ac.uk/openlearn/about-openlearn
8. http://web.mit.edu/fnl/volume/231/miyagawa.html
9. http://labspace.open.ac.uk/course/view.php?id=4352
10. http://kn.open.ac.uk/public/getfile.cfm?documentfileid=17624
11. http://ocw.mit.edu/about/site-statistics
12. http://ocw.mit.edu/about/ocw-stories/#students
13. See, for example, http://insidedigitalmedia.com/how-students-use-video-recordings-of-college-lectures-part-1-of-2 and http://usergeneratededucation.wordpress.com/2011/06/13/the-flipped-classroom-model-a-full-picture
14. http://unow.nottingham.ac.uk
15. www.facebook.com/theopenuniversity
16. http://openlearn.open.ac.uk/course/view.php?id=2908
17. https://open.umich.edu/wiki/DScribe
18. http://open.umich.edu
19. http://open.umich.edu/about/alumni
20. http://ocw.mit.edu/about/ocw-stories/gene-sprouse
21. See, for example, http://blogs.oucs.ox.ac.uk/listeningforimpact/2011/04/12/what-staff-think-of-oxford%E2%80%99s-podcasting-activities and http://tofp.wordpress.com/2011/03/10/mit-professor-walter-lewin-named-award-recipient-by-the-ocw-consortium
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CHAPTER 10

Pedagogical Content Knowledge in Higher Education and Open Educational Resources: A Case Study on Course Design

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Abstract

This chapter presents an overview of cultural and disciplinary ways of knowing, and the challenges of applying open educational resources between and across diverse cultures and disciplines. One way to ensure disciplinary and cultural relevance of open educational resources is to establish an evaluation process. The present chapter offers a case study illustrating how the use of surveys, interviews and evaluation frameworks can ensure the relevance of adapted open educational resources. Whilst conducting an evaluation of repurposed educational resources is time consuming, we illustrate in this chapter the value of the process — especially in relation to achieving the educational goals within diverse contexts. It is not enough simply to provide open access to educational resources. Those accessing these resources also need to apply them in a manner that is both disciplinarily and culturally relevant.

Keywords: *course design, cultural and disciplinary boundaries, evaluation, pedagogical content knowledge*

Introduction

The concepts of open educational resources (OER) and open courseware (OCW) are generally well understood, largely valued and accepted worldwide. However, even when OER/OCW are provided without restrictions or caveats, receiving access to decontextualised information is often insufficient in and of itself. This is particularly true with OER/OCW in post-secondary-level settings, where unique disciplinary ways of teaching make curricular generalisation and application a challenge. Without question, OER/OCW can advance the delivery and dissemination of educational materials by providing opportunities for use via open access to learning materials at no cost and/or minimal resources. Questions

do arise, however, on how to use and facilitate OER/OCW in a manner that is meaningful and relevant (Remmele, 2006), and how to generate stimulating, active engagement between and amongst teachers and learners. On this front, the use of OER/OCW is not always straightforward. Specifically, applying free and open access to high-quality, higher-education-level course materials (which include course planning materials and evaluation tools) requires not only an understanding of disciplinary-specific teaching and learning but also consistency with the unique cultural values and norms of the place (e.g., country, region) where the OER/OCW are being used.

Thus, in addition to the need to account for the different disciplinary ways of teaching and learning when designing and delivering course material, those who access OER/OCW may also need course materials that are designed to accommodate different ways of teaching and learning within different cultures. The diverse ways of teaching and learning unique to each discipline — referred to as "pedagogical content knowledge" — have been widely discussed, researched and generally accepted as being imperative to effective design and development within higher education (e.g., Donald, 2002; Kanuka, 2006; Shulman, 1986, 1987). In addition, international conferences have advanced the scholarship of teaching and learning in disciplinarily relevant ways (e.g., the International Society for the Scholarship of Teaching and Learning; the Society for Teaching and Learning in Higher Education). However, the intersections with culture and education within the post-secondary sector have not always been given as much attention. Critical discourse revolving around culturally diverse communication interactions and OER/OCW can offer insights resulting in better understandings of effective instructional design that transcends disciplinary and cultural differences. Studies that have investigated learning experiences of international students, for example, have found that cultural differences complicate students' communication, at times resulting in feelings of isolation, alienation, decreased motivation, and dissonance within the dominant classroom culture (e.g., Anakwe & Christensen, 1999; Goodfellow, Lea, Gonzalez, & Mason, 2001; Moore, 2006; Tapanes, Smith, & White, 2009). Hence, for individuals considering the use of OER/OCW, reflecting and embedding both culture and pedagogical content knowledge in the OER/OCW will assist in ensuring meaningful and relevant use of the materials accessed.

An important underpinning assumption of this chapter is that the ways in which we communicate our ideas and thoughts in our everyday classroom activities are both disciplinarily and culturally situated (Kanuka, 2006, 2010). In this chapter, we begin with an overview of culture and disciplinary ways of knowing, followed by the challenges of applying OER/OCW between and across diverse cultures and disciplines. We then provide an overview of a faculty development programme on course design and delivery that we have adapted from another institution, and discuss how we have addressed transcending cultural and disciplinary boundaries. An overview of our evaluation framework and the programme evaluation are provided to discuss the strengths and limitations of this programme within our cultural context and institutional constraints. We conclude by outlining the need for further research to understand the use of OER/OCW in different cultures, and by commenting on how others may use and adapt the programme described in this chapter within their own institutions.

Culture and the Disciplines

If the notion of OER/OCW is to continue to experience global take-up by those who provide access to educational materials as well as those who use these materials, it is useful to gain an understanding of how values and culture, embedded within the disciplines, link pedagogy and content to create practical and powerful pedagogical content knowledge (Gudmundsdottir, 1991). Within the higher education sector, the context is typically such that there are educational developers who have pedagogical expertise in learning theory and instructional design but do not have expertise in the disciplines, and faculty members who are content and research experts but not pedagogical experts. As has been argued elsewhere, the result is a bifurcation of content and pedagogy (Kanuka, 2006). This is further complicated with OER/OCW, as the integration of culture needs to be accommodated.

Individuals who assume responsibility for the design and development of classroom experiences in higher education typically have expertise in the content within their respective discipline; less typical is for content experts to have knowledge of course design and learning theory, as well as expertise in course design that is contextually sensitive and respectful of the cultural norms and mores across cultures. Use of course materials (whether from a purchased text or accessed openly via the Internet), applied *carte blanche*, can result in disengagement and/or lack of understanding due to an inability to understand how to apply the information within the given contexts (both disciplinarily and culturally). As noted, if OER/OCW is to be used effectively, it needs to be understood not only within the context of the discipline but also within the culture of origin of the resource. With OER/OCW, this requires a move beyond exploration into the specific forms of pedagogical and content knowledge, to include adaptation to the unique cultural ways of teaching and learning.

Pedagogical Content Knowledge: What Is It and Why Is It Relevant to OER/OCW?

A body of research has shown that there are disciplinary practices about the nature of learning which guide instructional methods and assessment processes (e.g., Donald, 2002). Shulman (1986, 1987) has referred to this body of research as *pedagogical content knowledge*. The dichotomy between subject-matter knowledge and knowledge of pedagogy has been questioned, largely due to the work of Shulman (1986, 1987; see also Grossman, 1989; Gudmundsdottir, 1988; Wilson, Shulman, & Richert, 1987). Recognising the importance of both pedagogical knowledge and content knowledge, Shulman developed a theoretical framework for instructors in education by introducing the notion that disciplinary ways of knowing need to be tied to pedagogical practices. Shulman argued that this distinctive form of instructor-practitioners' professional knowledge, which he referred to as pedagogical content knowledge, exists, and this knowledge builds upon but is different from subject-matter knowledge. In Shulman's view, pedagogical content knowledge is a form of practical knowledge that is used by instructor-practitioners to guide their actions in highly contextualised classroom settings. This form of practical knowledge involves: (a) an understanding of how to structure and present the subject matter to be learned, (b) an understanding of the

common conceptions, misconceptions, and difficulties that learners encounter when learning particular subject matter and (c) a knowledge of the instructional strategies that are effective in addressing students' learning needs in particular classroom circumstances. According to Shulman, pedagogical content knowledge builds on disciplinary knowledge, and is therefore a critical constitutive element in the knowledge base of teaching within a specific discipline.

This framework was later developed, with colleagues in the Knowledge Growth in Teaching project, as a broader perspective model for understanding teaching and learning (Shulman & Colbert, 1988). Rather than viewing instructor education from the perspective of pedagogical knowledge versus content knowledge, Shulman and Colbert argued that instructor education programmes need to integrate these two knowledge bases to more effectively prepare instructors.

Whilst not directing the argument at those using OCW/OER, Shulman and Colbert's (1988) theory of pedagogical content knowledge does have direct implications. Remmele (2006) also notes the need for OER to fit specific teaching/learning contexts. According to Shulman and Colbert, those who are involved in the development, design and facilitation of the learning process need to acquire knowledge about (a) content and (b) curriculum development. Hence, those who use OER/OCW (who will be located anywhere in the world) will be better able to use the resources effectively when they not only comprehend pedagogical strategies and learning theory, but also have some understanding about the subject matter being taught and the culture of the discipline. In particular, to select appropriate instructional methods, those who make use of OER/OCW need to see how ideas connect to their own discipline and to their own unique ways of knowing. This kind of understanding provides a foundation for pedagogical content knowledge that enables OER/OCW to make ideas more accessible. Drawing on Bruner (1967), Shulman also argues that content knowledge encompasses the "structure of knowledge" — or the theories, principles and concepts of a particular discipline. Hence, educators must identify the ways in which each unique body of knowledge (or discipline) should be structured so that learners can more readily understand it. Especially important, according to Shulman and Colbert, is content knowledge that deals with the learning designs, which includes understanding the most useful forms of representing and communicating content and knowing how students best learn the specific concepts and topics of a subject. This means that those who use OER/OCW need to develop a repertoire of teaching strategies that reflect the uniqueness of each disciplinary culture, consistent within their own culture. Thus, those who access OER/OCW are better able to adapt the materials when they have several kinds of knowledge about learning, across the disciplines.

Prior research has also revealed some important insights on the intersection of disciplinary content and pedagogical knowledge — also relevant to OER/OCW. Perhaps the most noteworthy literature on this topic is the extensive research conducted by Donald (2002). Her research aimed to reach a deeper understanding of the thinking approaches taken in different disciplines and to apply these approaches to student intellectual development. Results of Donald's seminal research reveal that there are significant differences in thinking, validation processes and learning activities between disciplines. These kinds of knowledge structures are constellations of beliefs that incorporate "values, techniques,

and so on shared by the members of a given community" (Kuhn, 1970, p. 175). These shared knowledge structures within disciplines also include notions of research traditions, a common ontology, and research methodologies with "facts and values interwoven in the fabric of our educational lives and intellectual development" (Gudmundsdottir, 1991, p. 45). This prior research on pedagogical content knowledge has direct implications for the everyday practice of educators who use OER/OCW, and the redesign, development and delivery of the content accessed within and across the disciplines.

What is lacking in the literature, which has an impact on the effective use of OER/OCW, is research that provides necessary insights on the intersection of disciplinary content and pedagogical knowledge *within diverse cultural settings*. Remmele (2006) makes a similar observation, noting that OER/OCW lacks a direct appeal to a "community".

Pedagogical Content Knowledge and OER/OCW: A Canadian Context

Immigration has played and continues to play a key role in shaping the character of the Canadian classroom. Although only a minority of Canadians have first-hand experience of immigration, non-Aboriginal Canadians have a parent, grandparent or more distant relative who came to Canada as a new Canadian; because Canadians share an immigrant past, there would be no Canada without immigration. Whilst early Canadian immigration was generally limited to Europe, today immigrants and refugees from the developing world and from other non-European sources outnumber European immigrants by about three to one. Canadians today reflect a vast diversity of cultural heritages and racial groups. The diverse population (ethnic and racial) is now a prominent characteristic of Canadian society. As a result, multiculturalism has become an increasingly important part of the Canadian landscape. Multiculturalism in Canada is complicated further by the fact that it is a bilingual country with two official languages and two officially recognised, distinct cultures. Hence, Canadians have had to address the diversity of these two cultures for over a hundred years, as well as the broader multicultural character of Canada. With respect to OER/OCW, Canadian course content has to ensure cultural relevance, as the diversity of languages and culture is reflected in the policy and law of Canada's educational systems.

Whilst Canadian classrooms do vary in diversity, instructors nevertheless have to pay attention to the integration of ways of learning and teaching that accommodate different cultural backgrounds and perspectives. At each level of the educational system, Canada faces the ongoing challenge to adapt teaching practices reflecting an active perspective on learning whilst acknowledging different cultural ways of knowing. Within institutions of higher education, this challenge is magnified by the mobility and diverse backgrounds of both students and faculty members. Canadian institutions of higher education are confronted with disciplinary and cultural diversity. This creates a similar need to what is found in OER/OCW — in particular, the need to redesign course content to meet the diversity of requirements.

Whilst the literature on OER/OCW affirms the need to adapt accessed resources (e.g., Remmele, 2006), little information is provided on *how* to adapt the resources in a systematic process, ensuring the redevelopment is meeting the needs of the course or programme participants. The following section provides an overview of an evidence-based process on how to redesign educational resources in a manner that aims to meet disciplinary needs as well as culturally diverse contexts.

The Teaching Enhancement Series: A Canadian Case

The McGill Model (Saroyan & Amundsen, 2004) is a programme to provide an introduction to course design and teaching for university teachers (see www.mcgill.ca/tls). As is the case with most educational resources, we needed to adapt the McGill Model content to fit our context at the University of Alberta. Specifically, we not only needed to redevelop and implement — we also needed to evaluate the programme in a manner that linked research-informed pedagogical practice, and in a format that could be implemented uniquely for each discipline, taking into account cultural diversity (which also differs within each of the faculties and/or departments).

We share the underlying assumptions motivating and guiding the design of faculty training as expressed in the McGill Model (Saroyan & Amundsen, 2004). In particular, we perceive faculty members as bringing a variety of knowledge, skills and perspectives, which often consist of well-developed subject-matter expertise and research skills but a relatively lower level of development of their teaching skills — though we acknowledge this is certainly not the case for all faculty members. Teaching and learning, from our perspective, revolves around student learning, and we strongly believe in the importance of understanding the context and culture in which professors work and develop as scholars and pedagogues.

Addressing the Aims of OER/OCW

A good place to start when adapting OER/OCW is to determine whether the resources are meeting the required aims or educational goals. We did this with an online survey after the first offering, followed by one-on-one interviews. The survey was aimed at determining whether our goals were met. In our case, the primary aim of the Teaching Enhancement Series is to provide participants with the ability to make informed decisions about their teaching practice. The overarching aims of the series include: (1) enhance knowledge of teaching and learning by developing learner outcomes, learning activities, assessment strategies, (2) ground the course design process in what is known about student learning and (3) align course goals, outcomes, class activities and assessment. Within the pedagogical context, the Teaching Enhancement Series was developed with three specific goals.

Goal 1: To facilitate the adoption of a reasoned approach to instructional decision-making by:

a) Emphasising congruence in the course development process.

b) Organising course components in a planner.

c) Fostering the practice of critical reflection.

Goal 2: To encourage community building through:

a) Facilitating opportunities to engage with colleagues on pedagogical issues.

b) Establishing communication within the wider community, as well as with disciplinary colleagues.

c) Creating a professional collegial environment to support dialogue about effective teaching and learning within the Canadian classroom.

Goal 3: To facilitate pedagogical competence by establishing:

a) Instructors' responsibilities.

b) Students' responsibilities.

c) A link to research-informed knowledge of pedagogy.

The Teaching Enhancement Series was created for anyone with teaching responsibilities on campus. The sessions were designed to address both the theory and the practice of teaching and learning in higher education.

The initial offering of the Teaching Enhancement Series closely followed the format and content of the McGill Model. For example, a five-day workshop was offered in a small group format. We also offered sections of the Teaching Enhancement Series over the 13-week semester, during which participants could choose to participate in any or all sessions.

The survey results on the first offering of the Teaching Enhancement Series revealed that Goal 1 (to facilitate the adoption of a reasoned approach to instructional decision-making) was being effectively met. Specifically, in an online survey, 86 per cent of participants indicated the need for and value of understanding how to design a course that is congruent, with intentional decision-making. Follow-up interviews with the participants revealed that this was the most salient aspect of the programme. In our case, this indicated participants' awareness of the need to strive for a balanced approach to their teaching.

The survey results also revealed that Goal 2 (to encourage community building) was achieved. Seventy-nine per cent of survey participants indicated that the opportunities to dialogue with colleagues were very helpful. However, in the follow-up interviews, some expressed that it might be more useful to work with colleagues in the same disciplinary area. The following are examples of comments in this regard.

> Collaborating and networking with colleagues from other departments and faculties was very valuable. However, it would be more beneficial to me to have more opportunities to meet and discuss my course planning with colleagues in my own discipline.

> It is good to talk to everyone, but it would also be beneficial to include ... activities [with] similar groups (i.e., science and engineering profs together while languages and arts can combine).

The survey and the following interviews underscored the importance of designing and delivering the Teaching Enhancement Series in a framework that supports pedagogical content knowledge.

Finally, the survey results revealed that Goal 3 (to facilitate pedagogical competence) was also achieved. In this example, we found 89 per cent of participants stated this section to be most useful. The notion of student engagement was interwoven throughout the sessions, in relation to research on effective practice (such as selecting appropriate and varied instructional strategies) and to the National Survey on Student Engagement. The follow-up interviews revealed a strong connection between instructional decision-making and student engagement.

The value of conducting a survey on the first offering of the Teaching Enhancement Series based on the McGill Model was that we affirmed that it was programmatically solid. However, the follow-up comments also revealed that the content was less effective at meeting the unique disciplinary needs (as the quoted comments above illustrate). In addition, the interviews also revealed that the five-day McGill Model suffered from fluctuating attendance. One reason for this was due to competing commitments. The other reason, however, was that some participants, upon seeing the schedule, elected to attend parts of the programme because of their specific interests and/or instructor needs.

Alongside the participant survey and interviews, a parallel interview with faculty deans and department chairs was also conducted. The interview results revealed a perceived need by department chairs for a teaching programme to assist their new instructors, many of whom are also new to Canada, about how to teach in the "Canadian classroom". It was expressed that there is a need, in particular, not only to understand but to embrace the culturally diverse ways of how students learn.

In an attempt to develop the Teaching Enhancement Series in a manner that is disciplinarily relevant and acknowledges many of the unique ways of knowing in a culturally diverse classroom, we began offering tailored training sessions. The programme was then modified again, to include three additional dimensions to the faculty development model.

First, the roles and perspective for the planning of the sessions were modified to include the involvement of key collaborators. We sent out a memo to all deans and chairs, stating that the Teaching Enhancement Series would be held "in-house" (within the departments and/or faculties) as well as online. We met with chairs or associate chairs again to discuss their "teaching priorities" and/or "problem areas". Once the high-priority areas were identified, we then worked closely to understand their unique disciplinary ways of knowing, as well as challenges they were facing with departmental student diversity. When possible, we also brought in students from their programmes to obtain their perspectives on their learning challenges. With this information, we then designed, collaboratively with the key disciplinary collaborator(s), the Teaching Enhancement Series around the identified critical areas that met the unique pedagogical content knowledge.

Second, when delivering the Teaching Enhancement Series, we integrated an opportunity for discussion and questions about students' learning that went beyond the course level. At times, for example, we would bring in student panels to describe their learning needs and/or the high-priority issues from their vantage point. This particular activity tended to be effective at communicating to instructors what the benefits and/or consequences of their teaching can be on students' learning.

Finally, as described in the first dimension, this format enables the co-development of training material and activities anchored in disciplinary ways of knowing and learning, and also contextually situated in culturally diverse classrooms. We put the repurposed content on our website as an OER so each faculty and/or department could access it — with the assumption that those who accessed this resource would adapt the content in a manner that would meet their unique needs. In addition, those wishing to access the resources but who also needed assistance in repurposing the content could work collaboratively with us to co-develop the resources.

How Well is the Repurposed McGill Model Working? Evaluation Results

To evaluate how well the adaptation from the McGill Model to the Teaching Enhancement Series achieved its aim, we used Guskey's evaluation model (1999, 2000, 2002). Guskey's model was designed to effectively assess professional development, understand the dynamic nature of professional development, and identify what contributes to improved student learning. The model is grounded in the assumption that if teaching development is to improve student learning, many levels of change are required, each with its own particular evaluation challenges. Whilst Guskey's model has five phases, we used a modified version with three levels, as described in Table 10.1.

Table 10.1: Teaching Enhancement Series (TES) evaluation

Level One	of participants' reaction (satisfaction)
Level Two	on learning (participants' acquired knowledge, skills and attributes (KSA))
Level Three	of participants' use of new knowledge (applied in practice)

TES goal	Guskey's model	Evaluation question
Encourage community building	LEVEL ONE (satisfaction)	• Do you feel that the Teaching Enhancement Series environment was conducive to collegial conversations about effective and engaging teaching and learning? » No » Somewhat » Yes
Acquire the knowledge and experience necessary to design engaging learning experiences	LEVEL ONE (satisfaction)	• Please rate the session(s) attended. » Not helpful » Somewhat helpful » Very helpful » N/A

TES goal	Guskey's model	Evaluation question
Design a course based on learning-centred principles	LEVEL THREE (applied use of knowledge)	• Do you have evidence of a course you designed that implemented the Teaching Enhancement Series practices (i.e., a course outline designed before and after taking the Teaching Enhancement Series)?
Develop the ability to critically reflect on teaching practice	LEVEL TWO (acquired KSAs)	• Did you obtain the necessary skills to reflect on your future teaching practices? » No » Not sure » I think so » Definitely
Provide participants with the ability to make informed decisions about their teaching practice	LEVEL THREE (applied use of knowledge)	• Did you change anything about a course you teach or will be teaching as a result of participating in the TES? » No » Not yet » Yes • Please explain what it was that you changed. • Do you think that your teaching improved as a result of applying these changes?
Foster discovery learning	LEVEL THREE (applied use of knowledge)	• Did you apply to a new or existing course any of the instructional strategies that promote active learning (i.e., case studies, debates, problem-based learning, invited guests, etc.)? • If so, which one? • Do you perceive your students' learning to have improved based on changes to your teaching practice?
Be relevant and practical	LEVEL ONE (satisfaction)	• Please rate the sessions in the following areas: » Relevance » Hands-on experience » Knowledge to proceed on my own » Resources

We also asked the following questions:

- How did you hear about the Teaching Enhancement Series?
- Would you recommend these sessions to others?
- Are there any areas you need assistance in implementing? If so, what specifically?
- Do you have any additional comments/suggestions?

Whilst the literature strongly recommends conducting studies linking academic development activities to student learning, there is inherent difficulty in carrying this out. It involves tracking the impact of the training on instructors' thinking through measuring change in their instructional actions that shows impact on students' learning. Further, even if one can create these conditions, many

factors can influence the findings — for instance, personal attributes (e.g., lack of skill to carry out the desired change), organisational context (e.g., policies that create large classes, lack of funding for teaching assistants) and methodological constraints (e.g., instruments not sensitive enough, individuals unwilling to participate). Reconciling these issues is an extremely difficult task.

Results

The Teaching Enhancement Series has now been delivered for four years, and each year it has been evaluated. Based on the evaluation results, it has evolved and revisions have been made accordingly. Overall, the evaluations indicate that the participants come with a range of experiences, from new faculty members — many of whom are also new to Canada and have no teaching experience — to others who have been teaching for many decades. On this front, whilst new academics were targeted and expected to participate, to our surprise we found that mid-career faculty members almost outnumbered the new academics. The following section is an overview of the four years of evaluations with respect to achieving the Teaching Enhancement Series' goals.

Attainment of Goals After Repurposing the OER/OCW

In addition to revising the Teaching Enhancement Series content, the aforementioned three main goals had to also be revised. The following post-survey data reveals the need to evaluate OER/OCW in relation to integrating pedagogical content knowledge and understanding the multicultural classroom.

Goal 1: Facilitate the adoption of a reasoned approach to instructional decision-making by emphasising congruence of outcomes, instructional strategies and assessment.

When asked to rate how helpful working with the course outline/planner was with respect to developing their course within their discipline, 88 per cent responded "very helpful". When asked "What left an impression on you?" some of the respondents' comments reflected the importance of the course planner and the process of reflection within their respective disciplines:

- The templates for course design and assessment design were very useful.
- The worksheets to fill out for the course plan and assessment plan were helpful.
- It helped clarify my goals and my intended approach as a teacher.

Goal 2: Introduce pedagogical and disciplinary ways of thinking about teaching and learning.

Guiding the participants through the course design process, alignment with content, learning outcomes, and assessment within their own discipline and disciplinary culture were all emphasised. Through each of these elements we aimed to provide new approaches that participants could integrate, where appropriate, into their disciplinary teaching context and student classroom composition. We asked the participants to rate the content presented on assessment for learning and instructional strategies, in relation to their discipline and context. Seventy-five per cent of respondents found the content on assessment for learning to be very helpful and 87 per cent found the instructional

strategies to be very helpful. Comments also support the general notion about how these elements improved their teaching:

- Talking [to my colleagues] about enduring understandings helped me focus my course content.
- The programme gave a good overview of the resources and strategies available to improve my teaching.
- Assessment for learning rather than only assessment of learning left the biggest impression for me.

Goal 3: Introduce research that guides and supports pedagogical content knowledge decision-making.

As mentioned earlier, the Teaching Enhancement Series was designed around a curriculum development model from McGill University. We have an underlying belief that teaching is a scholarly activity (Boyer, 1990). As such, the content also included evidence-based information about each of the course design elements, as well as current literature for optional supplemental material. Consistent with Saroyan and Amundsen's (2004) assertion regarding McGill's workshop, we also found that participants became increasingly aware that decisions about teaching can be based on the assessment of empirical data.

Finally, whilst creating a learning community was an explicit goal when the Teaching Enhancement Series was initially developed, based on multiyear evaluations the goal of creating a learning community was eventually replaced with a goal to facilitate pedagogical and disciplinary ways of thinking about teaching and learning. However, to ensure that cultural diversity was incorporated, the Teaching Enhancement Series continued to encourage community building through:

- Suggested activities to discuss teaching and learning issues with colleagues, as well as with students.
- Establishing communication channels between the central teaching unit and fellow participants.
- Creating content that incorporates a collegial environment to support dialogue about research-informed, effective teaching and learning.

To facilitate community building, the Teaching Enhancement Series includes activities that are formal (table groups) and informal (refreshment breaks) opportunities for collaboration and discussion. When asked to rate "participating in dialogue opportunities", 67 per cent found it very helpful. Open-ended questions did not provide further insights on this area.

Discussion

The Teaching Enhancement Series was developed with the aim to transcend not only disciplinary boundaries, but also the cultural diversity that exists in Canadian classrooms. The evaluation data showed that with respect to providing a teaching development programme that can be adapted to the unique disciplinary ways of teaching and learning, the Teaching Enhancement Series is very effective.

Using the Teaching Enhancement Series as a resource that is culturally relevant within a global context is less clear, given that our experience is limited to a

North American higher education context. At best, our evaluation shows that this programme was perceived by more than half the participants (67 per cent) as facilitating a learning community that aims to provide better understandings through collegial dialogue with students and academics. This aspect of the Teaching Enhancement Series requires further research.

The Teaching Enhancement Series is available as an open educational resource at the University of Alberta's Centre for Teaching and Learning (www.ctl.ualberta.ca), for anyone who is involved in teaching development to academics in institutions of higher education, and can be adapted within and across disciplines — as we have done.

Conclusions

The description of the adaptation and implementation of the Teaching Enhancement Series presented in this chapter provides an example of contextualised information and tools that may enable audiences to better use OER/OCW. These resources have a higher potential of appropriate use in different contexts if we provide the audience with goals, purposes and principles guiding the materials' development and implementation. Describing how we adapted the McGill Model, and how our use of it has evolved over time through evaluation and participants' experiences, aims at giving guidelines and background beyond the content itself. This information cannot offer the necessary cultural translation needed for the series' use in another context, but it provides an example of an evaluation framework that may help those who access OER/OCW translate and adapt resources to their own context. In agreement with Hylén (2006), "the end-user should be able not only to use or read the resource but also to adapt it, build upon it and thereby reuse it".

In closing, we end with where we began: It is not enough to simply provide open access to educational resources. Those accessing these resources need to apply them in a manner that is both disciplinarily and culturally relevant.

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Vignette

The Virtual University for Small States of the Commonwealth (VUSSC): OER within a Transnational Qualifications Framework

John T. Lesperance

Background

The Virtual University for Small States of the Commonwealth (VUSSC) is a network of small nations in the Caribbean, Pacific, Mediterranean and Africa committed to the collaborative development, adaptation and sharing of high-quality courses and learning materials. These materials are intended to be open educational resources (OER) and readily adaptable for use in a variety of courses in specific country contexts. The VUSSC is not a new tertiary institution. Rather, it is a collaborative mechanism for institutions in small Commonwealth countries to develop, adapt and share courses and learning materials. It is also a forum for institutions to build capacity and expertise in online collaboration, eLearning, and information and communication technologies (ICT) in general. The VUSSC was originally conceived by Commonwealth Ministers of Education at their triennial conference in 2000, in Halifax, Canada. The Commonwealth of Learning (COL) is facilitating the process of developing a workable model, to assist with implementation of the VUSSC.

In the course of developing the model, it became clear that it was necessary to create conditions in the various small states to ensure that the courses produced in the VUSSC could be readily used and transferred to other countries and institutions. This led to the creation of a mechanism that supported the development, international recognition, comparability and easy understanding of qualifications, in order to encourage the transfer of courses, qualifications and learners between countries — now known as the Transnational Qualifications Framework.

VUSSC Open Educational Resources Model

VUSSC incorporates all modes of delivery, including classroom teaching, eLearning and blended learning, and cuts across qualifications from level one certification up to doctoral degrees.

The aim is to improve access to educational opportunities and to enhance the quality of teaching and learning, whilst lowering costs. All member countries use English as a common language.

The VUSSC has created a model of developing, adapting and using OER that is unique in its breadth of international collaboration and ownership. This model has at its core not only the development of quality courses as well as quality teaching and learning materials, but also the building of capacity in online materials and OER amongst educators in small states of the Commonwealth, by hosting intensive training workshops or "boot camps". In these workshops, subject specialists from all participating small states learn how to collaboratively develop learning materials and use OER. Upon return to their home countries, workshop participants continue to collaborate on course materials and share their skills with colleagues.

After completion, content is made available as OER for any institution to offer, adapt or use in whatever way it sees fit. VUSSC materials conform to different Creative Commons copyright licenses, which allow the free use, reuse and, often, customisation of materials. Through the VUSSC workshops, participants gain skills in the creation of learning materials and in online collaboration using ICT.

By expanding access to learning, the VUSSC enables small states to become active contributors to global development and leaders in educational reform through the innovative use of ICT. In addition to the workshops, the VUSSC actively seeks partner institutions and development agencies for support in course content creation. Donated content is adapted and published as OER for localisation, contextualisation, adaptation and use in countries on a VUSSC portal.

One of the needs identified by the small states as they developed learning materials was to ensure that these OER courses and the qualifications derived from them would be recognised within the small states and internationally. This led to the development of a system for accreditation of qualifications and transfer of credits between countries, called the Transnational Qualifications Framework (TQF).

The Transnational Qualifications Framework

The TQF sets out procedures and guidelines for small states — with or without national qualifications frameworks — for translating quality assured national qualifications to the levels of the TQF. It is not intended to replace any existing qualifications frameworks or quality assurance systems in any of the countries, but rather provides a means by which the various prevailing frameworks can be compared and related, courses can be transferred, and learning materials can be used across borders. The TQF is therefore defined as:

> A translation instrument for the classification of VUSSC qualifications according to set criteria for specified levels of learning achieved to improve credit transfer and promote common accreditation mechanisms between participating VUSSC countries. (COL, 2010)

The TQF is a unified qualifications framework that includes higher education qualifications as well as post-secondary technical and vocational qualifications offered through the institutions that participate in the VUSSC. The TQF, as a translation instrument, relies heavily on the small states' existing national standards development processes and quality assurance systems, whilst providing an alternative only where a country has no such systems, or in some cases, where the country prefers to implement the broader transnational criteria. It can potentially facilitate the portability of courses and recognition of qualifications amongst countries. International benchmarking through the TQF may also lead to improvements in competitiveness and in standards of national education and training providers. Furthermore, being part of a network of virtual universities can help countries to collaborate and strengthen the capacity of their national education institutions.

Through the use of OER and the TQF, learners in various countries will potentially have access to a greater number and variety of quality assured programmes, courses and learning materials, and as a result, the quality of education and the mobility of learners throughout the participating countries may improve substantially.

Conclusion

The Transnational Qualifications Framework is meant to enhance transnational education and training systems, coupled with the collective development of high-quality programmes, courses and learning materials as OER. OER has the potential to increase the availability of relevant, need-targeted learning materials and thereby contribute to more productive students and faculty members, as well as reduce the cost of accessing educational materials by removing restrictions on copying resources. The VUSSC OER model is also stimulating active engagement in course design by encouraging the adaptation or development of materials for learning programmes that are relevant to small states, and by building the capacity for learning design through collaborative workshops, partnerships and communities of practice.

Many countries share the same belief in the transformation of their systems of education and training. Through the OER model, VUSSC focuses on the increased capacity to deliver high-quality education, and the TQF provides VUSSC with a translation instrument that allows comparability with bigger countries.

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CHAPTER

11

Experiences in Finding and Using OER in Teacher Education Programmes: Pedagogical Approach and Challenges

John Arul Phillips

Abstract

This chapter discusses the author's experience of using web resources — both open educational resources (OER) and non-OER — in undergraduate and graduate teacher education programmes. The focus is on the pedagogical and learning principles guiding the selection, sequencing and organisation of web resources in supporting programmes that use a blended learning approach. Specific examples are provided to illustrate how the pedagogical principles are applied in the use of web resources for supporting learning. Emphasis is on the changing role of teachers in higher education institutions, who will become content curators, and on engaging students in higher-order thinking. Finally, several challenges that may determine the future of using such resources for teaching and learning with OER and non-OER are discussed.

Keywords: *blended pedagogical approach, content aggregator, content curator, content selection, disruptive innovation, multimodality, non-OER, open educational resources (OER), self-instructional module, transference*

Introduction

The Web is the largest library on earth, offering a wealth of useful and accessible resources in a variety of disciplines and fields. It is estimated that there are over a trillion webpages and climbing (but no one really knows!). A unique feature of the Web is that anyone is able to design, create, publish and distribute materials on the Web in any format. The Web has revolutionised how information is accessed, making knowledge available to millions of people who would normally not have such access due to a lack of libraries and the costliness of textbooks and reference materials. Budget cuts in library expenditure in many colleges and universities have deprived students of badly needed educational resources. Ensuing deficits tend to be most acute in the developing economies, where it is not unusual for a tertiary student to share a hard-copy version of a required text with a hundred other course-mates.

Higher education teachers use the Web extensively for social and professional activities; unfortunately, many are rather reticent about the resources available on the Web for teaching and learning. It has been suggested that the Web is the most "disruptive innovation" in higher education, a term introduced by Christensen (2003) to describe a product or service which takes root initially in simple applications at the bottom of a market and then insistently moves "up market", eventually dislodging established rivals. Similarly, educational web resources, especially open access materials, initially may not be highly valued in higher education teaching for several reasons, one being perceptions regarding quality. But as the quality of these resources improves and quantity grows exponentially, open resources may eventually replace or at least modify existing pedagogical models and strategies in higher education. Wheeler (2010) argues that the enormity of accessible learning resources will eventually force academics to reinvent the way teaching–learning strategies are conceived and delivered in colleges and universities. Bill Gates, in a speech at a Techonomy conference in 2010, stated:

> Five years from now on the Web for free you'll be able to find the best lectures in the world.... It will be better than any single university ... the best lectures in the world will no longer be at hallowed institutions, reserved only for the privileged and elite, but on the Web for everyone who wants access to them. (Gates, 2010)

This challenges the long-held view that students enter colleges and universities to obtain knowledge locked in the minds of the world's academics and libraries. Learners are not necessarily concerned with where content comes from; they are more concerned with whether it is good (Spender & Stewart, 2002). Yet despite information being increasingly ubiquitous, higher education teachers continue to maintain their role as the source of all information. The knowledge transfer model fails to recognise that learners are growing up with computers, mobile phones, video games and the Internet. Rather than wait for an esteemed professor to tell them what to learn, these learners are finding out things on their own from the Web. Some academics, aware of the potential of digital educational resources, have made them available to learners any time, at any place, and in a form that is useful for them.

In the Organisation for Economic Cooperation Development (OECD) study, *Giving Knowledge for Free: The Emergence of Open Educational Resources* (2006), the majority of instructors in the 49 countries sampled had used open educational content to some extent in their teaching. They were using small chunks of courses rather than full courses. The reasons for using open content were to complement their own teaching–learning resources, to become independent of publishers, and to reduce the cost of developing learning materials. The study reiterated the need for more information regarding the users and uses of open resources.

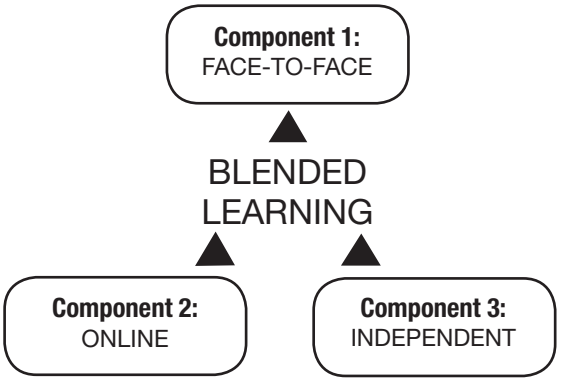
This chapter discusses how the School of Education and Cognitive Science at Asia e University (AeU) uses educational resources from the Web to provide a rich learning experience for students in teacher education programmes. Currently, the school offers the following programmes through distance learning: Bachelor of Education (Teaching English as a Second Language), Graduate Diploma in Early Childhood Education, Postgraduate Diploma in Higher Education Teaching, and Master of Education in ten areas of specialisation. Students in these programmes

are essentially working adults, ranging from 30 to 70 years of age and from varied backgrounds and experiences. Learners following these programmes are from Malaysia, Malawi, Kazakhstan, Singapore, Vietnam, India and Maldives.

Pedagogical Approach

The delivery of the four teacher education programmes at Asia e University adopts the blended pedagogical approach in meeting the needs of working adults and requirements stipulated by the Malaysian Qualifications Agency (MQA), responsible for accreditation of programmes. For example, in a three-credit course, learners are required to spend 120 learning hours over 14 weeks reading the learning materials, participating in face-to-face interactions, doing their assignments and projects, searching for materials and participating in online discussions. Figure 11.1 presents a summary of the three primary components of the blended or hybrid pedagogical approach that combines face-to-face learning with online offerings.

Figure 11.1: The blended pedagogical approach in the delivery of programmes



For Component 1, learners are provided with ten hours of face-to-face tutorials (18–22 learners per class), held during weekends (once a month) at a learning centre nearest to their residence. However, learners have the option not to attend these face-to-face tutorials and instead to pursue the programmes fully online. For Component 2, learners are encouraged to spend about 20 hours online, engaging in learning activities and problem-solving in online forums, chat rooms, blogs and wikis. The online interaction is facilitated by an online tutor who initiates learner–content interaction, learner–learner interaction and tutor–learner interaction. For Component 3, learners are involved in independent study supported with a comprehensive self-instructional module (SIM), which stipulates the "must-know" content learners are expected to master and apply. Learners are required to spend about 90 hours per course per semester reading the SIM, solving problems, doing assignments, watching video clips, listening to audio clips and preparing for an examination.

It has been the experience of the author that the greatest challenge in implementing the blended pedagogical approach at AeU has been the provision of high-quality learning materials. Not only are they expensive to produce, but there is also the difficulty of finding good writers with the relevant content knowledge to write such materials. To overcome these barriers and reduce reliance on publishers,

both open educational resources (OER) and non-open educational resources (non-OER) have been linked, adapted and adopted to provide a learning experience that allows self-paced learning in which learners have control over their learning time and pace. OER are digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research, and often carry a Creative Commons license (Speirs, 2006). OER also include works classified as "public domain" which can be used without permission because the copyright has expired and not been renewed, or works published in the United States before 1923, or works whose owner has indicated a desire to give them to the public without copyright protection. Some educational resources may neither carry a Creative Commons license nor be in the public domain, but their owners have allowed for the reprinting, distribution and storage of the original work. On the other hand, "non-OER", also commonly referred to as "stuff-on-the-Web", are those educational resources on the Web that cannot be reused, reversioned, stored or distributed because of copyright restrictions.

Fortunately, the Web is rich with educational resources for teacher education courses, and the majority are relevant and useful instructional materials. Nevertheless, these resources are painstakingly vetted by AeU subject-matter experts to determine accuracy, validity, relevancy and currency for use by students.

Whilst the quantity and quality of OER are increasing at a rapid rate, there are still areas in teacher education not adequately covered by open access materials. To make up for the shortfall in open OER for certain topics and subject areas, non-OER are used through hyperlinking; this is the practice of linking one webpage to another, with the linking word, phrase or image highlighted to serve as an "active" or "hot" zone on the page. The user gains immediate access to the linked page simply by clicking on the hot zone, eliminating the need to type in the full URL, since the hot zone replaces the underlying code. By and large, hyperlinking is not a breach of copyright; it is not tantamount to trademark infringement, commercial misappropriation, or defamation. According to Hofman, "linking does not involve unauthorised copying and it is hard to see how it infringes copyright" (2009, p. 67). Similarly, section 22(6) of the *Digital Agenda Act (2001)* in Australia states that, "in most cases of hyperlinking, the website developer will not currently be liable for infringement by authorisation" — i.e., hyperlinking will not normally infringe copyright except where the linked website itself contains infringing material. However, there have been several legal disputes on hyperlinking in the United States, Britain and Australia involving business organisations, especially in relation to the issue of "deep linking", where the home page or landing page of the linked website is bypassed (deep linking may affect the linked site's potential advertising revenue).

It is the author's practice to seek the consent of website owners. Oftentimes, owners are delighted to share their material because hyperlinking enhances traffic to their websites. In circumstances where either the owners are not contactable (because no email address was provided) or no response is received from them, the owner and origin of the website are acknowledged using the APA format. Every webpage is checked to determine whether its terms and conditions of usage allow hyperlinking. Every effort is made to ensure that for the hot zones,

plain-text names are used. Hot zones using the logo, slogan or trademark are avoided since these could lead viewers to conclude that the linked page endorses or is affiliated with the website. As far as possible, deep linking is avoided. A disclaimer is included stating that at the time the link was initially visited, it contained no offensive or hurtful materials, and that it should be understood that one does not have control of another's content, which may change after linking. The disclaimer also includes a statement that one is not responsible when the linked website contains infringing materials. Finally, each case of using copyrighted material is based on the four factors of the doctrine of fair use (U.S. Copyright Law – Section 107) which relates to the purpose and character of use, the nature of the copyrighted materials, the amount and substantiality of the portion taken, and the effect of the use upon the potential market (Stanford University, 2002).

Framework for Selection of Web Resources

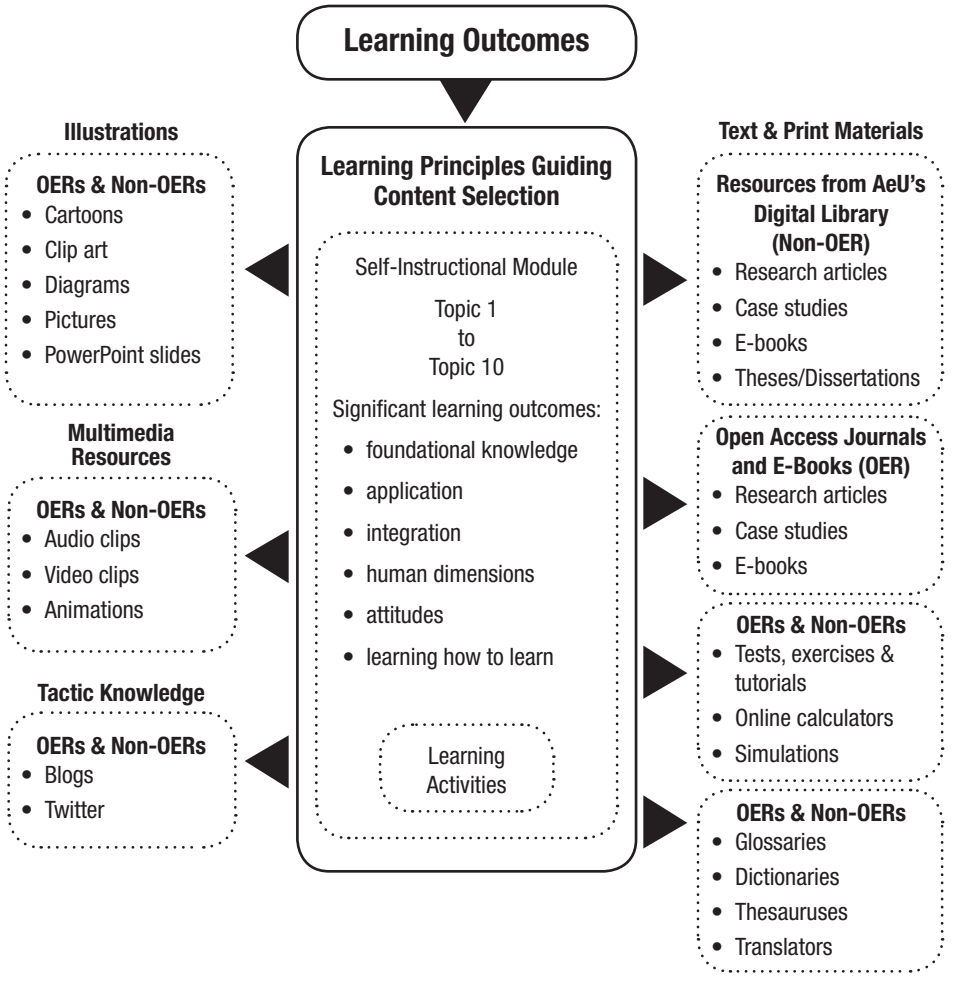
As mentioned earlier, the biggest challenge for successful implementation of the blended learning approach is Component 3 — providing learners with digital content that will enable them to learn independently, since face-to-face interaction is greatly reduced. The SIM provided for each subject or course, often described as a "tutorial-in-print", delimits the must-know content that learners are to master with minimal support from teachers (Rowntree, 1997). The design of the SIM takes into consideration that most learners pursuing the teacher education programmes are adults for whom English is a second language. Content is presented in short and manageable chunks using language that is sufficiently simple to keep learners engaged with the subject area. Whilst the language may be simple, the rigour of the concepts, principles, procedures and theories to be acquired is benchmarked against similar courses offered by well-known universities. Figure 11.2 provides a framework detailing the processes involved in Component 3 of the blended pedagogical approach, focusing on the selection and validation of web resources (both OER and non-OER) for a course or subject (Phillips, Kaur, & Ahmed, 2005).

The first process relates to the learning outcomes to be achieved in a course. Each course or subject consists of ten topics of content to be studied over a 14-week semester. Each topic consists of four to five learning outcomes, making a total of about 40 to 50 learning outcomes to be achieved in a course or subject. Learning outcomes are important because they determine the selection of relevant resources. Fink (2003) provides a useful Taxonomy of Significant Learning Outcomes that guides the selection of learning outcomes for a course or subject as follows:

1. Foundational knowledge (facts, concepts, principles).
2. Application (problem-solving and decision-making in real-world situations).
3. Integration (making connections amongst ideas).
4. Human dimensions (learning about oneself and interacting with others).
5. Attitudes (changing one's feelings, interests and values).
6. Learning how to learn (becoming a better and self-directed learner).

An appealing feature of Fink's Taxonomy is that it combines both cognitive (i.e., thinking) and affective (i.e., feelings and attitudes/values) outcomes of learning. The taxonomy is interactive, which means that each kind of learning can stimulate other kinds of learning. The challenge is to select relevant educational resources for the learning outcomes specified — for example, web resources that are appropriate for foundational knowledge, web resources that are appropriate for enhancing learners' decision-making skills, or web resources that are appropriate for changing one's attitudes or learning how to learn. Admittedly, it may not be possible to achieve all the "significant learning outcomes" in one topic. However, the more of these that can be achieved, the richer will be the learning experience.

Figure 11.2: Framework guiding selection and use of OERs and non-OERs



The second process relates to learning activities that are strategically interspersed in each of the ten topics in the SIM. Learning is not so much a matter of getting students to read; rather, it is getting together a set of things for students to do (Ellington & Race, 1993). Learners learn more effectively when concepts and principles are acquired in an active manner. Learning activities are designed to help students monitor their own progress, check their understanding, develop

specific skills, apply what they have learned to real-world situations and reflect on what they have done. Learning activities are most effective when they are problem-centred and involve the student in the activation of prior experience, and in the demonstration and application of concepts to real-world settings (Merrill, Zhongmin, & Jones, 1991). Learning activities seek to get learners to go beyond memorisation and instead to relate ideas in the learning material to their work, to share their rich life experiences, and to reflect on their own thoughts and feelings (Knowles, 1984).

The third process relates to the principles of human learning. These principles are derived from research in cognitive science (Gagne, 1985; Merrill, 1994) over the last six decades and serve as pointers in the selection of web resources towards achievement of the "significant learning outcomes".

- **Detection of Patterns and Connections:** Content that provides an opportunity for learners to "make meaning" by creating their own patterns, models and connections.
- **Elaboration:** Content that provides learners with an alternative explanation of the same ideas using different words and examples. It is like having another teacher explain the same concept or principle.
- **Application:** Content that provides situations in which learners apply concepts and principles to authentic real-world situations, such as case studies.
- **Demonstration:** Content that shows, in a multimedia presentation, the application of a concept or principle via worked-out examples of the solution for a problem.
- **Reflection:** Content that allows for learners to reflect and delve more deeply into the information provided by questioning its relevance and validity, and then to draw conclusions.
- **Alternative Viewpoint:** Content that provides learners with differing viewpoints of the same ideas being taught, especially for ill-defined and controversial issues, where learners are directed to compare differing viewpoints.
- **Multimodality:** Content that presents concepts and principles visually with narration or using narration without visual images, instantiating the different senses of learners through audio clips, video clips and Flash animations.
- **Relevant and Practical Content:** Content that is relevant and applicable to the present or future work of learners.
- **Past Experience and Knowledge:** Content that relates to the life experiences and knowledge of learners (because the majority are adult learners), such as blogs and Twitter.
- **Appropriate Difficulty Level:** Language and cognitive complexity of content selected is high enough to challenge learners, but not so high as to frustrate them.

- **Transference:** Content that provides an opportunity for learners to use the information taught in new settings (i.e., far transfer), such as case studies and simulations.
- **Reinforcement:** Content that seeks to reinforce learning of concepts and principles through drills and practice with immediate feedback, such as tests, exercises and problems.

Case Studies

The following is a sample of courses illustrating the adoption and adaptation of web resources (both OER and non-OER) in the teacher education programmes offered by the School of Education and Cognitive Sciences, AeU. The web resources selected for each of the courses described are based on the "significant learning outcomes" to be achieved and the principles of learning identified.

Example 1

For the course on "Philosophical Ideas in Education", a full textbook titled *Thinkers in Education*, by UNESCO's International Bureau of Education in Prospects, was used. The publication was available online and carried the caveat, "This document may be reproduced free of charge as long as acknowledgement is made of the source." Chapters selected sought to provide Eastern and Western perspectives on philosophical ideas in education. To assist learners who might find the language level difficult, a summary of the main ideas was made available and duly acknowledged. In the summary, learners were probed to think about how these philosophical ideas were applicable in their daily lives as educators.

Example 2

For the course on "Child Growth and Development", materials were obtained from several portals offering relevant OER, such as Wikipedia, OpenLearn, Connexion and TESSA. Materials were reversioned, repackaged, customised and aligned with the learning outcomes for each of the ten topics. Diagrams, pictures and clip art available in the public domain were adapted for use as illustrations in the SIM. Several video clips, which could be accessed online from YouTube, Google Tube and Videojug, were embedded in the module. For example, to demonstrate Piaget's theory of cognitive development, short video clips on experiments of conservation tasks were embedded. To expose learners to shared tacit knowledge, links were made to relevant blogs in which people from different cultural backgrounds discussed parenting styles, one of the topics in the curriculum. This was to give students an insight into other people's opinions on parenting and how they related to the theories and models of parenting styles identified by psychologists and paediatricians. However, students were warned about the contents of such discussions, which could be expressions of very extreme or permissive views.

Example 3

For the course on "Statistics in Education", the SIM developed was an adaptation of several open access textbooks available on Saylor.org, U-Now, University of Nottingham and others. Short video clips from YouTube, Google Videos and

Khan Academy were incorporated to teach specific concepts such as "test of significance", "hypothesis testing", "meaning of the t-test" and so forth. These audiovisual explanations of statistical procedures were found to be appropriate for adult learners apprehensive about statistics. To provide an opportunity for learners to practise analysing data, such as calculation of the t-test, ANOVA and others, links were created to online statistical calculators. Learners were given specific data which they could analyse and comment on using online calculators such as VassarStats and Easycalculation.com. However, the accuracy of these online calculators had to be established by comparing the statistical output with well-established statistical packages such as Statistical Package for the Social Sciences (SPSS).

Example 4

For the course on "Learning and Cognition", a 365-page open access textbook on educational psychology from OER Commons was reversioned and customised for development of the SIM. To enrich the experiences of learners, links were established to audio books (*Classical Works in Psychology*) and audio clips such as those found in LibriVox, which briefly explain key concepts and principles. Links to audio books and audio clips were to cater for the learning styles of learners who are auditory by nature. They also provided learners with the correct pronunciation of key terms and unusual names such as Gagne, Piaget and Vygotsky.

Example 5

Case studies are widely used as a teaching tool in several subjects. For the course on "Emerging Perspectives in Educational Leadership", case studies were extracted from several open access journals. However, many of these case studies were from the United States, United Kingdom and Australia, and had to be reversioned and contextualised to the Asian situation. Learners were asked to compare the experiences of educational leaders in these countries with their respective countries and experiences. Case studies provide opportunities for learners to relate the principles and theories they have learned to real-world situations and practice.

Example 6

For courses such as "Research in Teaching English as a Second Language", "Research in Nursing Education" and "Research in Science Education", learners were required to critically evaluate journal articles. Links were made to selected articles in AeU's Digital Library databases, such as ProQuest, which learners used their passwords to access. In addition, learners were referred to several open access online journals in the respective subjects areas, which they downloaded for their assignments. There are hundreds of open access journals offering full-text articles in PDF and Word document format, and carrying a Creative Commons license. Since some of the subscribed databases are expensive, the author directed learners to articles available in open access referred journals on various aspects of teacher education.

Example 7

For the course on "Teaching Science and Mathematics to Young Children", learners were directed to the thousands of lesson plans available online for preschool teaching and learning, such as those at EducationWorld, Teachers.net and other sites. Several of these lesson plans were available as OER, which enabled teachers to reversion and adapt them to local curriculum needs. These resources provided Malaysian teachers with insights into how preschool teachers in the United States, Canada, Kenya and New Zealand teach mathematics and science to young children.

Example 8

For the course on "Fundamentals of Instructional Technology", a rich database of PowerPoint slides were utilised for several topics. The PowerPoint presentations were available as stand-alone sets of slides or embedded in portals such Slideshare and Slideshow. Links to these slides sought to provide learners with the main points of a topic or chapter and thereby enable a quick overview and preparation for examinations.

Example 9

For the course "Educational Needs of Special Children", various reports and government publications (both OER and non-OER) on research, policies and practices were used. These resources were invaluable in encouraging learners to compare special education practices and policies in Malaysia, the United States and selected Asian countries. Links were made to several professional organisations in special education from different countries (such as the National Association of Special Education Teachers — NASET), which provided learners with up-to-date information on activities and events in the field that they could emulate locally.

Example 10

For the course "Curriculum Design and Development", the basic facts, concepts, principles and theories were derived from open access e-books on Open Library and articles in several open access journals. However, the examples illustrating the concepts and principles tended to be based on the American and British situations. Hence, case studies from India, Indonesia, China and Nigeria were identified and hyperlinked accordingly to provide learners with an Eastern perspective on curriculum development.

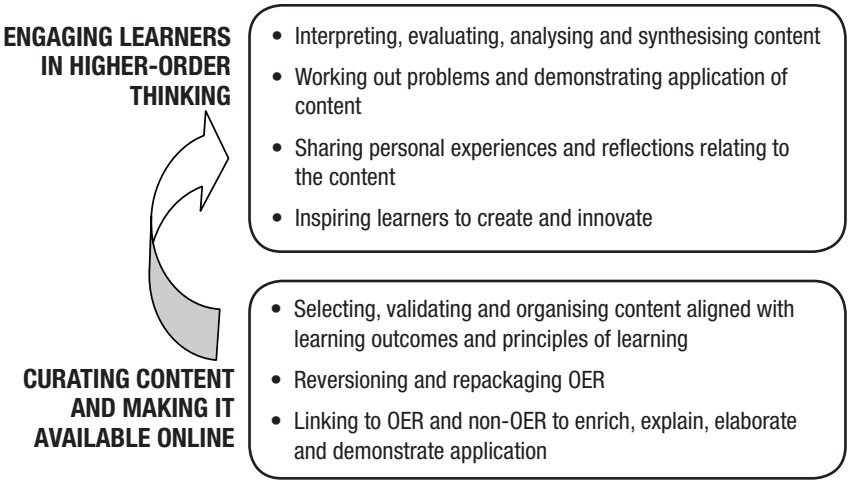
Online tests and exercises enable learners to test their understanding of the content and reinforce learning at strategic points in the SIM. Nearly all the subjects offered in the teacher education programme had links to online tests consisting of multiple-choice items, short-answer items, true-false items and so forth. However, many of these tended to be "non-OER" so permission was sought from publishers and their original form maintained. Fortunately, there is a growing number of sites offering online tests and exercises in teacher education that allow reversioning and customisation, such as those found at Curriki.org. In addition, students were directed to online dictionaries providing quick references to meanings of words, such as Dictionary.com and Merriam-Webster Online. Links were also established

to sites such as Answer.com and About.com Education, which enabled learners to gain a quick grasp of key ideas presented in precise and simple English.

The Shifting Role of Teachers and Learners

The increasing ubiquity and accessibility of OER and non-OER has challenged the spoon-feeding paradigm of learning in institutions of higher education. As shown in Figure 11.3, the teacher is no longer the sole purveyor of content, standing at the podium whilst learners diligently take down notes to be regurgitated later in an examination. The author, with over 20 years of teaching experience at several universities, sees his role shifting to that of a "content curator" or "content aggregator", sieving, sorting and vetting the vast amounts of OER and non-OER on the Web. The selected resources can then be presented in a meaningful and organised manner aligned with the learning outcomes to be achieved, and in ways that meet the learners' digital content needs, before the beginning of each semester.

Figure 11.3: The changing role of educators and learners in higher education



The SIM proves to be an effective way of organising and structuring content for a subject or course. Structuring and organising content is crucial in specifying the scope and depth of content to be studied in a semester or term. It has been the experience of the author that learners are often unsure about their ability to select and evaluate web materials, and prefer to rely on resources that have been given a seal of approval by experts in the subject area. Also, it is relatively easy for them to get lost in the Web, thus wasting valuable time engaging with resources that prove later to be irrelevant or unreliable. Providing learners with relevant learning materials and supporting resources frees up teachers to design appropriate learning experiences that make more productive use of the limited face-to-face interaction.

Teachers can now use the time to engage learners in higher-order thinking, focusing on analysing, evaluating and synthesising content; working out problems and demonstrating application of content; and sharing personal experiences and reflections (Phillips, 2006). Most importantly, teachers should inspire learners to create and innovate, which is the foremost goal of any higher education institution.

The old-fashioned method of broadcast learning will no longer be appropriate for tertiary-level students, who are required to be capable of multitasking and who have learned to cope with information overload (Tapscott, 2009). In the new style of learning, they will have at their disposal all the learning materials at the click of a mouse. Learners will construct information, do something with the resources, create something new — a solution, process or methodology. They will engage in higher-order thinking, collaboratively constructing knowledge, critically evaluating information, discovering things for themselves, and applying concepts and principles to new and unfamiliar situations that are analogous to what they would do in the real world after graduation.

Challenges

Web resources are increasing exponentially by the minute, and based on the author's experiences, using these materials for teaching and learning presents several challenges.

- First, there is the task of having to identify, sieve and authenticate their appropriateness for teaching and learning. It is a daunting task requiring dedicated subject-matter experts who are both "Internet savvy" and willing to spend time searching for such materials.
- Second, there is the monitoring of hyperlinks, as after a period of time some of them become "broken" for various reasons, such as the movement of web servers. Hence, it is the task of the subject-matter expert to promptly replace these "dead" links with equivalent alternative links.
- Third, there is the practice of hyperlinking, which is the very essence of the Web. If strict restrictions are imposed on hyperlinking, especially deep linking, the use of web resources for teaching and learning will be greatly curtailed. This is especially of concern to higher education institutions in less developed economies, where library services are lacking and subscription to online databases is prohibitively expensive.
- Fourth, there is the need for more flexible copyright terms and conditions when using non-OER, which currently tend to be rather restrictive, even for educational purposes. The Web contains many valuable non-OER on teacher education which could be reversioned and repackaged if copyright restrictions were less restrictive.
- Fifth, there is the paucity of web materials written by scholars and practitioners from Asian and African countries in the different fields of education, compared to materials available from the United States, Britain, Europe, Australia and New Zealand. There is an urgent need for open access

materials demonstrating the application of different educational principles in Asian and African settings, and making them available on the Web. Such materials would help educators bypass the long process of resource building and encourage institutions in the region to become producers and contributors to global knowledge.

- Finally, without doubt, the Web will grow as more material is uploaded and more people have not only access but faster access with high-speed broadband. The Web is like the vast universe with, as Carl Sagan might have put it, "billions and billions of webpages out there". This fact prompts the pressing need for more powerful and intelligent search engines that can delve into the depths of the Web to identify OER, as well as for search engines that are more intuitive, making it easier for learners to find what they are seeking.

Conclusion

The proposed framework guiding the use of OER and non-OER for teacher education programmes has proven to be useful. Methods developed by the School of Education and Cognitive Science at Asia e University have begun to be adopted by other schools and centres in the university. Initial efforts have been taken to use the framework for training academics in public and private Malaysian universities in the use of web resources for teaching and learning. Many of the teachers who initially were rather sceptical about web resources became convinced of their potential in teaching and learning. However, the framework will be modified as practitioners from the various disciplines provide feedback.

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Vignette

Teaching with Technology: A Personal Journey

Edward P. Rybicki

This is described as a personal journey because it was, by and large, a lonely one: the early 1990s were a largely technology-free teaching, and especially learning, environment at the University of Cape Town (UCT), and those of us interested in improving teaching by use of electronic media were few and far between. Indeed, the highest tech device one could reasonably aspire to employ as an instructor was a PC, which one could use either to generate slides for conventional projection, or — in lecture rooms or small groups and without the benefit of projection — to illustrate particular concepts and especially animations. Needless to say, very few of us in any one department were interested, and such development was very much a personal pursuit, done on one's own computer in isolation. Whilst electronic communication with the world was possible — UCT was wired for networking in the late 1980s, and we had had email, Telnet, FTP and Gopher contact with the world since then — there was no Web, and there were no student computer labs; thus, only we instructors had any routine access to whatever multimedia resources were available.

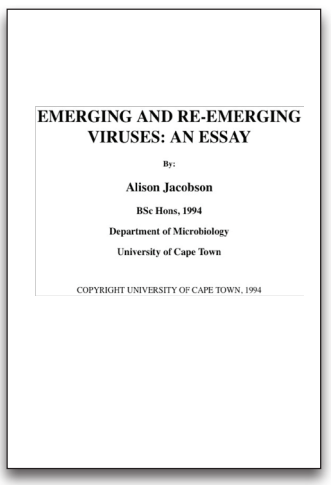
Lecture theatre PC from the 1990s: still locked in the corridor

By the mid-1990s, digital projectors had started to become available in South Africa — but definitely not as standard issue. I managed to prevail upon our department to buy a projection slate; this came with a special high-power overhead projector, which had to be carted along with a standard PC into the lecture theatre. That this was a difficult undertaking is illustrated by the fact that, when faced with having to lecture across the road from our building, I had to transport slate, projector, PC and screen with a large two-deck trolley to and from the other venue, every midday lecture, for a month. As a result, I was one of possibly two people amongst 14 staff who bothered at all.

Another technological development at the time was my discovery of multimedia development software: this was by way of a 3.5" disk stuck onto the cover of a British PC magazine sold at a discount store in Cape Town, which delivered a free demo version of a package called Illuminatus. This proved so easy to use, and gave such good results, that I bought the commercial version and started to play. I managed quite quickly to produce a four-disk multimedia presentation entitled

"An Electronic Introduction to Molecular Virology", and used it both for instruction in lectures and as a distributed learning tool for private student use. The university was actually reasonably facilitative about the adoption of multimedia for teaching/learning purposes: an informal grouping around the topic became the Multimedia Education Group (MMEG), headed after 1997 by Martin Hall — now a very web-savvy Vice-Chancellor at Salford University in the UK.

By 1994, however, something happened in the world outside UCT that profoundly influenced my personal future development as an electronic teacher. This was the advent of the World Wide Web. My departmental colleague and fellow PC geek Vernon Coyne pointed me towards the first browser — Cello, as I recall — that one could download via Gopher, to see the first (text-only!) webpages, and I was hooked for life. I immediately started transcribing my Illuminatus material into webpages using Windows' Notepad, and downloaded webpages to guide my HTML constructions. Pretty soon Mosaic came along, and one could embed images and even animated GIFs in the text — and I had to start developing my own (horrible!) illustrations. I began to use this material — which was far quicker and easier to develop than the multimedia offering and almost as good — for lectures, via HTML pages accessed directly on my PC using Mosaic, in the presumed absence of a local web server. The next development was that we then discovered accidentally, through connections in the university's IT services, that UCT did in fact have a web server — but that they were keeping it secret, for reasons that are obscure even now. Vernon and I managed to convince them to let us have some rights to upload material onto it, and my web teaching material found a home — followed soon by an embryonic departmental webpage. I also had my teaching material mirrored on the nascent Molecular Virology WWW server at the University of Wisconsin, courtesy of Stephan Spencer, because access to our site from outside South Africa was so slow. And I was able to significantly enhance my material with stunning colour 3-D virus particle reconstructions from X-ray data, provided by Jean-Yves Sgro of Wisconsin.


EMERGING AND RE-EMERGING VIRUSES: AN ESSAY

By:

Alison Jacobson

BSc Hons, 1994

Department of Microbiology

University of Cape Town

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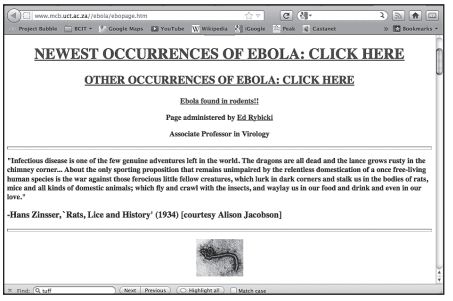
Another world development that profoundly influenced me had nothing to do with electronics or multimedia: this was the Kikwit Ebola outbreak in 1995, which very quickly became the first epidemic on Earth to be first made public, and then covered as it unfolded, by email and web postings. I was very well placed to cash in on this, given that an honours student in my lab in 1994 — Alison Jacobson, who had the only Led Zeppelin labcoat I have ever seen — had just written a very good essay on "Emerging and Re-emerging Viruses" (www.mcb.uct.ac.za/ebola/ebolaess.html), concentrating on haemorrhagic fever viruses (HFVs) and on Ebola virus in particular, and I had just HTMLised it and put it up on the Web. In a very short time, that essay became the single

most downloaded resource on our university server, as it was one of the only web-accessible sources of information on this topic in the world at the time, and was more current than the other offerings. As a result of the almost overwhelming interest — we were regularly fielding phone calls from U.S. newspapers asking for "Dr." Jacobson — and because one of the only other electronic sources of information on the outbreak was the then-new ProMED Mail, I started an Ebola information page, which survives to this day (www.mcb.uct.ac.za//ebola/ebopage.htm).



The page was basically an aggregator of all the material I could dredge up on a daily basis from the World Health Organization, the Centers for Disease Control and Prevention, ProMED, and newspapers and magazines, at first relevant only to the Kikwit outbreak, but later to Ebola and other HFVs in general as the outbreak died away. It attracted a lot of attention as a primary information source, helped by its being highlighted in *New Scientist*'s Netropolitan column, and is still listed in many places as such. I commented in late 1995 on the aftermath of the web frenzy, in an essay I wrote for a UCT alumnus publication, also HTMLised for my site, entitled: "The Student, the Web and the Ebola Connection, or: 'Dr Jacobson, are you going to Kikwit?'" (www.mcb.uct.ac.za/Staff/Ed/Ebola/ebolali.html), where I wrote the following:

> The whole phenomenon has been an object exercise in the power of the Web as a tool for the wide dissemination of information: we reached not only professional virologists, but also healthcare professionals, and — most importantly — the lay public on a large scale. Dr FA Murphy of the Veterinary Faculty at U California Davis — speaking on emerging diseases at the recent Vth International ICVO Virology Congress in Midrand — used slides of our site and of the David Ornstein site in the US as examples of how archives on the Web and on the Internet run by non-specialist and/or non-medical people could be invaluable means of quickly and widely disseminating important information to a lay public.

I was sufficiently impressed by the whole exercise that I wrote an essay entitled "The Internet as an Educational Tool: Making the Web Work for South Africa" (www.mcb.uct.ac.za/Staff/Ed/educwww.html), for a then print (!) and now electronic magazine called *OnTheInternet* (www.isoc.org/oti), published by the Internet Society. Therein I made this brave comment:

> The fact that the tutorial and related material are on the Web means, of course, that they can be accessed from all over the country and in fact the world — and therein lies the value

> of what at first sight looks like a distinctly elitist mode of instruction: It means that any tertiary institution in the country that has Uninet [!] access could use this material as part of its teaching/tutorial curriculum.

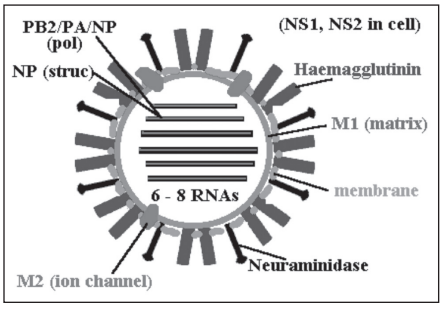
Revolutionary stuff, back there in 1995 — because whilst we lecturers had Internet and now web access, our students (at least at UCT) did not. This meant that whilst I could use my Web and sometimes my multimedia material for lecturing purposes, only students who had their own PCs at home could access it — unless they were outside the country, which I discovered as a number of people from places as diverse as Monash University in Melbourne, and the Federal Universities of São Paulo and Brasilia in Brazil, contacted me to ask whether they could use the resource. Accordingly, for a number of years I used what was effectively the external market to keep up my development of something our own undergraduate students could not access. Post-graduates were a different case, however, and for them I initiated an internal network resource consisting of molecular biology and other methods culled from all over — some of which still survive in the Bionet environment, as the resource did not survive the decentralisation of our network — and Windows 98! I also created a set of pages which is still extant, based on my techniques teaching to our Honours degree class (www.mcb.uct.ac.za/Manual/molbiol_manual.htm); I found, to my surprise, that this has attracted a number of citations, making it a primary information resource and something worth claiming as a publication!

Another important lesson in the years that followed the Ebola episode was the rise and rise of what I can only term pernicious misinformation, first about HIV and AIDS, and second about genetically modified organisms (GMOs), misinformation now also propagated via the rapidly ramifying Web. The deep and very negative societal impact of HIV/AIDS denialism at the highest levels of the South African government has been extensively covered elsewhere, and I will not go into it here. What may not be appreciated, however, is that there was an educational impact too: I found the classes to whom I taught virology suddenly became polarised on the subject, according to which information sources they chose to believe — and distressingly, this was often along racial lines. Accordingly, I set up a now very dated information page on HIV/AIDS (www.mcb.uct.ac.za/HIVAIDS.HTM), as the most authoritative statement I could make from my vantage as a University of Cape Town academic, to inform the general student body as well as an increasingly web-aware lay public of the truth around the virus and the disease. I followed this with another page, written with Jennifer Thomson, on "The Genetically Modified Foods Debate in South Africa" (www.mcb.uct.ac.za/gmos.htm), to counter an increasingly vociferous and highly ignorant anti-GMO lobby emerging in the country.

The Ebola experience and the misinformation-debunking exercises were very important lessons for me, and spurred my early and independent involvement in what has become the "open educational

resources movement". The fact that so many ordinary people would access factual information compiled and edited by a scientist was revelatory, and gave me a lot of hope for the success of my admittedly less exciting teaching material. Which, of course, I spiced up by including Ebola and its cousins at every opportunity... .

As an unintended consequence of incrementally increasing my teaching resources, I had created something that was open access — and in the absence of any reliable passwording utility, I realised that my material was well and truly in the public domain. I also realised that I could therefore not use proprietary images or other material without breaching all sorts of copyright. Accordingly, and because my own illustrations were really very primitive and demonstrated my severe artistic deficits, I began to explore the possibility of obtaining material from others.



One of my first collaborators in 1998 was Linda Stannard, of what was then the Department of Medical Microbiology at UCT: she had her own web teaching pages on virus structure and electron microscopy, but kindly provided micrographs of T-even phages, from which I fashioned my own animation of the infection of a bacterial cell — still the only one I know of made from real images (see www.mcb.uct.ac.za/tutorial/Bacterial%20Cell%20Entry_files/phage.gif) — and also a general diagram illustrating the process of infection, which I was able to use to construct several other infection process animations (see, e.g., www.mcb.uct.ac.za//tutorial/dsdnarep2.gif). A short while later I found Russell Kightley, of Russell Kightley Media in Canberra, Australia (www.rkm.com.au). Russell had done some HIV illustrations that I thought were brilliant; he was quite receptive to my using them — and we started an association that continues today, with him having me assess his images of viruses and viral infection for their scientific rigour, and me using cut-down versions of these images on my teaching site. To say that this has enriched my material would be to severely understate the case — thanks, Russell!

Another and surprising source of quality images for web teaching use has been the Nature Publishing Group (NPG) site (www.nature.com). It turns out that reuse of published imagery from their stable of publications in teaching websites is very quick and easy to arrange, via the web version of each specific paper, and is free — provided proper acknowledgement is given. This is regrettably not the case for many other publishers, and NPG should receive kudos for what is an enlightened policy. So too should open access publishers such as PLoS (www.plos.org) and Biomed Central (www.biomedcentral.com), where Creative Commons licenses for reuse seem to be the norm.

Whilst I have concentrated on my use of the Web for teaching, as I have concentrated much of my effort there over some 17 years,

I need to also make some more mention of multimedia. Whilst I discontinued my own use of proprietary software some years ago — Illuminatus sadly went defunct, the UCT initiative ran out of steam, and I ran out of time — I found that Microsoft's PowerPoint was a surprisingly effective tool for creating quite sophisticated presentations, which included complex animations constructed within the programme, as well as embedded video and sound clips.

Which pretty much brings me up to the present — where the glamour of Web 2.0 applications and mobile devices and social media are increasingly diverting us from the fact that even creations as fundamentally cool as Apple's iPad need *content* if they are to function in the teaching and learning arena. I have begun to explore this new territory for my own purposes — and here I must acknowledge my guru in these matters, the redoubtable Alan J. Cann of Leicester University in the UK. Whilst I think I may have beaten him onto the Web for teaching virology, he quickly outstripped me in both the amount and sophistication of his material — and then went on to pioneer podcasting and videocasting, and the use of social media for teaching and the dissemination of media. However, possibly the most important thing he did for me (apart from helping convince me to switch to Apple products) was to introduce me to blogging as a means of keeping students and the public up to speed with modern virology.

After dipping my toes in the water by contributing fairly regularly to Alan's MicrobiologyBytes site (now at www.microbiologybytes.com/blog), I have had a dedicated virology teaching blog (ViroBlogy: http://rybicki.wordpress.com) since November 2007. I have racked up 212 posts, with some 110,000 all-time page hits, on topics that my tag cloud tells me are as diverse as virus evolution, influenza, HIV, vaccines, Ebola (of course), Mimivirus and Megavirus, and rolling circle replication. I have induced students to read it regularly by threatening them with examination questions based on unspecified posts; a colleague in Saudi Arabia has made it compulsory reading for her students — and the general public keeps running across it every day, as they search for, according to today's access records, "megavirus chilensis, ebola, prion disease oral, how did viruses evolve, mimivirus". A new adventure as of February 2012 is use of a news aggregator site — Virology News (www.scoop.it/t/virology-news) — to do daily posts on general news concerning viruses, which feeds into ViroBlogy and also a regular Twitter update.

The path is still a rather lonely one, as no one else in my department shares my interest in providing original teaching and learning material, for free, on the Internet. However, and to my pleasant surprise, an entire community of like-minded souls in the university seems to have discovered me — and I have been enriched thereby (OER UCT; see www.cet.uct.ac.za/oer). Thank you, the Open Educational Resources project in the Centre for Educational Technology at UCT: we will be working further together!

Vignette

OER and Teaching Occupational and Environmental Health at the Post-Graduate Level to Medical Practitioners at the University of Cape Town

Jonathan E. Myers

Background Information

I happened onto the area of open educational resources (OER), in their electronic manifestation, by chance, as convenor for a post-graduate diploma in occupational health (DOH) aimed at industrial medical practitioners. The diploma was structured as an eight-week, block-release, face-to-face programme over two years. Students were widely distributed throughout South Africa and elsewhere in Africa, especially in remote rural or mining areas.

Being early adopters of technology and aware at the time of other Internet-based, distance, master's-level courses in Canada and the UK, my colleagues and I were keen to develop a locally relevant course. Teaching staff at our university felt somewhat dissatisfied with the duration and quality of contact with DOH students, and were keen to develop educational materials and a programme structure that could reach students further afield and offer them high-quality learning resources, increasingly available on the Internet. We wanted to take advantage of this wealth of information and share it with the students through our programme, as well as making our own materials more relevant, dynamic and available to others running similar programmes.

Our DOH was one of a few local courses on offer, and we were involved in regional southern African programmes, notably the U.S. Fogarty International Center NIH research training programmes in Environmental and Occupational Health (ITREOH) and the capacity development programmes of the Swedish International Development Agency's Work and Health in Southern Africa (WAHSA), which were potential vehicles for channeling OERs in occupational and environmental health. I was able to raise a grant via the Fogarty programme in 2003 and spent a sabbatical year (2003–2004) preparing course materials for a reconstituted DOH. Eight OER modules were developed and implemented. Substantial inter-block work was added to the contact activities.

From 2005, the DOH was restructured into three block-release, contact weeks with daily Internet activity over the full two-year period, without

breaks. A fourth and final contact week was reserved for examinations. The new programme ran for three two-year cycles. Reviews were undertaken at the end of each contact block and at the end of the two-year cycle, along with external examiner evaluation. In 2011, the programme reverted to a block-release, contact format. The OER materials continued to be used.

Processes, Methods and Experiences

Commencing the process of developing electronic materials was difficult, in that it depended upon the individual enthusiasm of a single person, and support for the development from the university's information and communication technology (ICT) department was minimal. A fairly generous grant was raised from the Fogarty NIH programme. A retired university professor with a strong background in computer-based learning was hired to render the teaching materials into suitable electronic format. Teaching staff supplied educational materials in a mixture of Microsoft Word documents and PowerPoint presentation files, along with photographic materials. The university in these early days had very limited experience of eLearning and little expertise supporting its development. The WebCT teaching platform was then in use.

Given the limited bandwidth available in South Africa, it was decided to put as much material as possible onto disk so that students would have easy access to large files. It was also decided to avoid synchronous tools and to focus on a combination of teacher-chaired, asynchronous discussion fora and email communication. Disk materials required repeated updating.

User-unfriendly and increasingly expensive WebCT was a steep learning curve for teachers and students, and was mercifully replaced by the user-friendly and well-supported Vula teaching platform when UCT joined the open source SAKAI network in 2005.

The body of the learning material was derived from the previous contact course and systematically adapted for electronic format by the computer-based learning expert. Materials were rendered in webpage format with hyperlinks to deeper levels of engagement with resource materials. This allowed different levels of use, beginning with more superficial readings by classes of up to 20 post-graduate diploma students and permitting use at greater depth by between two and four trainee occupational medicine specialists (registrars) who, although fewer in number, required greater depth and breadth of knowledge.

At first our main U.S. academic institution counterpart — the University of Michigan — where the principal investigator of the ITREOH grant resided, did not want any involvement in the production of materials as OERs, or in agreements concluded between our university and other local and regional universities in South and Southern Africa,

anticipating intellectual property (IP) difficulties. The University of Cape Town concluded fairly cumbersome agreements with these institutions, allowing for use and modification of materials.

From 2009 onwards we became involved in accelerated OER developments at UCT and in Africa, led, interestingly enough, by the same University of Michigan. With greater institutional support at UCT for OER materials development, we embarked on the process of rendering our materials suitable for placement on the open content pages of the UCT website. At this point we became aware that many of the materials we had inserted into our course disks had to be removed or replaced with hyperlinks which the students needed to access for themselves — and with greater difficulty, given bandwidth constraints — in order to obtain IP-compliant materials. This was a time-consuming task and progress was slow.

Updating materials on disk and changing defunct hyperlinks required constant vigilance and effort. Feedback received from students was an important trigger for these changes. Rewriting webpages, done mainly by one person (myself), was time-consuming, unremunerated work, due to the absence of a specific budget. Residual connectivity problems with students in other African countries were persistent.

Enthusiasm for the new mode of teaching was not universal amongst teachers. Student calibre varied from intake to intake. During the ensuing two-year cycles we experienced variable engagement as the law of thirds applied, with the top third actively contributing, the middle third passively lurking, and the bottom third never engaging. Much administrative cajoling was necessary, based on electronic performance tracking to pinpoint problems with both teachers and students. Some of the teaching staff were not motivated, and forum discussions for their topics did not materialise in a timely manner or at all, and were deemed unsatisfactory.

There was no dramatic improvement in student catchment area, enrolment numbers or quality and performance.

Workload increased substantially for staff, with many more administrative demands to keep up participation levels. The amount of material provided expanded exponentially in breadth and depth, and students had difficulty absorbing it, despite its design being aimed to facilitate a less detailed first-level reading, with optional links to deeper and more varied materials. There was a sense, particularly amongst the specialist trainee students, that the materials they were required to master were unbounded. For busy staff at a South African research university, the extra administrative teaching burden involved with daily online interactions compared with limited, compact, week-long block teaching proved insupportable and unpopular.

Modular learning materials were used as stand-alone courses or as components of programmes within and outside the academic

environment. Examples include the Master of Public Health (MPH) programme at the University of KwaZulu Natal, the MPH in Occupational Hygiene at Witwatersrand University, materials for factory and agricultural inspectors in the Department of Labour, and for mine inspectors in the Department of Minerals and Energy, along with diploma- and master's-level course materials for pesticide regulators, being developed in our own department for the Food and Agricultural Organisation.

Take-up in other Southern African countries was disappointing due to the absence of a local critical mass of occupational medical specialist personnel, and hence academic training programmes which could house, modify and deliver the materials.

Attempts were made to translate the materials into Spanish for use in Latin America through the Fogarty network, but these came to nought.

Experience with these OERs led us to a serious but failed attempt in 2009 at globalising the materials as part of our proposal for constructing an open learning repository for occupational health, based at the occupational health network of the World Health Organisation (WHO). A traffic jam of agendas in the network resulted in an expensive, unwieldy funding proposal combining three elements: OERs, occupational health consulting services and a formal training course in occupational health for nurses and others.

At home, we ran into problems of a quasi-legal nature which hinged on government and institutional educational policy. The first was the level of our DOH qualification. Our external examiners habitually commented that the level of our online programme was too high for a post-graduate diploma, and that it was at the master's level. Permissible educational formats at the time doubly excluded a positive outcome. Firstly, there was a monopoly on distance education and only one university was authorised to provide it, not ours. Secondly, the South African higher educational quality framework was seriously outmoded and rigid, disallowing any master's-level qualification which lacked a single unitary dissertation component constituting at minimum one third of the required credits. The second restriction appears currently to be on the brink of being relaxed, after many years of damage to the development of modern post-graduate programmes which aim to enskill professionals at high levels, rather than restrict post-graduate programmes by insistence on substantial dissertation requirements. Professional development is not necessarily served by training researchers.

Had we been allowed to provide a professional master's programme free of dissertation constraints, there would have been a larger market for our educational wares. Instead, we ended up offering an inappropriately deep and broad educational experience, drawing considerably greater input and work from staff and students, for our post-graduate diploma candidates who simply wanted diploma-level certification to practice their professions legally. The level of materials was only suitable for

the very few trainee occupational medicine specialists, but they did not need the formal qualification as they were enrolled in a Master of Medicine programme. The advent of a professional master's could open up a market for our OER programme recast as a professional master's. However, it would need to be hybrid and not a fully online distance course. An OER online professional master's, had it been allowed, would have worked well and would have responded to the substantial need for high-level enskillment for different categories of medical and non-medical occupational health practitioners and managers, especially in Africa and other parts of the developing world.

Nevertheless, a useful collection of locally and regionally relevant materials were assembled. At the time of writing (2012), our learning materials have been mostly made available as OER resources under non-restrictive Creative Commons licenses, and placed on the UCT open content pages (http://opencontent.uct.ac.za), where they cohabit with other OERs, and will hopefully contribute to the ultimate development of an open learning repository at our university. The materials are still being used in the DOH, which has reverted to the block-release, contact model. Modules available on UCT OpenContent cover occupational hygiene, occupational epidemiology and biostatistics, and occupational medicine and toxicology.

What Lessons Were Learned ?

eLearning methods for materials delivery and hybrid distance and contact learning were not particularly effective for students, nor were they more efficient for teachers. Whilst this dampened our OER enthusiasm, it did result in some local materials that added to the inventory of OERs for use in this course as well as other related ones. The target market for occupational and environmental health is complex, and at least three separate educational qualification vehicles are required to improve knowledge and professional practice in these fields. Current developments in the higher education framework of the South African national Department of Education seem likely, in the near future, to allow for a professional master's programme which would be better suited to the use of OERs, especially at distance.

A one-stop shop for OERs is not possible, given IP considerations, which limit access to licensed materials. An irreducible body of work will be required to manage IP considerations into the future, which will hopefully decline in size and weight as more and more educational institutions set up open learning repositories and make their materials available under Creative Commons licenses that allow modification and sharing.

As Internet use and bandwidth increase in the developing world, and as open learning repositories develop globally, OERs will increase their reach and usefulness, might benefit teachers more without overburdening them, and will provide greater access to students in

locations that have hitherto been isolated from the Internet. Improved connectivity and Internet access will facilitate learning from others, especially the experience of other students and staff in locations at similar levels of development, and should allow greater flexibility with fewer fixed time commitments compared with contact courses. Synchronous communication will become increasingly possible.

There should be better and more adequate resourcing for academic convenors and course administrators to ensure that online programmes run more smoothly and with better maintenance of their OERs, building and maintaining an *esprit de corps* for the programme cohort. This will go a long way towards enhancing levels of engagement and reducing the effect of procrastination on the part of students and teachers in their online communication, which tends to disrupt and diffuse the learning experience in comparison with the much more intense and concentrated contact learning experience.

Conclusion

Whilst there were some positive achievements, the overall result of our experience was a reversion to the full face-to-face contact teaching mode for this particular programme, albeit with better OER materials that are undoubtedly better for learning than bulleted lists prodding the teacher's memory. The trend is in favour of easier production by teaching staff of web-ready teaching materials whilst older staff who struggle with the new information and communication technology retire. With careful thought about the target student market and needs in particular settings, OERs developed thus far could be revisited, should truly distance, Internet-based programmes be allowed, with post-graduate enskillment via professional master's degrees now imminent at South African institutions of higher learning.

Despite our somewhat negative experience, it is clear that OERs are the way of the future. However, their development awaits a reconfigured environment where universities increasingly turn to producing their teaching materials as OERs, whilst relying on their reputations rather than their content materials for sustainability and profit. Whilst such developments are increasingly emerging globally, South African universities, along with Internet connectivity in South Africa and elsewhere in Africa, are not there yet. This vignette is an example of the teething problems of an OER system and its architecture, located in a less developed setting with its attendant resource constraints.

An important battle is about to be won in getting a professional master's degree recognised as a legitimate qualification in the national framework. The next step is to remove the monopoly on distance education — required by the national Department of Education — held by only two institutions of higher learning in South Africa. After all, distance education is an increasingly important component of learning for teachers, students and autodidacts. It should not be restricted.

CHAPTER 12

Sharing Existing Teaching Materials as OER: Key Considerations from Practice

Monica Mawoyo and Neil Butcher

Abstract

Sharing of higher education teaching materials under open licenses is a growing global practice. Several models of adapting and sharing existing materials include: institutionally-driven initiatives that result in materials being shared, mostly through repositories; cascade models that have a strong mentoring component; use of network repositories; and conversion of commercial teaching resources for sharing as open educational resources (OER). The processes followed in these models are similar in many respects. They typically include authoring of teaching resources for classroom teaching, making the decision to share resources openly, adapting resources for open sharing (which includes copyright audits), replacing copyrighted content with OER, seeking permissions to reproduce content, HTML authoring, packaging materials, quality assurance, and sharing OER by hosting them on multiple platforms. The case studies presented in this chapter, drawn from OER initiatives in Africa, the UK and the USA, introduce an empirically informed discussion of varied methodologies of producing and sharing existing teaching materials. Particularly, the case studies point out the technical, pedagogical and legal considerations that should guide OER production and sharing. The chapter highlights that both minimalist and well-resourced and supported approaches provide opportunities for improved access to quality teaching materials in under-resourced contexts. Importantly, early adopters of OER in higher education are developing practice models and frameworks that will make it easier for those who adopt open sharing practices in the future.

Keywords: *copyright clearance, licensing, OER hosting, packaging, sharing content, sourcing content*

Introduction

Open sharing of higher education teaching materials has grown exponentially since early open courseware initiatives from the Massachusetts Institute of Technology (MIT) and the Johns Hopkins School of Public Health (JHSPH). Before existing materials can be shared as open educational resources (OER), significant reworking must occur to prepare them for public dissemination.

Using eight case studies that were compiled through face-to-face, email and telephone interviews, and from information in reports and guides on selected projects in Ghana,[1] South Africa,[2] the United Kingdom[3] and the United States of America,[4] described below, this chapter presents an overview of the processes informing preparation of existing teaching materials for release as OER.[5] The cases are used to elaborate concrete examples of practice. Purposive sampling (Cohen, Manion, & Morisson, 2007) was used to select the cases, in order to highlight practices in different regions. These cases do not, however, consider models that involve development of new materials or adaptation of existing materials to create new resources. They focus exclusively on the processes surrounding release of existing materials under open licenses. This has been a problem that most universities interested in harnessing OER have had to confront at some point, so it is hoped that the emerging lessons might be of value to those wishing to share materials with others.

The chapter first presents a brief description of the selected initiatives, locating them within typologies of practice that outline their distinctions. Pertinent issues on technical, legal and pedagogical aspects for consideration in the sharing of teaching materials as OER are then discussed. The chapter concludes by presenting a dual model of OER sharing, based on ideal and acceptable practice.

Models of Practice in Converting Teaching Materials to OER

Three approaches that distinguish various methods of converting teaching materials into OER in higher education have been generated from the case studies: institutional, network repositories and conversion of commercially published resources. These approaches are not "ideal" types, as their characteristics are derived empirically, rather than from some known criteria of "best practice". Further, the types are not mutually exclusive, although their differences provide sufficient justification for mapping different practices that illustrate options for preparing teaching materials for sharing.

Institutional Projects

Institutional projects comprise three variations:

1. Institution-wide projects, involving all schools and departments, with a unit acting as a conduit to support OER activities, and hosting materials on an institutional repository.
2. Mentorship-based projects, where an institution with an established OER repository cascades its own experience to support and mentor other

institutions wanting to develop their own OER and establish an institutional repository.

3. Discrete projects that are faculty or departmentally driven.

A good example of an institution-wide project is the University of Michigan (U-M) OER initiative, Open.Michigan (http://open.umich.edu), the objective of which is to create and share teaching resources and research from the university. Open.Michigan (OM) is driven by a team of education specialists, software developers, dScribes (staff and students who engage in OER production), and publication and copyright experts. It facilitates a vibrant community of over 350 educational content producers, OER advocates and a diverse student body, all dedicated to building a culture of sharing knowledge at the university. The initiative has produced OER in 180 courses, and materials constituting over 1,412 resources from 13 U-M schools and colleges. A major contribution of the OM initiative to the OER community is the development and refinement of the distributed OER production process called "dScribe", which is elaborated upon later in the chapter.

Likewise, the University of Nottingham's OER resources, which include full credit-based modules and shorter stand-alone teaching resources, are hosted on the U-Now OER repository (http://unow.nottingham.ac.uk). U-Now was instituted in 2007 under the university's eLearning strategy. Activities to enable it are funded by the university and driven by the Information Services Learning Technology Unit. U-Now is part of Open Nottingham, which focuses on production and publication of OER and encourages use of OER in the university. The growing significance of OER at Nottingham is evident from its inclusion in the university's five-year strategic plan for 2010–2015.[6]

Although the university is the sole funder of U-Now, in 2009 and 2010, the Higher Education Academy (HEA) and the Joint Information Systems Committee (JISC) funded the Building Exchanges for Research and Learning in Nottingham (BERLiN) project within U-Now. BERLiN provided an opportunity to employ full-time staff to work on OER development and related activities and to involve more faculty members. This led to the collective production of material equivalent to 360 credits for the funded period, as well as investigation and documentation of issues faced by higher education institutions during the process (Beggan, Johnson, Horton, & Stapleton, 2010). It also gave the university a chance to consolidate multiple and disconnected pockets of OER within the university, making U-Now the institutional repository. Independently, the BERLiN project was able to publish 22 modules. During 2011, publication of resources has continued to be supported by faculty under the Open Nottingham project, with over 1,100 credits now available in U-Now and with 70 per cent of schools engaged in open publication.

Another example of an institution-wide initiative, with a mentorship dimension, is the University of Bath and University of Derby OER initiatives. These were implemented under the guidance of the University of Leicester, which had acquired OER development experience through its Open, Transferable, Technology-enabled Educational Resources (OTTER) project. Before OTTER, Leicester already had a well-established tradition of sharing content freely, dating back to 1993, but these efforts were fragmented. OTTER enabled the university to consolidate these and host them in a single institutional repository. Systemic processes for production, publication and updating of OERs were also developed.[7]

The OTTER project was supposed to produce 360 credits' worth of teaching resources and was able to exceed this funding requirement, producing 438 credits' worth of teaching materials (Witthaus and Armellini, 2010).

Following the success of OTTER, the University of Leicester team received additional funding from the OTTER funders, JISC and HEA, to cascade and transfer the outcomes of the OTTER project to the Universities of Derby and Bath. The subsequent project, OER Sustainability through Teaching and Research Innovation: Cascading across HEIs (OSTRICH), entailed Leicester providing leadership and direction to the other two universities, and sharing templates[8] used in OTTER. Besides the release of materials worth 210 credits and the current development of materials equivalent to another 85 credits, OSTRICH also modified the process workflow framework developed for OTTER. Further, a useful guide on "scaffolding"[9] other OER project teams through OER adoption and implementation has been developed (Witthaus, Armellini, Gagen, & Jenkins, 2011), and provides a useful starting point for other institutions wanting to follow this mentorship model of materials conversion and open sharing.

As an example of a discrete project, since 2009, the University of Cape Town (UCT) Faculty of Health Sciences (FHS) has been running a pilot project on health OER development and use, funded by The William and Flora Hewlett Foundation, under a grant co-managed by OER Africa and University of Michigan. The Education Development Unit (EDU) in the FHS is responsible for co-ordinating this project, which involves solicitation of teaching materials from faculty, and assisting with relevant activities to prepare these resources for sharing as OER. To date, the initiative has completed nine OER and is working on ten more to be released in 2012. The health OER work is driven by a small team of OER champions, most of them employed on a part-time basis, who, in addition to running advocacy workshops, approach lecturers who have good teaching materials and encourage them to release these as OER.

In another example of a discrete initiative at UCT, the Centre for Higher Education and Development (CHED) Academic Development Unit (ADU) modified an existing booklet for first-year students and released it as an OER.[10] This guide had first been published in 1998 as a booklet for students and consisted of printed text bound together and handed out to students. A lecturer from CHED was responsible for rewriting the guide, with the assistance of other colleagues for translation. A graphic artist from the Centre for Educational Technology (CET) was responsible for illustrations, and CET technical staff took care of the packaging and web publishing of the resource.

Also initiated in 2009 as part of the same Hewlett Foundation grant funding for the UCT FHS health OER initiative, the University of Ghana (UG) College of Health Sciences (CHS) health OER initiative involves developing materials from scratch (see Chapter 4 by Omollo, Rahman and Yebuah), as well as converting existing teaching materials into OER. The latter are sourced from faculty, with the dedicated co-ordination of one of the lecturers who has also shared his teaching materials as OER. This lecturer works with a small team of three technologists, who assist with any technical conversions required on the materials before they are released. To date, ten teaching resources have been converted to OER and the team is working on seven more.

Network Repositories

MedEdPORTAL (www.mededportal.org), a programme of the Association of American Medical Colleges (AAMC) in partnership with the American Dental Education Association, is a good example of a network repository. MedEdPORTAL co-ordinates the sourcing, peer review and publishing of teaching resources and assessment tools in medicine and dental health education. Publication of teaching resources on MedEdPORTAL is recognised by institutions in the AAMC as constituting the required scholarship for promotion, especially since publication of materials is based on a formal peer-review process. MedEdPORTAL resources are used in over 190 countries globally, with weekly downloads of over 1,000 resources.[11] MedEdPORTAL has over 700 peer reviewers who are volunteers from faculty. Over 2,000 resources have been published on the portal since 2005.

Converting Commercial Publications to OER

Established in 1992, the South African Institute for Distance Education (Saide) plays an important role in supporting the development and use of OER through its OER Africa initiative (www.oerafrica.org/aboutoer/AboutUs/tabid/113/Default.aspx). Before the concept of OER came into existence, Saide had developed a comprehensive set of teacher education materials called the Study of Education Series. Keen to release these as OER, Saide transformed the resources, which were originally published by Oxford University Press, to produce and share openly:

- Five 200-page learning guides designed for independent study, downloadable either in sections, or as whole books.
- 39 edited readings to support the five modules, and full references for a further 23 which the original authors/publishers would not make available as OER.
- 29 audio clips of interviews and classroom events related to the themes in the modules.
- 23 video clips which bring to life issues and debates from the modules or show methodology in action in real classrooms. (Welch, 2011)

Saide had retained the copyright of the series but had granted Oxford University Press the exclusive right and license for publishing the material. After a few years, this right reverted to Saide for five of the seven resources. However, the publisher retained the rights over the resources' design, layout and typography. This meant that Saide had to redesign the resources. The process of releasing these materials as OER as the Saide Teacher Education Series injected new life into them by providing affordable access to teachers and students in higher education institutions.[12] At the time of this chapter's writing, Google Analytics showed that without any dedicated marketing, the resources in the Teacher Education Series had received over 84,000 views since being released in July 2010. In addition, four of the five OER learning guides are in use in BEd and Honours degrees at South African institutions — University of South Africa, University of the Witwatersrand, University of Pretoria and Nelson Mandela Metropolitan University. For example, in each of 2010 and 2011, the University of the Witwatersrand ordered 200 print-on-demand copies of the learning guide and readings for use by second-year students. Students use the website to access audio resources.

Except for the Saide initiative, the starting point for converting teaching materials into OER in the other initiatives has been that the materials were intended for use within the respective institutions, then made accessible for use by others elsewhere. That resources are actively used and considered good enough for fee-paying students in an institution gives some assurance of their quality for external users.

Summary

Table 12.1 highlights approaches to sharing and releasing content as OER that emerged from the case studies, together with the salient features of these approaches.

Table 12.1: Options for publishing teaching materials as OER

Model	Initiatives	Defining features
Institutional: institution-wide	• Open.Michigan • University of Nottingham	• Financial backing of institution, possibly supplemented by other sources of funding. • Scale of publications is achieved. • Central hosting of resources in institutional repository. • Involvement of various schools, which can be demanding on human resources. • Dedicated units to support initiative. • Suitable for consolidating fragmented initiatives.
Institutional: discrete	• UCT FHS health OER • UG CHS health OER • CHED student guide	• Specialised content focus is achieved. • Scale and output is usually limited. • Limited human capacity, as small team is driving the initiative. • Often donor-funded. • Can work with other institutional structures.
Institutional: mentorship	• OSTRICH	• Opportunity for replication of OER initiative using own experience to mitigate known limitations. • Resource output high because of cascade experience. • After initial mentoring period, initiatives in mentored institutions can be scaled up independently.
Network repository	• MedEdPORTAL	• Scale is large. • Specialised subject matter focus. • Support from network — volunteers in peer review.
Conversion of commercially published work	• Saide Teacher Education Series	• Easier when the authoring institution retains copyright. • Option for exploiting diminishing commercial value of resources.

Pertinent Issues on Sharing Teaching Materials as OER

As mentioned previously, for existing teaching materials to get to the point where they can be shared, reworking of material is essential. The technical, legal and pedagogical issues pertinent to the adaptation of teaching materials for sharing as OER are considered in this section.

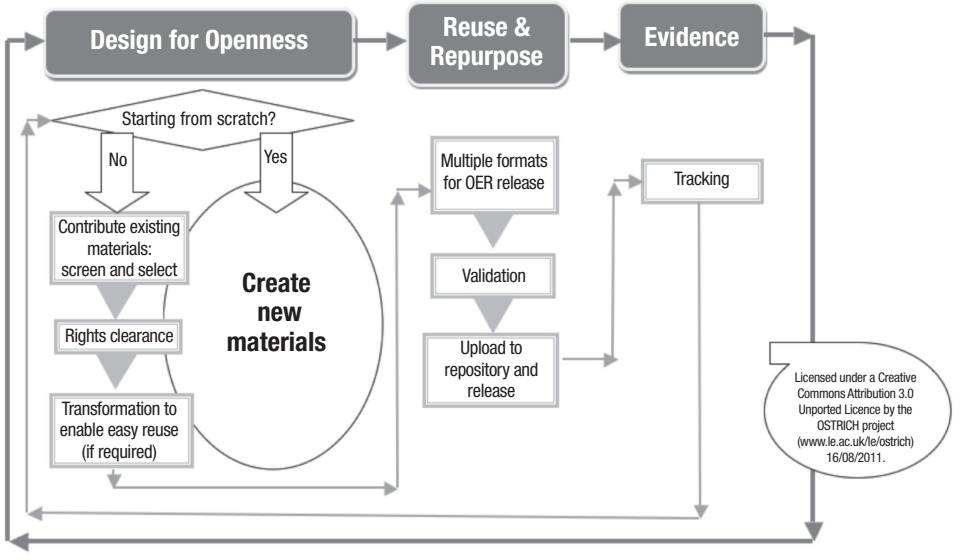
Technical Issues

The technical issues in preparing teaching materials for sharing as OER pertain to the processes involved and are based broadly on the production/workflow process, which includes initial authoring, HTML authoring, presentation and packaging, and hosting of resources.

Publishing Process

Except for the MedEdPORTAL model of publishing, the workflow processes for converting teaching materials as OER are similar across the initiatives explored for this chapter. The process begins with sourcing materials for conversion and ends with hosting of resources on repositories for open access. Although not all initiatives have an explicitly written workflow model, the OSTRICH Content, Openness, Reuse and Repurposing, Evidence (CORRE) 2.0 and the Open.Michigan dScribe processes mapped out in Figures 12.1 and 12.2 encapsulate the standard process implicit in all initiatives.

Figure 12.1: OSTRICH CORRE 2.0 OER publishing workflow process[13]

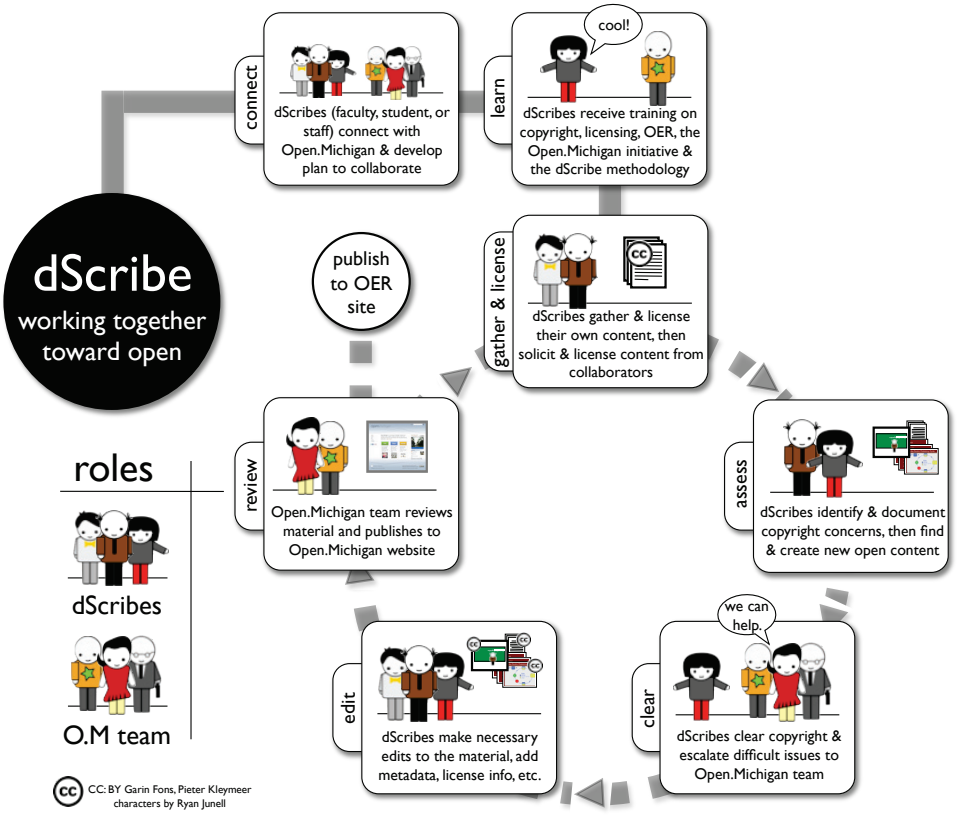


CORRE was first developed for the OTTER project and modified to version 2.0 for the OSTRICH project, to include processes of creating OER from scratch. Figure 12.1 shows that an important objective of sharing teaching resources as OER is reuse and repurposing by others. CORRE 2.0 uses this objective to inform the workflow process, as thinking about the end product and how best to share it shapes the authoring, licensing and packaging of the resources. Tracking use is

also important to evaluate whether materials are being used and to determine how they can be made more visible if download appears to be limited.

The CORRE workflow is process-oriented, in that it maps the key processes for converting teaching materials into OER. The U-M dScribe workflow is process- and role-oriented, as outlined in Figure 12.2. CORRE outlines the production process without specifying the implementers, but the dScribe process is explicit about who the role players are for each activity in the production process, and what their specific functions are.

Figure 12.2: Open.Michigan OER publishing workflow[14]



Whilst it follows the generic process of content gathering, copyright clearance, transformation of materials, review and publication, the dScribe process is quite unique in that existing student–lecturer relationships are maximised through collaboration in the OER production process, thereby including students in the production of the resources with which they will engage during their learning. The process also streamlines the Open.Michigan team's responsibilities, which, because of the involvement of dScribes, are reduced to support on any copyright challenges experienced by dScribes, quality assurance and publishing of resources. The Open.Michigan team makes use of OERca to complement the dScribe process. OERca is a content and decision management system that assists dScribes to track and manage the content clearance process, and to submit copyright clearance questions to the Open.Michigan team for review.

Training, which is embedded in the dScribe process, is integral to some of the other initiatives as well. In addition to dScribes training, Open.Michigan trains support staff to ensure a standard approach to OER development across schools and departments engaged in OER activities. MedEdPORTAL advocates training that is tailored to the needs of faculty, when they need it. Mentor training is effective, as authors who have published OER successfully can cascade skills to novices. The OSTRICH project included the Leicester team training content developers from Bath and Derby on content development issues. Training is useful for streamlining the process and can save production time if content developers know what is expected of them from the outset.

The explicitness of the CORRE 2.0 and dScribe workflow processes is useful in determining the level of input for emerging projects and in mapping out project management methodologies against identified processes. Of course, there are cost implications for each process model. The dScribe process could be a more cost-effective model, because making use of students as co-collaborators could reduce the cost of copyright clearance and sourcing OER to replace copyrighted materials. At the same time, student exposure to OER during the production process promotes their awareness and use of OER.

The OER production process for BERLiN, the UCT CHED student guide, UG CHS and the Saide Teacher Education Series resembles that of CORRE 2.0, whilst that at UCT FHS is modelled on the dScribe process. Post-graduate students play the dScribe role at UCT FHS. UG CHS is aware of the dScribe process but is not using it for converting teaching materials, as technical staff members are addressing copyright clearance matters.

The MedEdPORTAL workflow process is different in that completed resources are peer reviewed upon submission. When material is approved by the peer reviewers, MedEdPORTAL hosts it on the website. The peer reviewers provide recommendations to the author on how content can be improved, and authors likely use resources in their institution to effect changes for enhancing their work.

Authoring and Metadata Generation

In terms of authoring, faculty are typically responsible for the initial copy, which is usually handed over to technical teams for HTML authoring — this is the case with UCT FHS, UG CHS and Nottingham. The University of Nottingham has chosen a simple HTML editor, *ExE*, which enables non-technical developers to "build web ready learning resources relatively easily" and also facilitates "incorporation of multiple media types and the production of thematically linked resources" to enable lecturers to eventually author their own materials (Beggan et al., 2010). This takes the load off the technical support team significantly and also empowers lecturers.

Once authoring has been completed, materials need to be presented and packaged in a way that makes them accessible. Discoverability is an important aspect of accessibility. For a resource to be used by others to achieve the goal of sharing, it has to be discovered through search engines and the university repository. A key element of improving discoverability is the generation of metadata for a resource. Metadata are information describing the characteristics of a resource. Metadata can consist of the title of the resource, its author, what type of resource it is and an explanation of what the resource is about. These descriptions are used to create

metatags, which enable search engines to retrieve the resource when keywords are used to search for it.

Metadata generation practice varies with the different initiatives. The author of the current edition of the UCT CHED student guide did not generate metadata or package the guide, as these functions were handed over to another department in the university. At UG CHS, UCT FHS and MedEdPORTAL, metadata generation is the author's responsibility. For MedEdPORTAL, after the author's submission, MedEdPORTAL staff catalogues and formats the metadata for consistency. The University of Nottingham has a metadata and cataloguing team that generates metadata for resources. Saide metadata is developed by the librarian, technical experts and content experts. The Saide respondents reported that there are challenges with metadata generation if a resource is too large, so it typically has to be "chunked" into discrete parts. However, metadata for each part must provide the context for and links to the other parts to make learning more meaningful, otherwise chunking becomes a hindrance to learning if the different parts of a resource are disconnected and do not reflect a coherent learning pathway. At Open.Michigan, the publications manager, and in some instances any person who uploads content, assigns metadata.

Discoverability of resources can also be enhanced through the use of different filters. For example, the University of Nottingham's U-Now site has an advanced search facility that provides filters by author, faculty, school and media type.

Packaging Materials

Packaging of materials has implications for access to the resource. For most resources, packaging is a straightforward process which includes putting resources on the Web in various formats (for example, PDF, PowerPoint, Word or video). The Saide experience of repackaging existing multimedia-based materials for digital download within a context of changing technology provides important insights on how complicated the process can be. The Teacher Education Series comprises multiple video and audio files. When Saide started converting these resources to OER, the video and audio files were in old formats so the technical expert at Saide had to find a media house with facilities to convert VHS tape to DVD and then to a format that could be used on a website. The same process was followed for audio files — the original cassettes had to be converted to CD. Added to the struggle between old and new formats was how to keep sense and maintain coherence after a change in format. Some of the larger files were chunked into topics as discrete, stand-alone resources. In the case of video, this necessitated creation of stills to contextualise the video if it had been chunked.

The studied initiatives also highlight necessary considerations regarding file size in resource packaging. Saide's file size restriction on the Teacher Education Series resources was 15 megabytes or lower, and MedEdPORTAL has an upload restriction of 500 megabytes. For files over 500 megabytes, MedEdPORTAL saves the resource to CD or DVD and posts it to the requestor anywhere around the world within a week of the request. Saide also provides an option to send materials to users upon request.

In consideration of those with connectivity and bandwidth challenges, UCT FHS provides its materials in low and high definition. File formats include PDF and Word so that the material is easily available for adaptation and reuse. The CHED

student guide project shows that using graphics takes up less file space than using photographs. The materials should also be packaged in such a way that they can be accessed online and downloaded in whatever format the user wants. At UG CHS, materials are packaged on CD and distributed to students for use.

Resource Hosting

Release of OER involves hosting resources on local servers and institutional repositories. Table 12.2 shows locations of resources for the initiatives that were studied.

Table 12.2: Hosting of OER

Initiative	Location of completed OER
UCT FHS	• Faculty website: www.healthedu.uct.ac.za/workareas/healthoer (links to UCT OpenContent directory) • UCT OpenContent directory: http://opencontent.uct.ac.za • Vula site: https://vula.uct.ac.za/portal (where resources can be accessed by students as part of learning materials if being used for teaching) • OER Africa's African Health OER Network website: www.oerafrica.org/healthoer/FindOER/tabid/1862/Default.aspx • The University of Michigan Open.Michigan site: http://open.umich.edu/education/med/oernetwork
UCT CHED student guide	• UCT OpenContent directory: http://opencontent.uct.ac.za/Health-Sciences
UG CHS	• Distributed to students on CD • Hosted on a local area network server for the CHS • Hosted on the African Health Network • Hosted on the Open.Michigan site
OSTRICH	• Project repository: http://ostrich.bath.ac.uk • Jorum: http://jorum.ac.uk
Open.Michigan	• Available at Open.Michigan site: http://open.umich.edu • Link available on OER Africa website
University of Nottingham	• Institutional repository: www.nottingham.ac.uk/open/opennottingham.aspx • Link to repository on OER Africa website • Jorum: http://jorum.ac.uk • MERLOT: www.merlot.org • RSS feed makes content available in: » Open CourseWare Consortium: www.ocwconsortium.org » Xpert: www.nottingham.ac.uk/xpert » OER Commons: www.oercommons.org » Folksemantic: www.folksemantic.com
MedEdPORTAL	• MedEdPORTAL website: www.mededportal.org
Saide	• OER Africa website

Table 12.2 shows that faculty-based projects have multiple dissemination avenues. This is likely to increase their discoverability and thereby share resources more meaningfully.

Legal Issues

There are two major legal concerns in the presentation of teaching resources for sharing as OER: copyright and licensing. The copyright clearance process is regarded as more demanding in terms of time input, and two approaches to copyright clearance stand out:

1. *Dedicated approach:* For example, at U-M, the Open.Michigan team has developed a casebook[15] of illustrative examples of content classified according to type, compiled from the U-M OER clearing process and review of U.S. copyright case law. Each example carries an explanation of why content is copyrighted and gives a recommendation on a course of action, including removing the content and searching for a replacement, or retaining and attributing the original source. The copyright clearance process is therefore quite broad, and considers retention and attribution as well as replacement of copyrighted content. For replacement of copyrighted materials, Open.Michigan has compiled a resource with sites that are useful for sourcing OER, ranging from images, audio/video, content, textbooks, clip art/icons and other OER.[16] Saide also has a dedicated approach, and employs an editor who checks materials for copyright and writes letters seeking permission to use copyrighted content in OER. UCT FHS works with lecturers initially to ask them about the copyrighted materials, then dScribes seek permission to use the content. MedEdPORTAL staff editors prepare a memo with all potential copyright violations and give authors options to address these.
2. *Conservative approach:* This is aimed at protecting the institution from risk associated with infringing copyright law. Examples of this include the following:
    a. The Universities of Nottingham and Leicester have taken the position that, if the image is not central to the pedagogic message, it is best to remove it. The two institutions report that rights clearance is very costly, given the time required, and takes up quite a significant portion of the budget. With the goal of removing or reducing this overhead, The University of Nottingham created the Xpert Attribution Tool, which helps users to find Creative Commons or public-domain images and automatically incorporate license information into the image. Routinely embedding open licenses simplifies OER development, removes barriers to repurposing and publishing OER, and substantially increases the usability and accessibility of course materials. The tool is available at www.nottingham.ac.uk/xpert/attribution.
    b. UG CHS and UCT in the CHED student guide have used graphic artists to draw images to convey the message. Graphic artists at UG sit with the lecturer to get a clear idea of the pedagogic message,

then draw an image to capture this. CHED did not have issues with copyright, as it was adapting a departmental resource and from the beginning decided to incorporate images to enhance the student resource. These images are available under a Creative Commons license and can be reused by other people if needed.

The OSTRICH and BERLiN projects have highlighted important key lessons about the complexity of the copyright clearance process:

- If authors have not accurately or fully attributed sources in the original teaching materials, which is often the case when the material is designed for private classroom use, it can be time-consuming to trace original content and check its copyright status.
- Whilst the option to use existing OER is attractive, there may be incompatibilities that prevent reuse. For example some available OER may be licensed under more restrictive terms (such as a non-derivative license) and cannot be used in materials that will be published under more open terms (such as a share-alike license).
- When asking for permissions, authors may come across cases where contracts with authors for commercial publishing have changed, and some resources have been used from other existing resources, so tracking the history of intellectual property rights becomes a long and complex undertaking, which delays completion of materials. Further, copyright owners may not respond to requests, or there may be duration-of-use clauses which affect reuse (University of Bath, 2011; Beggan et al., 2010).

In all the case studies, work shared as OER is licensed using conditions from the six Creative Commons (CC) licenses (http://creativecommons.org/licenses). Each licensing condition enables authors to choose the use terms that they want to impose on their work. Almost all institutional initiatives amongst the cases, with the exception of Nottingham, allow authors to choose their own license. However, U-M does not accept non-derivative licenses, which restrict reuse in that the materials cannot be adapted. For the OTTER project, the University of Leicester also only allowed licenses that permit free reuse and repurposing. All resources on U-Now are licensed as CC Attribution-NonCommercial-ShareAlike (CC BY-NC-SA); authors are not able to choose other options. MedEdPORTAL reported that even though authors make their own choices, they are typically choosing the least restrictive licenses.

The UCT CHED student guide is published under a CC Attribution-NonCommercial-ShareAlike license. The Saide Teacher Education Series is released under the least restrictive license, Attribution (CC BY), which allows others to distribute, adapt, remix and build upon the original work, even commercially, as long as they acknowledge the author of the original work. Most content being shared by UCT FHS is licensed using a non-derivative license, and the interviewed respondent attributed this to the fact that academics are not yet ready to share their content without restrictions. Nevertheless, the fact that they are sharing their content means others can still use these resources, even though they cannot legally repurpose them.

Pedagogical Issues

Pedagogical implications of open sharing are embedded in almost all aspects of the process of converting teaching materials. Learner engagement enhances the quality of the materials. That is why resources in the Teacher Education Series are enriched with video and audio clips, and the CHED student guide is extensively illustrated, to ensure that learners can understand and learn without the mediation of an instructor. However, rather than not share anything at all, as academics get used to the idea of open sharing and the accompanying requirements to make content more dynamic for easier self-directed learning, it will be useful for some time to share even simple text-based materials.

The most versatile OER will likely be dynamic and consider the context of use, but also cater for wider usage. The UCT CHED guide was transformed from a plain text-based, ring-bound resource written in English only, to a multilingual guide presented in three South African languages used predominantly in the region where UCT is located (Afrikaans, English and isiXhosa). In this way, the language barrier is diminished when students use the guide for self-directed learning. The resource can also be used beyond UCT. The aesthetics of the guide have been greatly improved. From simple black-and-white text, the guide now appears in colour and the predominantly text-based guide is infused with graphics to illustrate some of the messages. This is likely to engage students who use the guide for self-study and to enhance their understanding. Whilst the original resource was available to students in print-only format, the new guide is available online as well. This also means that whilst it is designed specifically for first-year UCT humanities students, and has specific information on how to use the UCT library, for example, first-year students from other faculties at UCT as well as elsewhere can make use of the guide for generic information on nutrition, study skills, writing skills and examination preparation. The print and online formats cater for students who have Internet access as well as those who do not.

The University of Nottingham respondent believed that resources like handbooks, which explain learning pathways, outline sequences of learning, direct users to additional resources and offer assessment tasks, are very valuable for self-directed learning, as the user can benefit from these without the need for an instructor. Self-directed learning is also enhanced if a description of how chunked materials relate to other parts is given, so that a user knows that a single resource is more meaningful in relation to its other parts.

Material available in editable formats and licensed for repurposing enables other academics to adapt it easily for their own use. Including the date when the resource was produced allows users to decide how current the resource is, whilst providing information on the level of study enables them to decide quickly whether or not the resource is relevant to them (Beggan et al., 2010).

The initiatives explored demonstrate ways by which the quality of a resource is determined:

1. *Author's responsibility:* For Nottingham, if the resource is actively being used in the university, it is considered good enough for sharing through the repository, as there are internal mechanisms for monitoring quality which any additional monitoring would only duplicate. The author would have made sure the resource is of good quality. UCT FHS content contributors

are also responsible for quality of content and need to approve its aesthetic appearance before it is posted on the website.

2. *Formal peer review:* At Open.Michigan, the author, education specialists and the publication manager are responsible for final quality assurance, and the resource is reviewed several times during its development. MedEdPORTAL has a pool of peer reviewers who review each submitted resource before publication. The OSTRICH project had a quality management framework embedded within it. In the development of the Saide material, there were extensive formal peer-review processes as well as rigorous editing processes by the publisher. The Saide librarian provided quality assurance for the uploading of the material onto the website.
3. *Informal peer review:* UG CHS relies on other lecturers to volunteer to review submitted content before it is released as OER.

Conclusion

The OER sharing models presented in this chapter illustrate how varied the options are for academics who want to publish their teaching materials and share them with others. Options include: learning from others who have gone through the experience; releasing as a faculty or department; pursuing an institution-wide initiative; converting commercially published materials; and using a network repository for lone content developers who have no institutional initiative to support them.

What is important is that the processes required before release are essentially the same for all models, and include content authoring, copyright clearance, licensing, packaging, quality review and hosting.

Based on this process analysis, features of both an ideal and a minimal OER release model for teaching resources are outlined in Table 12.3.

Table 12.3: Dual model of OER publication of teaching materials

Process	Ideal characteristics	Minimum characteristics
Sourcing content	• A dedicated unit is in place for supporting academics to publish their resources as OER. • Criteria for sourcing content are developed. • Content is converted for OER sharing. • Explicit process model. • Training of content developers.	• Champions of OER are available. • Any type of content can be converted and shared. • Content is shared as is, with no modification.
Copyright clearance	• Make use of dScribes or copyright clearance support team. • Replace all copyrighted content with OER content. AND/OR • Use graphic artists to replace copyrighted images. AND/OR • Ask for permission to use copyrighted resources.	• Author asks for permission. • Discard all copyrighted content, and replace with new content and images drawn by graphic artists.
Licensing	• Use the attribution license and any other license that allows reuse and repurposing. 	• Use an Attribution-NonCommercial-NoDerivs (i.e., no derivatives) license. 
Quality review	• Enable internal and external peer review of the resource.	• Authors review the quality of their own resources.
Packaging	• Multiple file formats to enable adaptation. • Consideration of file sizes for easier download. • Package for both online and offline use. • Chunk to reduce size. • Provide context of chunking and link to other parts of resource. • Generate metadata. • Package on CD and DVD for very large resources.	• Restricted file formats. • Large resources published as single resource. • Generate metadata.
Hosting	• Disseminate on multiple repositories and sites. • Multiple filters to promote discoverability. • Track usage. • Feedback facility built into resource.	• Publish on local area network server.

Whilst the ideal is resource intensive and may not be achieved by most, the acceptable model conveys a message that it is better to share basic resources than none at all, whilst simultaneously aspiring for the ideal.

Acknowledgements

The contributions of the following people towards the data gathering for this chapter are highly appreciated: Andy Beggan, Catherine Hutchings, Dave Malicke, Richard Adanu, Emily Puckett Rodgers, Gabi Witthaus, Greg Doyle, Michael Saleh, Monge Tlaka, Stacey Stent, Steve Stapleton and Tessa Welch.

Notes

1. University of Ghana College of Health Sciences Health OER Project.
2. University of Cape Town Centre for Higher Education Development student guide, the Faculty of Health Sciences Health OER project, and the Saide Teacher Education Series project.
3. The BERLiN and OSTRICH projects, which incorporate projects at the University of Nottingham and the University of Leicester.
4. University of Michigan Open.Michigan and MedEdPORTAL.
5. Some of the projects described in this chapter worked on creating new resources as well as converting existing materials to share as OER. The focus of this chapter is conversion of existing materials.
6. The strategic plan is available at www.nottingham.ac.uk/about/values/universityvalues.aspx
7. See OTTER final external evaluation report: www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/otter/documentation/OTTER%20FINALSUMMATIVE%20%20REPORT%20JUNE%202010-FINAL.pdf/view
8. Particularly the CORRE framework that was modified during OSTRICH — see Appendix A in the final OSTRICH evaluation report: www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/ostrich/documents
9. Available as Appendix B in the final OSTRICH evaluation report: www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/ostrich/documents
10. Available at http://opencontent.uct.ac.za/Centre-for-Higher-Education-Development/Studying-at-University-A-guide-for-first-year-students
11. www.mededportal.org/about
12. A major problem for teachers and students in developing countries had been that the price of the printed texts was unaffordable.
13. Sourced from the OSTRICH final project report: www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/ostrich/documents
14. Sourced from Open.Michigan: https://open.umich.edu/wiki/images/3/31/DScribepublishingprocess-update.jpg
15. The casebook can be downloaded from https://open.umich.edu/wiki/Casebook
16. See http://open.umich.edu/sites/default/files/3659/PDFs/open-content-repositories.pdf for a complete list of sites.

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CHAPTER 13

Experiences of Developing OER-Amenable Policies

Sarah Hoosen and Neil Butcher

Abstract

Governments across the world are increasing the openness and transparency of their services, a move also taking place in the education sector in some countries, signifying commitment to openness and ensuring that adequate attention and funding is paid to open educational resources (OER). This chapter assesses the extent to which policies are being developed and/or modified to support effective use of open educational resources. However, despite the growth of OER at many institutions, surprisingly few have developed and implemented formal OER policies. Those with policies have most commonly established them in a context of having implemented OER projects, thereafter recognising the need for policy to inform initiatives or to institutionalise OER formally. Others have developed OER policies as they began exploring the use of OER. Evidence suggests the vital role of leadership support and champions in encouraging and driving OER policies. Several institutions have developed practices or procedures that support OER and which contribute towards institutionalising OER, even though there may not be a formal policy. A review of available policies reveals that they do not typically cover all aspects related to OER creation and adaptation, with most institutions focusing primarily on managing intellectual property rights and releasing materials using a Creative Commons license. In some instances, policy has been created, but with little evidence of consistency between policy and practice, highlighting that policy fulfils a limited function and that issues such as sustainability and faculty buy-in and involvement are of equal importance. This chapter concludes with recommendations to accelerate the development and adoption of open licensing frameworks for governments, institutions and faculty.

Keywords: *copyright, Creative Commons, intellectual property rights, OER policy, open policy, policy environment*

Introduction

The presence of policies that are supportive of OER can be used as a gauge to determine levels of commitment to OER, at either a national or an institutional level. The literature indicates several policy issues that are useful to consider when examining commitment to OER development and use at higher education institutions. Most commonly, intellectual property rights (IPR) and copyright issues are regarded as impacting on OER. IPR is a broad term that relates to copyright, trademarks, patents and other claims for ownership of a resource. Copyright is a form of IPR which provides that people cannot reproduce, copy or transmit copyrighted material to the public without the permission of the copyright owner. In the higher education setting, such policies typically focus on issues relating to works created during the course of employment and how these may be shared with and used by others. Such policies might, for example, outline the respective rights of the institution and its employees, subcontractors and students regarding intellectual capital. Such policies might also need to spell out whether or not research and educational products will be treated any differently by the institution, justifying why if so.

There are also human resource policy guidelines for whether or not the creation of certain kinds of work (for example, learning resources) constitutes part of the job description for staff, and what the implications of such creation are for development, performance management, remuneration and promotion purposes. This also typically involves a reward system for creating or adapting OER, such as acknowledging time spent creating OER (Butcher, 2011). Wiley (2007) believes that the most salient policy question a higher education institution can ask is what can be done to provide incentives for faculty to participate in an OER initiative.

OER is also affected by information and communication technology (ICT) policy guidelines regarding access to and use of appropriate software, hardware, the Internet and technical support, as well as provision for version control and back-up of any storage systems for an institution's educational resources. Additionally, it may be necessary to review materials development and quality assurance policy guidelines to ensure appropriate selection, development, quality assurance and copyright clearance of works that may be shared (Butcher, 2011). Another salient institutional policy question is: "What current institutional policies create obstacles for faculty who wish to open access to one or more of their courses?" Examples of such policies may include those that discourage faculty from engaging in online teaching activities before receiving tenure, and policies by which institutions control intellectual property developed by their faculty (Wiley, 2007).

It has been argued that policy can accelerate or impede the adoption and creation of OER (Plotkin, 2010), and will help institutions to manage and archive their material better, whilst stimulating internal improvement, innovation and reuse (Joyce, 2006). In addition, the issue of policy is usually part of discussions about ensuring sustainability of OER at institutions. However, growth of the "OER movement" and the "culture of contribution" has not necessarily yet led to the development of specific policies that address or support development, sharing, adaptation and use of OER, although there is mounting evidence that this work has now begun in many institutions and countries. This chapter provides an overview and analysis of progress being made in a selection of countries and

institutions, to assess the extent to which policies are being developed and/or modified to support effective use of OER.

Of course, whilst it is important to consider the relevance of such policies in higher education settings from an OER perspective, they are not the be-all-and-end-all, as policy fulfils a limited function. Other issues are likely of equal relevance, including faculty buy-in and involvement, enabling of technology environments, funding, sustainability, and motivation and reward systems to facilitate the active participation of stakeholders. In addition, universities have their own distinctive missions, histories and ethos, and varying organisational styles present different opportunities and constraints in terms of strategies for engaging policy with a view to making it supportive of OER development. Furthermore, although effective policy is an important starting point, the real issue becomes that of consistency between policy and practice.

National Movements Towards Openness and Transparency

Several governments around the world are taking steps to open their data and adopt policies for maximum transparency and citizen engagement, in growing recognition of the need for users to access and reuse data, taking cognisance that governments and public agencies are essentially involved in the provision of publicly funded work. For example, the President of the Republic of Korea has a website which provides information on national parliamentary bills and online communication, licensed with Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) licenses ("Cheong Wa Dae," n.d.). In the Netherlands, CC0 (CC no rights reserved) is the default copyright policy of the Dutch national government's website (www.rijksoverheid.nl). The purpose of the website is to establish one central portal through which the public can access all government organisations and ministries ("Netherlands government," n.d.). In Australia, the Australian Bureau of Statistics has made the census available to use under a CC license (Australian Bureau of Statistics, n.d.). In addition, AUSGOAL (www.ausgoal.gov.au) is the nationally endorsed Australian Governments Open Access and Licensing Framework, which recommends the suite of CC licenses for copyrighted material and the CC Public Domain Mark for non-copyrighted material (Park, 2011b). It provides support to government and other sectors to enable open access to publicly funded information (AusGOAL, 2011). In New Zealand, the New Zealand Government Open Access and Licensing Framework, NZGOAL (http://nzgoal.info) provides a guide which recommends adoption of a Creative Commons Attribution (BY) license as a default when releasing government-held content and data for reuse (AusGOAL, 2011).

In the USA, OER advocates have recently been successful in encouraging the use of open licenses for all publicly funded material. In January 2011, the U.S. Department of Labour announced the fiscal year 2011 grant competition for the Trade Adjustment Assistance Community College and Career Training Grant Program. The funding will enable eligible higher education institutions to expand their capacity to provide quality education and training services to Trade Adjustment Assistance for Workers Program participants as well as other individuals, to improve their knowledge and skills and enable them to obtain employment. The programme has an OER requirement on new course content developed — work that is developed by the grantee with grant funds is required

to be licensed under a Creative Commons Attribution 3.0 license (United States Department of Labour, 2011). These developments have been in part a result of the recognition that the public deserves free access to educational materials it funds. However, there is scope for contestation from key vested interest groups, such as publishers who fear that government support for OER would erode their profits and give the free programmes an unfair advantage. They argue that, if effective programmes are already for sale, extra money should not be spent to reinvent the wheel (Nelson, 2011). As OER policies gain traction around the world, there are likely to be similar challenges in other countries.

Moves towards such openness have also been noted in other U.S. national institutions. For example, in 2008, the National Institutes of Health (NIH) adopted a Public Access Policy, which requires all NIH-funded researchers to submit their final, peer-reviewed manuscripts to a publicly accessible digital archive (PubMed Central) so that anyone can access them. The idea is to increase public access to academic research that is funded by the federal government (National Institutes of Health Public Access, 2009).

These moves at a national level are also filtering down to an "intermediate" level (i.e., provincial and council levels), indicating commitment to transparency and accountability. In Australia, several local governments — for example, the Victorian and Queensland governments — have committed to using CC as a default licensing system for public sector information ("Queensland government," n.d.). Examples of local authorities opening their data are the Piemonte Regional Government in Italy, which launched an open data portal under the CC0 public domain ("Piemonte regional government," n.d.), and the Open Government Data Portal by the City of Vienna (Park, 2011a).

The above examples indicate burgeoning activity around increasing openness and transparency at the national level to promote citizen engagement and increase the transparency of government services and resources. However, this does not necessarily always translate to openness in education. One of the reasons for this, as Bossu (n.d.) suggests for the Australian context, is due to lack of a national framework to guide and assist educational institutions in the adoption, use and management of OER. Some believe that the lack of such frameworks limits and slows down the process of adoption or may even discourage institutions from pursuing OER undertakings. Given this, there has been recognition of the need for intergovernmental organisations such as UNESCO and COL to support governments by encouraging them to engage with OER, raising their awareness of the potential benefits and value proposition of OER, and supporting development of appropriate national policies and funding allocations (UNESO & COL, 2010).

Creating an Enabling Policy Environment for OER at the National or State Level

As the above examples have illustrated, government efforts to mandate openness and transparency are gathering momentum in several countries. In some countries, this is also occurring specifically in education. As the case study on Brazil in Chapter 14 of this collection notes, that country has introduced legislation which requires government-funded educational resources to be made available to the public under an open license. The legislation clarifies that resources produced by public servants

in an official capacity should be OER or otherwise released under an open access framework (Vollmer, 2011). In addition, the municipality of São Paulo Department of Education has mandated that all of its educational and pedagogical content will be made available under the Creative Commons Attribution-NonCommercial-ShareAlike license (BY-NC-SA) (Vollmer, 2011).

In other cases, whilst there is no specific "policy", there are definite moves to support the use of open resources in education. The Norwegian Ministry of Education and Research recognises that it needs a policy for OER, and this is not limited to higher education institutions. Its commitment and support for OER is noted in the Norwegian National Digital Learning Arena, which is an OER project and open source platform for sharing OER in secondary education. This is a joint initiative by different provinces in Norway that allocates a portion of state funds to ensure free access to textbooks for Norwegian students, and to develop digital resources (or purchase them from publishers or other producers) that are then released under a CC Attribution-ShareAlike license ("OER case studies," n.d.).

This type of national initiative is also underway in the Dutch Ministry of Education, which launched an OER platform for teachers in 2008 (Wikiwijs) to cater for all levels of education, from primary to higher education. As the programme plan outlines:

> It is a tool with which to promote the development and use of open educational resources and, in doing so, to improve the quality of teaching. (Wikiwijs, 2011, p. 4)

The aims are to stimulate development and use of OER, improve access to both open and "closed" digital learning materials, support teachers in arranging their own learning materials, and increase teacher involvement in the development and use of OER. All content on Wikiwijs is available under a CC BY license ("Wikiwijs," n.d.).

In other instances, local government policies drive OER at the institutional level. An example of this is the State Board for Community and Technical Colleges (SBCTC) in Washington, an organisation that provides leadership and co-ordination for Washington state's public system of 34 community and technical colleges, with an enrolment of over 470,000 students. In 2008, SBCTC released its Strategic Technology Plan to provide clear policy direction around mobilising technology to increase student success. One of the guiding principles of the plan is to "cultivate the culture and practice of using and contributing to open educational resources" (Washington State Board for Community and Technical Colleges, 2008, p. 17). Following this, the first state-level open licensing policy was approved in 2010. It requires that all digital works created from competitive grants administered through SBCTC carry a Creative Commons Attribution only (CC BY) license (Caswell, 2011).

> All digital software, educational resources and knowledge produced through competitive grants, offered through and/or managed by the SBCTC, will carry a Creative Commons Attribution License ... [and this policy] applies to all funding sources (state, federal, foundation and/or other fund sources). (Washington State Board for Community and Technical Colleges, 2010, p. 1)

This license allows educational materials created by one college to be used or updated by another in the system, as well as by other education partners globally.

It is believed that allowing the free flow of all educational content produced by State Board competitive grant funds is an efficient way to engage in the OER movement, whilst maintaining a focus on the specific needs of Washington's community and technical college students (Caswell, 2011).

Other states have also been looking into developing such policies. For example, the Southern Regional Education Board (SREB) recently published a policy document titled "An Expectation of Sharing: Guidelines for Effective Policies to Respect, Protect and Increase the Use of Digital Educational Resources". It recommends openly licensing digital educational resources to maximise potential sharing both within and outside the SREB consortia of states (SCORE Working Group on Digital Content Rights, 2010). There is also significant work underway in California to provide K–12 open source textbooks, an initiative supported by the state's Governor.

The fact that there are policies at national and intermediate levels driving OER at education institutions is significant and promising, as it displays commitment to openness and ensures that adequate funding and attention is paid to OER at the institutional level.

Policy Development at Higher Education Institutions

There are several instances of institutions taking the initiative to create OER policies. This is most commonly done in a context of having implemented OER projects, and thereafter recognising the need for policy to inform such initiatives or to formally institutionalise OER.

Policy Development Following OER Projects

In some instances, institutions have successfully developed policies following the implementation of OER activities. For example, at the University of Cape Town (UCT) in South Africa, OER was initially manifested through isolated publications, some teaching practices and a few repositories, which contributed to an environment supportive of OER. Its emergence appeared to be centred around a number of individual champions or groups of students and academics supporting the notion of increased openness in teaching and learning materials and/or processes. Examples included conference papers, competitions and the development of open access textbooks. These practices imply deliberation around OER, even though they may not have been formally identified as supporting a movement towards OER or an institutional vision of OER. These largely individual efforts were made more noticeable when UCT signed the Cape Town Open Education Declaration, which also provided some sense of strategic direction for the university (Hodgkinson-Williams, 2009).

UCT recently updated its intellectual property (IP) policy so that it now specifically covers issues relating to the creation of OER resources and to licensing processes that must be followed. Section 9.2 of the policy provides support for publication of materials under Creative Commons licenses:

> UCT supports the publication of materials under Creative Commons licences to promote the sharing of knowledge and the creation of Open Education Resources. UCT undertakes certain research projects

that seek to publish the research output in terms of a Creative Commons licence.

9.2.1 Author(s) of Copyright protected materials that are listed in clauses 8.2[1] and 8.3[2] is free to distribute their material under a Creative Commons licence.

9.2.2 Author(s) of Copyright materials that are listed in clause 8.1[3] should seek permission from RCIPS, who on behalf of UCT, may grant permission for the material to be distributed under a Creative Commons licence. (University of Cape Town, 2011, p. 15–16)

In addition, the policy indicates that an IP advisory committee is to be established to manage processes relating to IP for UCT. The policy focuses on adoption of open licenses as a default for research and teaching related to software development at the university. Notable aspects of the updated policy also include IP related to the creation and licensing of films as teaching and learning media/tools (University of Cape Town, 2011).

Another example is that of the University of Bath in the United Kingdom, which is participating in the OSTRICH project (OER Sustainability through Teaching and Research Innovation: Cascading across Higher Education Institutions), funded by the Higher Education Academy and Joint Information Systems Committee (JISC) and led by the University of Leicester. The project has, as its themes, to:

- Explore legal and IP issues for people who want to create OER.
- Provide good practice advice and support for creators and users of OER.
- Foster active discussions in this area and explore opportunities and challenges. ("The OSTRICH open educational resources project," 2011)

At the University of Bath, some of the key findings of the project indicate interest in releasing a variety of learning materials as OER. In addition, there appear to be different motivations for engaging with the creation of OER, ranging from personal beliefs about the openness of education and a culture of sharing to opportunities for offering "taster" or marketing materials for prospective students. Furthermore, the project has highlighted that concerns about copyright and other IP rights need to be resolved with adequate support and guidance. In light of this, the project created a variety of support resources in this area and has developed solutions to IP issues specific to OER at the University of Bath (Jenkins, 2011).

The university currently does not own the scholarly output of academic staff. One of the results of the project has been the creation of new IP documentation to allow the university to release material as OER. Thus, if academic staff would like to release OER, they can now license the university to do so by completing a Deed of License, which allows the institution to release under an open license content which is the IP of academic staff members. In addition, guidance documents related to the institution's IP policy now include reference to this, as a direct result of the work of the OSTRICH project. Section 4.13 of the policy guidance states:

> In other instances where the University wishes to permit others to use scholarly output it will formally request the author for a licence on this basis. For example if the University wishes to record a lecture and make it available as an open educational resource it will need a licence from the academic author permitting the University to make

> the lecture available in this way. It is hoped and anticipated that staff will accede to this request on the basis of the public benefit of such initiatives. (University of Bath, 2011a, n.p.)

The guidelines do, however, note that this does not apply to distance learning materials, where it is part of the staff's role to create material and thus these materials are the IP of the institution and can be released as OER without the need for an additional license. The guidelines also indicate that, when using external contractors or working with other institutions or funders, the contract should clarify the ownership of IP (University of Bath, 2011b).

For the OSTRICH repository, which houses materials created through the project, content developers are required to complete an OER Release Form in which authors permit materials to be released as OER and provide metadata for inclusion of material into the OER repository. This is to ensure that there is a record of the IP ownership of resources before materials are released as OER (University of Bath, 2011b). In addition, there is a "take-down" policy to ensure that material in the OER repository does not infringe third-party property rights or UK law. This allows users to report content that has breached copyright, moral rights, and/or laws governing unauthorised use of material ("OSTRICH OER repository," 2011).

Policy Development in Tandem with OER Introduction

Other institutions developed OER policies as they began exploring the use of OER. A good example of this is the Otago Polytechnic in New Zealand (also documented in Chapter 15). The process of policy creation started when the Flexible Learning Development Department began to engage in content creation in late 2006. Part of this process involved building awareness of the potential in searching for CC licensed content and of techniques for accessing popular media sharing sites for reusable content. As faculty learned of available existing content, they became willing to consider reusing existing OER. This prompted recognition that the IP policy needed rewriting to allow reuse of OER and to encourage faculty participation and contributions, thereby helping to establish a stronger online presence for the Polytechnic (Blackall, 2007).

What is interesting about this institution is that those who wish to publish with restrictions beyond attribution are required to notify and motivate such action to the Polytechnic so that an appropriate restrictive statement can be added. This is a reversal from what is common in most other educational institutions, which typically offer online content under "all rights reserved" copyright and (although only in some cases) with an option to release content openly (Park, 2008).

It is also notable that Otago Polytechnic's commitment to education for sustainability is embodied in its strategic plan. This is demonstrated by the Council's decision to establish the OER Foundation as an independent entity rather than hosting yet another institution-based project (Vollmer, 2010).

Examples of other institutions that have developed policies as they were introduced to OER are two Ghanaian universities, the University of Ghana (UG) and the Kwame Nkrumah University of Science and Technology (KNUST), the experiences of which are described in Chapter 4. They were introduced to OER through a grant-funded health OER project, which began with the Colleges of Health Sciences in the two universities producing a significant number of

eLearning materials as health OER. However, they soon faced challenges such as faculty time commitments, technological and infrastructural constraints, shortage of technical expertise, lack of awareness beyond the early adopters, and non-existent systems for OER dissemination and use. These challenges revealed the need for institutional policy and integration to ensure effective implementation and sustainability of OER efforts (Tagoe et al., 2010).

At UG, the College of Health Sciences (CHS) initiated a process to update its policies to support OER, which started at around the same time that the institution was undergoing a cyclical revision of its statutes. The university has drafted an OER policy which covers a variety of issues, ranging from infrastructure and Internet access to organisational structure, copyright and quality assurance. At the time of writing, the policy was still in draft form and needed to go through the approval of various university boards at different levels of the university administration.

As with UG, establishing a policy framework conducive to the creation and use of OER in KNUST was identified as a critical step if the OER initiative was to succeed. In addition to the challenges mentioned above, such as lack of administrative, technical and infrastructural support for faculty, wider institutional awareness, interest and support were lacking due to the project being based in the College of Health Sciences. It therefore became apparent that an OER policy was needed to ensure the growth and sustainability of OER at the university (Donkor, 2011).

KNUST's OER policy covers issues regarding copyright and licensing, human resource and budgetary allocation, infrastructure, collaborations, technical support, systems for production (authoring), delivery (sharing), review process and quality assurance, access, potential liability, motivation and academic rewards. For example, the policy affirms KNUST's adoption of the Creative Commons licenses. It also tackles some of the challenges mentioned above and paves the way for institution-wide adoption of the OER initiative (Donkor, 2011). One of the remarkable outcomes of KNUST's involvement in OER has been the influence it has had at a national level. KNUST, in partnership with the Association of African Universities (AAU) and with funding from Electronic Information for Libraries, has embarked on an advocacy campaign to raise awareness of open access with government officials and the research community. A meeting was held with the Ministry of Education to discuss an action plan to move the open access agenda forward. A notable outcome of this engagement was the KNUST institutional repository being designated as the national open access repository (Electronic Information for Libraries, 2011).

Finally, The Open University, in the UK (UKOU), has always sought to match strategic aims with the rigorous evaluation of innovative experimentation.[4] The UKOU's mission, to be "open as to people, places, methods and ideas" (The Open University, n.d., n.p.), has included free-to-air educational broadcasting with the BBC since 1971. The launch of a joint website with the BBC in 1999, called Open2.net (www.open2.net), supplemented this broadcasting by providing free-to-access online educational resources alongside free-to-contribute opportunities, both online and offline, through public engagement activities.

In 2005, senior management set up a strategic review to report on what the UKOU should do about the issue of open content, following the success of the

Massachusetts Institute of Technology (MIT) OpenCourseWare Initiative. This report recommended that the UKOU carry out a substantial open content pilot which would test the impact on the UKOU of making materials freely available on the Internet. The Open Content Initiative (OCI), as it was then titled, formally started in 2006 with funding support from The William and Flora Hewlett Foundation.

As OCI (renamed OpenLearn on launch of the platform, www.open.ac.uk/openlearn) was an institution-wide, action research initiative, its Director reported directly to the Pro Vice-Chancellor (Strategy, Planning and External Affairs) and had to provide regular written or oral reports and take further papers for approval to various UKOU committees. There was also a Steering Group which included four members of the Vice-Chancellor's Executive, plus other senior staff.

At the end of the two-year pilot period, a major internal review outlined the value to the UKOU provided by the initiative up to that point, and recommended further internal investment to continue developments and evaluations. At the same time, elements of OER activity were in several places built into the UKOU's strategic plan, which is reviewed annually. This has included its international social justice work, such as the Teacher Education in Sub-Saharan Africa programme (www.tessafrica.net) and that programme's partnership, research and scholarship activities.

As well as releasing content through OpenLearn, the UKOU was also able to take advantage of proprietary channels for educational content, namely YouTube (www.youtube.com/oulearn) and iTunesU (http://open.edu/itunes). Having established separate ways of developing and publishing OER through these different channels, the UKOU then decided that all of these activities needed to be consolidated and embedded into existing systems and processes. The UKOU has now recast OpenLearn as the brand for its own open channels, transferring material from Open2.net into OpenLearn to sit alongside the content in OpenLearn's LearningSpace (http://openlearn.open.ac.uk) and LabSpace (http://labspace.open.ac.uk), and also aggregating information on content put out through iTunesU and YouTube. It has also consolidated its use of technologies such as Moodle as a platform, and its internal eProduction systems and technologies for all forms of content. This means that now the UKOU has largely stopped openly publishing legacy content already developed for student use, and moved to the open publishing of newly developed or updated content from taught modules and programmes.

Prior to August 2011, most modules were selected by faculty to be released as OER according to what they saw best and which teams were most enthusiastic (with central guidance being simply to cover the breadth and depth of all programmes). However, this process only covered 40 per cent of all modules, being constrained by additional resources, by some modules not being suited to having part made open for a variety of reasons, and by costs associated with re-engineering content already developed. Thus, the new UKOU policy is that every new or revised module will have the open part pre-identified and planned so that it is a frictionless byproduct of standard module development at no extra cost, whilst there is also a small budget for doing bespoke OER for other reasons. These new developments include an Open Media Policy and greater integration between open activities around the Web (www8.open.ac.uk/community/main) and website

policies (www8.open.ac.uk/about/main/admin-and-governance/policies-and-statements). Lastly, both the Learning and Teaching and the Curriculum Strategies support the use and reuse of OER from other sources within new and adapted modules.

Leadership Support in Driving OER Policies

There are also institutional examples that indicate the vital role of administrative and leadership support in driving OER policies. A good example is that of Foothill-De Anza Community College District (FHDA), the first community college in the USA to develop an OER policy.

FHDA began actively pursuing a formal OER policy in 2004. The Board of Trustees indicated an interest in OER and organised "an inquiry-based research strategy", which involved engaging with faculty on the subject by designing a "public domain survey". This was distributed to gauge faculty interest in and knowledge about OER. The results of the survey indicated great interest in OER, with a large number of faculty already using or having developed OER. The findings of the survey were discussed widely, and this began a public conversation about how to create and use OER for students, as well as an investigation of ways to incorporate the discussion of OER into professional growth opportunities for faculty and staff. This approach helped to identify how the institution could support faculty in ways that would be welcomed. The goal was to identify and help champions, and support them as leads in their departments, divisions, campus-wide, and at the state and national levels. Thus, the first official step was to invite faculty and staff involvement in development of the policy, and to address concerns and stimulate discussion about the potential impact of OER (Plotkin, 2010).

The approach was to encourage faculty rather than coerce them, and it stressed that faculty determine what learning materials they wanted to use. Thus, a collaborative approach was taken. The combination of openness to new ideas and administrative willingness to resolve concerns as frequently and immediately as they arose led to a policy that was universally endorsed by faculty, staff and student groups prior to its approval by the board in late 2005 (Plotkin, 2010).

> The Foothill-De Anza Community College District supports the creation, use, accessibility, and ongoing maintenance of public domain-based learning materials in accordance with established curriculum standards for educational purposes of the District, using the commonly accepted legal definition of public domain materials. The goals of this policy are to provide students with learning materials that reside in the public domain to augment and/or replace commercially available educational materials, including textbooks where appropriate, to create sustainable academic resources for students, faculty and staff, and to provide opportunities for professional growth of district employees involved in these activities. The Chancellor will provide periodic reports, not less than annually, to the Board that detail the progress made toward accomplishing the goals delineated by this policy. (Foothill-De Anza Community College District Board of Trustees, 2004, p. 6141)

The policy strongly encourages adoption of OER to increase access to education for all students, but does not mandate its use. Thus, participation is voluntary and faculty members are free to make whatever decisions they feel are in the best interests of their students. The policy instructs senior college administrators to look for ways to encourage faculty members to organise and use open content in place of commercial textbooks. The policy leaves the specifics about implementation strategies in the hands of academic administrators, but requires that annual progress reports be made to FHDA's board (Plotkin, 2010).

Incentives and related programmes to accomplish the objectives of the policy continue to evolve, but already include: professional development time for faculty so that they can find, organise or prepare OER; awards; recognition for the best sets of open learning materials; and tutorials that help faculty members identify useful openly licensed resources in their fields (Plotkin, 2010).

Another example of leadership support is the case of UCT, where the signing of the Cape Town Open Education Declaration by the then Deputy Vice-Chancellor, Professor Martin Hall, represented "the most visible symbolic act cementing UCT's institutional commitment to sharing teaching and learning materials to date" (Hodgkinson-Williams, 2009, p. 10). This served to explicitly support the notion of OER at the institutional level. There is other anecdotal evidence of leadership support in institutions (even though there may not be explicit policies that demonstrate this). For example, at the University of Michigan, the OER efforts have received significant senior leadership support, particularly from the Dean of the Medical School and the Dean of Libraries. This has also been the case at both UG and KNUST, where the Provosts of Health Sciences have been instrumental in institutionalising OER. They are not abstract OER champions simply driving policy development; they have credibility as OER creators who have also taken their insights and experiences to international professional and academic fora. Both have the strong support of senior academics, including those responsible for leading OER co-ordination and development (University of Michigan & OER Africa, 2011).

At Nottingham University, there is also no formal OER policy. However, at the senior level there is encouragement for OER. For example, under the "Social Responsibility" section in the university strategy, mention is made of promoting and supporting open education:

> Expand our U-NOW open courseware initiative, which provides an opportunity for sharing knowledge widely to increase learning opportunities for those who, for whatever reason, are unable to undertake formal qualifications. (The University of Nottingham, 2010, p. 44)

In addition, a U-NOW podcast on YouTube (www.youtube.com/watch?v=E9MBkJr3ba8) that features the Vice-Chancellor, the Pro-Vice-Chancellor for Internationalisation and the Director of Teaching and Learning at the University of Nottingham indicates support from senior management for U-NOW.

The Importance of Champions

In addition to leadership support for OER, the role of champions is also significant in OER policy development. In many institutions, involvement in OER efforts has evolved from the efforts of a "champion" who has taken interest in sharing OER.

As the desire to share grows from a few faculty to a larger group, the institution becomes involved with necessary policy and funding issues (Members of the IPT 692R class at BYU, 2009). For example, the emergence of OER at UCT appeared to centre around a number of individual champions or groups of students and academics supporting the notion of increased openness of teaching and learning materials and/or processes (Hodgkinson-Williams, 2009). The Centre for Educational Technology appears to be pivotal in providing intellectual leadership together with technical support (University of Michigan & OER Africa, 2011). Other institutions formally appointed a champion. For example, as indicated above, at KNUST a professor of internal medicine was appointed to co-ordinate OER activities in the college (Donkor, 2011). Other institutions have instituted structural changes to reflect the formal role of champions. For example, at Notre Dame University, open courseware (OCW) efforts are facilitated by a full-time OCW Project Coordinator, who works with students and interested faculty in developing the OCW courses. In addition, at the University of Michigan, staffing to accommodate OER efforts includes two full-time employees, a full-time publications and communications specialist, and a shared full-time software developer (Members of the IPT 692R class at BYU, 2009).

However, one of the difficulties regarding champions is that they come and go, and initiatives are vulnerable to the mobility of staff and new institutional appointments, especially in key decision-making posts (Donkor, 2011).

Practices Supporting OER

Several institutions have developed practices or procedures that support OER and that contribute towards institutionalising OER, even though there may not be a formal policy. For example, the University of Michigan does not have any official OER policy at the university level. However, it has developed OER production practices guidelines. In addition, Open.Michigan has been able to convince departments to allocate funds for OER through other techniques such as memos, committees and small projects, without having a policy. Michigan State University (MSU) also does not have a formal OER policy, but does have procedures in place for academics to release content as OER. It has created a handbook ("OER@MSU") to guide academics about OER, their benefits, licensing issues and publishing options. At MSU, academics wishing to release their presentations as OER are required to complete an "OER Presenter Release Form", which serves as an agreement to make material available as OER using a CC BY license.

Open Access Policies

Whilst there are relatively few institutional OER policies, many institutions have adopted an open access policy with regards to research. As mentioned above, on a national level in the USA, the NIH announced a revision to its public access policy that made its application mandatory rather than voluntary (Pappalardo, 2008). In Australia, as part of the Open Access to Knowledge (OAK Law) project, Fitzgerald et al. (2006) have developed an action agenda and recommendations for the Australian Department of Education, Science, and Training, regarding a legal framework for copyright management of open access within the Australian academic and research sector. They recommend that each institution should

develop and publish its policy on open access, clearly declaring its objectives and interests in providing materials by this means. Many universities have also adopted open access policies — these include MIT, the University of Leicester and Athabasca University, amongst others.

Key Issues

Lack of Institutional Policies

Despite widespread growth in development, adaptation, sharing and use of OER at many institutions worldwide, very few institutions have yet adopted new, or adapted existing, policies to reflect their practices or to explicitly encourage and formally endorse such practices at institutions.

In the United Kingdom, according to the JISC/HE Academy OER Programme Synthesis and Evaluation Project Wiki, which describes the experiences of OER in UK higher education, one of the identified critical barriers is the lack of clear institutional policies on IPR, leaving staff feeling exposed. The evaluation study notes that several institutional practices need to change. For example, it found that obtaining rights clearance from institutions or departments may be an issue, especially where institutions are not very aware of OER. The study also found an apparent distinction between the willingness of individuals to clear rights and that of institutions. Where OER are being developed collaboratively across institutions, access permissions for material hosted on institutional servers may present a challenge that also affects management of the OER. Technical support needs to be in place for OER design and development, resolving server/hosting issues, and content management. In addition, institutions need to ensure that hosting services are adequate for OER requirements. However, the study also notes that individual OER projects have received institutional buy-in to OER release, particularly in instances where these support existing priorities and strategies, such as sustainability, lowering environmental impact, or marketing. Nevertheless, even where there are agreed institution-wide processes that enable OER release, projects have found that there is a long way to go before this becomes an explicit policy and an expected part of course creation, highlighting the need for institutional IPR policies to be more supportive of OER release (McGill, 2011).

During research for this chapter, online searches for OER-related policies yielded few explicit policies. Whilst the presence of a separate policy may denote an overt recognition of the importance and priority given to OER, it is also possible that OER practices are integrated into other policies. The latter may signify that an institution has incorporated OER into institutional processes. This has been noted at The Open University, in the UK, which has several policies relating to OER, such as an Open Media Policy, the Curriculum and Qualifications Strategy and the Learning and Teaching Strategy. Regardless of approach, the presence of policies will allow faculty to be aware that their inputs will be recognised by the statutes of the university and they will receive the appropriate credit for that activity.

Some institutions have begun the process of policy creation. For example, in 2010 the Faculty of Health at the University of Canberra in New Zealand took advantage of its university's IP policy review period, and developed an IP policy proposal ("Open education practices," n.d.). Open Universiteit in the Netherlands is in the

process of reshaping its policies. The University of Leicester in the UK does not have a finalised OER policy, but has a draft one that is still going through senior management processes for approval. It does have an open access policy, focussed on research output through the Leicester Research Archive, but this mandate does not cover teaching materials. Similarly, Athabasca University (AU) in Canada is in the process of developing an OER policy, but it had not yet reached the first draft stage at the time of writing. However, it also has an open access policy that was developed in 2006:

> Publishing in an Open Access journal has always been a right at AU; however, making one's research products available to the general public should be equally encouraged, especially in an "open" university. (Athabasca University, 2006, n.p.)

The policy notes that AU faculty, academics and professional staff members are encouraged to contact the copyright holder and request permission to publish the research concurrently in an open access format.

Universities are complex, autonomous institutions in which curriculum and operational changes are made only after deep and careful consideration — and after going through several institutional processes that are often time-consuming. Thus, it may be expected that there will be acceleration in the creation of supportive policy environments for OER as the breadth and depth of OER practices matures globally. In addition, initiatives such as the Open Education Quality Initiative's (OPAL) Awards for quality and innovation through open educational practices, which recognise outstanding achievements in the fields of OER policy, promotion and use, are helpful, as they may spur institutions to develop policies ("Submissions invited to OPAL Awards," 2011).

However, as highlighted in this chapter's introduction, policy fulfils a limited function, and issues such as sustainability and faculty buy-in and involvement are of equal importance. This point can be illustrated in the example from the University of the Western Cape (UWC) in South Africa, which passed an ambitious "Free Content, Free/Open Courseware Policy" in 2005, aimed to remove institutional obstacles to the publication of OER (Keats, 2005). It initiated the Free Courseware project towards implementation of this strategy. However, if one views the UWC repository (http://freecourseware.uwc.ac.za), there are only nine courses available, offering little evidence that the policy has gained traction. This provides an example of a policy that has been created, but with little indication of consistency between policy and practice.

It appears that OER initiatives at most universities are still largely project-driven rather than being part of an institution-wide, integrated process. OER and OCW initiatives seem to be an add-on rather than an integral part of the institutions' business. This lack of integration is also reflected in funding for OER.

OER Funding and National Policies

Although there has been significant diversification of sources of funding for OER initiatives in the past two years, many OER projects remain predominantly donor-funded (although there is some growth of institutional funding, particularly amongst early adopting institutions), with major funders including The William and Flora Hewlett Foundation, the Bill & Melinda Gates Foundation, The Andrew

W. Mellon Foundation, and the Shuttleworth Foundation. Whilst foundation funding has been an essential component of establishing the OER field, it has been argued that such funding cannot be relied on for ongoing development, operations and sustainability, with many OER initiatives struggling to establish and transition to a future independent of foundation funding (Stacey, 2010).

Funding issues are also important at the national level, depending on the funding structures of a country. Some institutions have received donor and government funding. For example, Utah State University OpenCourseWare (USU OCW) received multiple rounds of funding from The William and Flora Hewlett Foundation, as well as a one-off appropriation from the Utah state legislature as part of the Utah OpenCourseWare Alliance. However, despite having published over 84 USU courses over four years, the project offered no faculty incentives for participating and it is no longer operating, for lack of funding. It has been argued that this was due to OCW at USU not being integrated with university structures (Members of the IPT 692R class at BYU, 2009).

In contexts where universities are mainly funded by the government (such as the cases of UG and KNUST), funding in general is often a challenge. Friesen (2009) suggests that tangible benefits of OER should be linked to core institutional priorities, thus making a case for institutional funding. Harley (2011), in his review of the African Health OER project, notes that despite some progress in institutional policy conducive to OER, policies are as yet relatively silent regarding funding. KNUST stands out as being explicit in regard to resourcing for OER:

> Colleges, faculties and departments will be required to make budgetary allocations for the development of OER within their units. They will also be required to explore external sources of funding including grants and collaborations to roll out OER. (KNUST, 2011, p. 6)

Thus, in the African context at least, it is likely that such initiatives will need to be supplemented by alternate funding models in addition to institutional budget allocations.

Nevertheless, a key way to address funding issues is to acknowledge the benefits of integrating OER practices with any content/material development process (as has been done at The Open University, in the UK). Sourcing existing OER as part of the process of investing in high-quality learning resources that meet curriculum needs can save costs. In contexts of national support for OER, it is likely that funding will be channelled towards these efforts, such as the financial support seen in Norway and the Netherlands. Such approaches formally support and encourage institutions to create OER. Additionally, such support for OER provides an increased likelihood that such efforts are sustainable.

Focus on IPR

Review of available policies reveals that they do not typically cover all aspects related to OER creation and adaptation, with most institutions focusing primarily on managing IPR and releasing materials using a Creative Commons license. OER may be reviewed for copyright infringement, and there may also be "take-down" policies that provide users with an opportunity to report intellectual property licensing conflicts. Even fewer policies are explicit about issues such as the enabling technology, technical support, funding and staff motivation.

Institutions differ as to whether they provide incentives to faculty for participating in OER creation. For example, at KNUST and UG, the policy makes provision for incentives for OER creation and for research. However, few universities appear to provide incentives for faculty members to participate in OER initiatives (this includes UCT and USU OCW). In most institutions, OER appear to be funder-driven in the form of stand-alone "projects" (as opposed to integrated with institution-wide processes that reward faculty) which are likely to have driven OER at the institution. In the USA, faculty involvement in OER at most institutions is voluntary (Members of the IPT 692R class at BYU, 2009). In addition, only a few policies (such as at KNUST) make explicit mention of the notion of monitoring quality.

Lack of Leadership Support

It is also possible that lack of policies is due, in some instances, to lack of leadership support for OER. Plotkin (2010) hypothesises that the lack of higher education governance involvement in the OER movement is primarily a generational issue. He notes that the majority of higher education governance officials may have no exposure to OER or limited experience in assisting with or supporting the development and use of OER. They may not know what OER are, or may confuse OER with less useful materials, such as online textbooks or, more generally, "stuff you can find on the Internet". Support at the national level can assist in overcoming institutional barriers to facilitate the adoption, use and management of OER.

Conclusion

Surprisingly few institutions around the world are developing and implementing formal OER and open access policies to increase the reach and impact of faculty's, staff's and students' intellectual efforts. Some national and federal agencies are placing such mandates on their systems. But from a national or regional point of view, increased funding to encourage higher education institutions to work on OER projects is still unusual. However, as governments often play a key role in policy development and funding of higher education institutions, and as government policies on higher education funding also indicate key priorities, governments are ideally positioned to encourage or mandate institutions to release materials as OER and to license materials developed with public funding under an open license.

Possibly the most effective way to accelerate open licensing and sharing of higher education resources would be adoption/adaptation and approval of an appropriate national open licensing framework, with clearly defined options for use by all higher education stakeholders, ideally as part of an overarching policy framework on IPR and copyright in higher education that spans both research and teaching activities. Such a licensing framework may also cover the copyright and IPR status of educational materials produced by government departments and agencies.

Governments can also assist higher education stakeholders to understand issues surrounding IPR, as well as how these are challenged by the digitisation and online sharing of information. In addition, they may benefit from a review of national ICT/connectivity strategies for higher education, given the centrality

of ICT to accessing and sharing content online. Such reviews could focus on ensuring sustained provision in connectivity and staff/student access to ICT within higher education systems. Furthermore, government can collaborate with higher education providers to determine the most cost-effective ways to facilitate the organisation, electronic management and online sharing of OER. Options would include hosting content on institutional servers, establishing a shared repository for all higher education providers, or joining regional/global efforts to develop OER repositories and directories rather than replicating these investments (UNESCO & COL, 2011).

In cases where government may not be aware of the potential of OER, institutions may also have a role to play in sensitising government around OER (as has been done by KNUST).

Experience shows that, when an institution makes its courses/materials publicly available online (assuming they are of quality and relevance), this can attract new students, facilitate accountability (through its transparency), advance institutional recognition and reputation, and support the public service role of institutions. It may also further the dissemination of research results and thereby attract research funding (UNESCO & COL, 2011). However, the strategic advantages of having an OER policy are not yet articulated clearly in existing research.

It appears that where they exist, policies vary significantly across different institutional contexts, and each policy has its own logic, depending on the circumstances of the institution. Contextual differences across institutions present different levels of opportunity for policy engagement directed at an OER mode of operation. Most OER efforts appear to provide an optional and voluntary condition for faculty. It may therefore be worthwhile to provide incentives for faculty to participate in OER initiatives. This also entails ensuring that staff workload models allow for curriculum, course and materials design and development, as well as research activities. Furthermore, institutions will benefit from establishing and maintaining a rigorous internal process for validating the quality of educational materials prior to their publication as OER.

For institutions starting OER initiatives, awareness creation may be essential initially to drive institutional adoption of OER. This may include holding consultations and workshops with relevant stakeholders. At institutions that have successfully passed a policy that promotes OER, evidence indicates that there was consultation around policies to ensure buy-in. Early involvement of key individuals, and a clear communications structure, can be important for ensuring institutional take-up. Furthermore, it is important that such policies be aligned to the institutional mission and objectives to ensure buy-in. In addition, the examples demonstrate the vital role of champions at higher education institutions to drive policy.

Institutions will also benefit from periodic reviews of institutional OER policies and practices to determine their value. This could include reviewing the extent of use of openly licensed educational materials in higher education programmes and assessments, the effects of the use of OER on the quality of educational delivery, and its impact on the cost of developing/procuring high-quality teaching and learning materials for undergraduate and post-graduate programmes.

Finally, faculty and students would benefit from familiarising themselves with relevant national and institutional policies that might affect their rights, and the avenues for channelling any concerns about the nature of these policies.

Notes

1. UCT automatically assigns to the author(s) the copyright, unless UCT has assigned ownership to a third party in terms of a research contract, in:
   - Scholarly and literary publications.
   - Paintings, sculptures, drawings, graphics and photographs produced as an art form.
   - Recordings of musical performances and musical compositions.
   - Course materials, with the provision that UCT retains a perpetual, royalty-free, nonexclusive license to use, copy and adapt such materials within UCT for the purposes of teaching and/or research.
   - Film.
2. UCT assigns the copyright in a student's thesis to the student author (or in the case of a work of art that is submitted for examination purposes, to the IP creator of the work of art), subject to UCT retaining a royalty-free right to publish a thesis in any form. Whilst the student has the right to enter into agreements with the publishers, who may wish to publish the thesis in whole or in part, the student shall ensure that UCT's rights are acknowledged by the third party and maintained, and shall with the consent of their supervisor(s) ensure that such publication is not in conflict with any past or planned future assignment of rights to another publisher, e.g., of a journal article or other literary publication.
3. 8.1 UCT holds copyright in:
   - Banks of multiple-choice test and examination questions.
   - Syllabi and curricula.
   - Computer software developed at or commissioned by UCT to support academic or research administrative processes or the general operational management of UCT.
   - All UCT produced publications (e.g. but not limited to The Monday Paper, Varsity, Research Report, etc.) including electronic media and content on the UCT websites.
   - Photographs and digital images taken by employees for UCT media or publicity or specifically commissioned by UCT.
   - Specifically commissioned works and course materials that fall outside the scope of normal academic work.
   - Computer software developed as part of a research project, unless assigned by research agreement to another party.
4. Information on The Open University was kindly supplied by Andy Lane, director of the OpenLearn Initiative.

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CHAPTER 14

From Apples to Legislation: OER Policy in Brazil

Carolina Rossini

"If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple. But if you have an idea and I have an idea and we exchange these ideas, then each of us will have two ideas."

George Bernard Shaw

Abstract

This chapter is written at a turning point in Brazilian policy history — a moment when Brazil has signed an international declaration on open government, when its senate has approved legislation on access to governmental information, has passed local legislation that gives preference to free software for governmental use in states like Rio de Janeiro, and is discussing implementing policy related to open educational resources (OER) at different governmental levels. It is also a moment when the concept of open education, as defined by the Cape Town Open Education Declaration (2007), has begun to be reflected by some OER practices in government projects and in the classroom. This chapter explores such public policy developments in Brazil, briefly presents some case studies, and shares the experience of a grassroots project that advocates, researches, assists community development of and builds awareness of OER in Brazil, hoping to contribute to this pioneering moment — when technology meets openness — that education faces. It also presents data on the public investment flow in the development and purchase of educational resources, and builds recommendations for policy makers.

Keywords: *Brazil, grassroots efforts, open education, open educational resources, open policy, textbook market*

Introduction

By the time you read this article, much of it will be history. And this is good! This is an inescapable characteristic of a chapter that is frozen in time and space, and tries to portray policy adoptions that are taking place as it is written.

We are at a turning point in Brazilian policy history — a moment when Brazil, still marked by the shadow of dictatorship and with many people still fearing openness and transparency, signed the international declaration on open government,[1]

when Brazil's senate approved legislation on access to governmental information,[2] approved local legislation that gives preference to free software for governmental use in states like Rio de Janeiro,[3] and is discussing implementing policy related to open educational resources (OER) at different governmental levels. It is also a moment when the concept of open education, as defined by the Cape Town Open Education Declaration (2007),[4] has started to be reflected in some practices that implement OER projects in the classroom.

For the purposes of this chapter, I will use the OER concept definition crafted by the OER international community after a call from UNESCO in mid-2011. At a 2011 UNESCO/COL meeting in Paris, some people proposed that the 2002 concept[5] should be changed to comprise solely "free" — zero-price — digital content. However, an extensive international open discussion, which included many representatives of the Brazilian OER community,[6] ended up defining the concept thus:

> OER are teaching, learning, and research materials in any medium that reside in the public domain or have been released under an open license that permits their free use and re-purposing by others. The use of open file formats improves access and reuse potential of OERs which are developed and published digitally. Open educational resources can include full courses, course materials, modules, textbooks, research articles, videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.[7]

The importance of this definition is that it clearly reflects how the discussion is framed in Brazil within a broader movement of access to knowledge and consumer rights. The inclusion of the text "The use of open file formats improves access and reuse potential of OERs which are developed and published digitally" is also vital, given the importance of free software and accessible technical formats for community members within the broader OER community in Brazil, since many have come from the Brazilian free software movement.[8]

This chapter examines not just the OER policy being discussed and implemented in Brazil, but also the trajectory of a grassroots project in which I and others are involved — the "OER-Brazil Project", supported since 2008 by the Open Society Foundations (hereafter referred to as the OER-Brazil Project). The OER-Brazil Project is focussed on raising awareness, building capacity and community, supporting hands-on OER projects, as well as developing and implementing public policy on openness (and specifically on OER) in Brazil. Policy developments in Brazil have been significantly driven by grassroots efforts.

The main message that moves OER forward in Brazil is that *publicly funded educational resources should be OER, and OER is necessary to foster international human rights and the Brazilian constitutional right to education.* This message is also supported by the need for innovation in publishing, teaching and learning methodologies, and for the revalorisation of the teacher.

However, it is important to understand how this message is justified, localised and applied in different countries. The arguments, strategies and alliances presented in this chapter were built specifically for the Brazilian reality. Thus, whilst they may be applicable in other countries, they may also simply be used as a discussion

point or even as an example to inspire action and change in other parts of the globe.

The message in Brazil is supplemented by three core tenets:

1. *Public access to publicly funded educational materials.* Publicly funded educational materials, both teaching materials and research output, should be considered public goods and made available under international definitions of OER. Adherence to this principle requires attention to intellectual property rights law and institutional regimes, prices, access and training. Zero-price educational materials are not an acceptable substitute for materials that meet the definitions of true "open educational resources".
2. *Training the trainers to collaborate.* Public funds for information and communication technology (ICT) investment in infrastructure and in programmes for teachers' continued education should be conditional on the recipient having an acceptable pedagogical plan to educate teachers and other key stakeholders about OER. This recognises the role of teachers in the "collaborative characteristics" of the information society — the unanticipated use and reuse of content by those other than the intended audience, leading to the emergence of new creative works in software, encyclopaedias, educational materials, scholarly journals and more. These pedagogical plans should define the inputs of open resources, the outputs of the educational process, and how teachers and the community will be engaged to take full advantage of the combination of technology and open content. In the absence of such a plan, it is unlikely that teachers will understand "at a glance" how to integrate new materials and formats and, perhaps most importantly, new types of rights to adapt those materials into local classroom settings. Without this knowledge, the vast potential of the open materials will not be realised.
3. *Transparency and collection of data.* Data, statistics and metrics regarding the success of OER policy should be developed and published openly on the Internet at no charge, and with no role for intellectual property rights other than the provision of credit and the ability to use "marks" to guarantee the quality of data[9] (Rossini, 2010a).

The Government as Primary Funder and Purchaser of Educational Resources in Brazil

These core tenets of OER were described in a working paper written by this author in 2009–2010, hereafter referred to as the "Green Paper" or Rossini (2010a). The Green Paper starts with a brief introduction to the history of the OER concept and how it relates to the concept of economic development. It also links OER to the concept of open access,[10] which some in Brazil already knew, thus placing the OER discussion within a broader debate focussed on access to knowledge. The second section explores the state of education in Brazil, its policy governance, structures and institutions, presenting education data from government sources and also building upon a series of OECD papers on the quality of education in Brazil and innovation capacity within Brazilian society. The third section presents an analysis of Brazilian public and private educational projects as compliant/non-compliant in relation to the concept of open educational resources, as understood

by UNESCO and under the principles of the Cape Town Declaration on Open Education of 2007.

The Green Paper maps more than 14 Brazilian projects, the missions of which are to provide access to free educational recourses and, in some cases, openly licensed educational resources. The analysis focuses on the projects' legal and technical interoperability elements, as well as considering who owns the rights to the educational content that is published and distributed. Finally, it presents a set of recommendations that have subsequently been used as a basis for discussion with key government departments, such as the Ministry of Education and regional city governments, on how to redesign projects that actually intended to be OER, but may have fallen short due to legal or technical barriers.

The majority of the projects considered in Rossini (2010a) failed to implement OER comprehensively, even when their mission was clearly to provide access to free and open educational resources. Sometimes, the projects exhibited technical barriers to complete fulfilment of OER potential — for example, by not allowing collaboration or by archiving materials in closed or proprietary formats. Most of the analysed projects also lacked a unified copyright management strategy or a complete understanding of open licensing, whilst some suffered from bad licensing schemes in the chain of production of such resources; this resulted in rights not flowing to government, even in cases where consultants were hired under a "work made for hire" scheme and the government thought it had the rights to use, publish and allow reuse and repurposing of the materials.

Two projects worth specific mention are the Teachers Portal, developed by the Ministry of Education, and the Projetos Folhas (Folhas Project), developed by the past state government of Paraná State. The Teacher's Portal[11] is an initiative to integrate all of the online public systems that serve education at the equivalent of the K–12 level in Brazil. Its goal is to provide an environment that connects decision makers, academics, teachers and students. One key section of the Portal is the "Learning Objects Repository", which states: "all resources published in the Teacher Portal can be downloaded — to your computer, pen-drive, CD, DVD or otherwise — copied and distributed, being forbidden any for-profit use".[12] However, a brief analysis of a sample of materials showed that each had its own license terms. Some had "all rights reserved" notices, others open license notices, and others a variety of Creative Commons licenses. The result was a lack of legal interoperability,[13] creating a barrier to creative reuse of the repository's content.

The Folhas Project is part of a programme by the State Secretariat for Education of Paraná (SEED), focussed on training teachers from that southern Brazilian state and perfecting their research and authorship abilities. It was established in 2004, and is an effort to value teachers and involve them in the development of educational materials. The objective is to establish a daily practice of research in schools, encouraging teachers to search through available digital knowledge as well as explore the theoretical and methodological foundations of the disciplines that they teach, and then produce texts to be used in the classroom. The framework of this work is the Paraná State curriculum. Once finalised, and then verified and validated by the Educational Regional Nucleus (NRE) and the Ministry of Education, the texts, called "Folhas", are published in the Dia-a-Dia ("Day-by-Day") Education Portal.[14] This portal provides information and materials for

teachers, students, schools and communities. The texts, which can be developed via co-authorship, are also published in the internal network of schools in Paraná and can be accessed and printed by these schools.

The "Folhas" are then organised as "public textbooks",[15] which follow the content of the Paraná State curriculum and are subject to the federal Law of Directives and Bases of Education. In total, twelve books have been created, covering the secondary school curriculum subjects of Art, Biology, Physical Education, Physics, Philosophy, Geography, History, Portuguese Language and Literature, Modern Foreign Language, Mathematics, Chemistry and Sociology. To distribute the books, the state publishes a regular call for proposals and secures a suitable service provider. These are Brazil's first open textbooks.

Accordingly, such a programme has freed the State Secretariat for Education of Paraná from the need to purchase the books listed by the National Programme of Textbooks (PNLD) or the National Programme of Textbooks for High School (PNLEM).

A relevant aspect of this case is that there is a clear programme of incentives for teachers to participate in the Folhas Project. With publication, the authors receive points that are counted towards career advancement. Teachers are allowed to take some sabbatical time to write materials, whilst they also receive training and support as they undertake the task.

These public textbooks[16] are open, free, available in digital format and can be printed and distributed, provided the original author is acknowledged. Inside each book is a notice stating that "total or partial reproduction of this work is allowed". Thus, even without having adopted a formal Creative Commons license, the project uses an open license and can be seen as the first true OER project led by a regional administration in Brazil. However, a subsequent change of regional government, and consequently of the educational secretariat of the state, may put the future of Projeto Folhas at risk.

The fourth section of the Green Paper focussed on the issue of textbooks in Brazil, analysing public policies of textbook adoption, government purchase programmes, and the issue of access to and cost of scientific books and textbooks for higher education. Crucial data on the flow of public investments during the purchase and development of textbooks and scientific books was presented, building upon previous studies done by the Brazilian Institute of Consumer Defence (IDEC, 2008) and the Research Group for Public Policies for Access to Information (GPOPAI) at the University of São Paulo (USP) (GPOPAI, 2008 and 2010).

These studies were conducted in response to increasing pressure, including threats of possible legal actions and judicial suits, from the Brazilian publisher associations — specifically, the Brazilian Association of Reprographic Rights (ABDR),[17] supported by the Brazilian Association of Copyrights (ABDA). ABDR developed a public campaign with a core message that copying textbooks is a crime — a statement that ignores works in the public domain and rights granted under exceptions and limitations to the current Brazilian copyright law. ABDR also did not consider or try to obtain a balanced or negotiated solution with students and professors regarding out-of-print or foreign books not published in Brazil — where there is a clear lack of market interest on the publishers' part.

Educational Materials in Higher Education: The Case of Scientific Textbooks

IDEC (2008) calculated the costs of acquiring material for disciplines such as law, economics and business, focusing on the first college year at some public and private teaching institutions. The results were dramatic. The average cost in public institutions was R$2,578 (around US$1,467 in January 2010) and R$3,908 in private ones. Strikingly, almost one third of the required books were out of print, so these were not incorporated in the average cost. IDEC also investigated the situation of institutional libraries. It discovered that the average collection numbered no more than six books per 100 students at public institutions and no more than eight at private ones.

The study conducted by GPOPAI at USP (2008) showed similar results. It evaluated the cost of all professional books required in ten top courses at USP, comparing this with the average monthly income of the students' families. The conclusion was that for 75 per cent of students, the cost of acquiring books was higher than the family's monthly income (the Brazilian monthly minimum wage was R$465 in 2010).

Table 14.1: Cost for the acquisition of books listed in the mandatory bibliography, and family income of the students

Course	Annual cost of books	% of students with family monthly income below R$5,000
Information Systems	R$3915.58	90.6%
Natural Science	R$3640.90	91.3%
Tourism	R$4572.90	81.3%
Marketing	R$4242.51	76.1%
Technology of Textiles	R$4164.79	79.5%
Environmental Management	R$5212.69	84.1%
Medicine – Obstetrics	R$5810.46	86.7%
Medicine – Gerontology	R$4417.19	91.2%
Physics	R$3344.75	88.3%
Public Policy Management	R$5343.02	78.1%

Source: GPOPAI, 2008, p. 36.

Again, for this study, one third of titles were out of print and thus were not included in the costs.

In response to a set of connected problems — high costs, unclear limitations on the rights of copyright holders, and increasing pressure from students under the flag "Copying Books is a Right" — some universities have issued internal resolutions adopting 10 per cent of a work as the definition of "short extracts" acceptable for photocopying without payment. However, this stance resulted in a threat from the International Intellectual Property Alliance through its Special 301 blacklist, which then led to revocation of such university resolutions.

Business associations in Brazil echoed these international threats. ABDR refused to accept the universities' resolutions, increased the 2004 trend of revoking licenses and suing copy-shops (Lemos, Magrani, Mizukami, & Souza, 2008) and began a media campaign called "Copying Books is a Crime".[18] ABDR actions did not differentiate amongst cases where books were out of print or rare, openly licensed through Creative Commons, or even in the public domain. At the policy and legal level, ABDR have pushed for restrictive bills to enshrine their position in law, though so far without success.

Both the IDEC (2008) and GPOPAI (2008 and 2010) studies reached a similar conclusion when investigating who pays for the greater part of the production of professional and scientific textbooks adopted by Brazilian universities. For instance, results from the sample collected by GPOPAI (2008) show that the market for professional and scientific textbooks accounts for 25 per cent of titles and 7 per cent of sale-unites. This amount accounts for 20 per cent of sales in the publishing market — equivalent to R$418,550,460 in 2006.

In addition to direct public expenditures, since 1960 and reaffirmed by article 150 of the 1988 Brazilian Constitution,[19] the publishing industry (i.e., books in all forms, newspapers and magazines) is tax-exempt. In 2004, the publishing industry was granted additional benefits and freed from an obligation to make contributions such as Social Integration Programme fees and the Contribution for the Financing of Social Security (known in Brazil as PIS/PASEP and COFINS). These tax and contributions exemptions, which affect both the final product and the production process (including, for instance, the paper used) are intended to reduce the final price of the product.

GPOPAI (2008) estimated that from 2001 to 2006, these subsidies (by virtue of the tax and contribution exemptions) represented a windfall of around 30 per cent of the total sales income. For the sake of comparison, this subsidy was roughly double the total budget of the Brazilian Ministry of Culture over the same period.

The government also plays a major role in the markets, with taxpayer monies constituting the largest single investment source for higher education scientific and professional books in Brazil. This role of "single investor" plays out in multiple areas because, unlike in most countries, the federal and state public universities in Brazil are free,[20] the salaries for employees and professors come from the universities' budgets (and thus from the government), and many scholarships, including at master's and doctoral levels, are provided. Additionally, the majority of public institutions maintain their own academic publishing units, also supported by their university budgets (in the sample collected by GPOPAI, around 10 per cent of the prescribed books were published by university presses).

The result is a concentration of textbooks written by professors. For instance, 86 per cent of the books in the GPOPAI sample (1,910 books adopted by 25 different courses in more than 14 institutions) were authored by full-time, employed professors from public institutions.

According to GPOPAI (2008), the total invested by universities and public financial agencies (such as the São Paulo Research Foundation — known as FAPESP in Brazil) through scholarships and publication grants is R$78,410 over three years per master's thesis per student and R$155,344 over three years per doctoral thesis per student. By comparing these values with what is invested by publishers of books

derived from theses, the GPOPAI (2008) study concluded that 17.9 per cent of the total cost of a book based on a master's thesis comes from private investment, whilst 82.1 per cent comes from public investment. For doctoral theses, 9.9 per cent is from private sources, whilst the remaining 90.1 per cent comes from public investment.

University presses also play an important role. Researching a sample of 29 per cent of university presses in Brazil, the majority from public institutions and amongst those with the largest share of the market, GPOPAI (2008) analysed ten items that could potentially be subsidised by the university: taxes, rent, water, light, salaries, transportation, telecommunications, workshops and training, mail and marketing. More than 90 per cent of the sample analysed has 91 per cent of these items paid by public universities or related institutions, whilst 55 per cent have 100 per cent paid. The average value of this support (through either direct or indirect means) was 66 per cent of the total cost of the university press.

When asked by GPOPAI (2008) about out-of-print books, which form part of the university presses' catalogues, 85 per cent of interviewees were in favour of making them available online in a print-on-demand model, whilst 77 per cent were in favour of making the books openly licensed. However, these options are still not in place in Brazil as of the end of 2011.

Textbooks for K–12 public schools

Through the Ministry of Education, the Brazilian federal government operates three programmes geared towards K–12 textbooks: the PNLD (National Textbook Programme),[21] which meets the demands of students registered in elementary education; the PNLEM (National Textbook Programme for Secondary Education),[22] which meets the needs of secondary school students; and the PNLA (National Textbook Programme for Youth and Adult Literacy),[23] which meets the needs of youths and adults who have already finished the regular school phases, but wish to continue their education to receive formal diplomas.

The textbooks for courses in a given school year are distributed free of charge to all students registered in elementary school, high school or the Brazil Literacy Programme.[24] For those states that opted for decentralisation, such as São Paulo, the National Fund for Education Development (FNDE) transfers financial resources for the acquisition and distribution of textbooks, and the Secretary of Education of that state has total autonomy with regard to the choice of titles (Rossini, 2010a).

Between 1994 and 2005, PNLD acquired 1.077 billion books from private, for-profit publishing houses for use in the school years between 1995 and 2006. They were distributed each year to an average of 30.8 million registered students in about 163,700 schools. In 2007, PNLD bought 110,241,724 books to be used in the 2008 school year, at a cost of R$559,752,767. Books were acquired for every course and discipline for the 13.4 million students in 5th to 8th grade (or Grade 9 for the schools that have adopted this teaching level over a period of nine years), for all students in kindergarten, and for those required to repeat Grades 1, 2 or 3 (Rossini 2010a).[25]

All of the resources used for the textbook programmes are financed by the general budget of the federal government, obtained through a tax called "salary-education".[26] In 2008, the total gross amount collected was R$8,863,800,740 (Rossini, 2010a).

The relevance of this data is to call attention to the amount of investment that moves from the government directly to the hands of private publishers through a long and complex process — described in detail in Rossini (2010a) — that has not changed in years.

The Current State: Four Main Policy Efforts

The Brazilian national education system is based on a mandate from the Constitution of 1988 and implemented through a set of laws, plans and regulations. It can be understood as a complex, inter-federative regime based on co-operation between the federal government, states and municipalities. Under this system, education in Brazil is regulated by the federal government through the Ministry of Education, which defines the guiding principles for organisation of educational programmes. Local governments are responsible for establishing state educational programmes, following federal guidelines and using funding supplied by the federal government and local governments.

This system of co-operation is governed at the federal level by the Basis and Directives Law,[27] the National Plan of Education (a system of graduate and post-graduate educational institutions such as federal universities and institutes), a fund that regulates educational investments, and a process of national evaluation. Under this system, the goal is to reduce social exclusion so as to avoid social inequality. To achieve this, a budget has been allocated that is equivalent to 4.7 per cent of the Brazilian GDP (R$41,000,000,000 — the biggest in the history of the Ministry [Ministry of Education, 2009]).

Taking account of the expenses of procuring "all rights reserved" textbooks and thus attempting to move this system towards the use of OER, policy building and advocacy has been needed at federal, state and local levels. There are currently four main policy efforts underway in Brazil. These efforts have demanded significant work behind the scenes to get policy makers to "buy in" to the idea of OER and understand the role of the government in setting such policies. The work involved presentations and meetings to convey and discuss the main results of the research conducted by IDEC (2008) and GPOPAI (2008 and 2010), in order to explain the economics of textbook and educational resource publishing, and how and when the government pays for educational resources.

This background research was crucial to motivate policy makers to get involved in the debate and agree to author some of the policy efforts discussed below. To gain legitimacy with policy makers, the OER-Brazil Project also had to identify and build specific alliances, as well as to participate in political forums discussing education and related topics, such as the reform of the copyright law in Brazil,[28] the drafting of the Internet civil framework regulation, and the drafting of the access to data bill.

These four main efforts, explained in detail below, already exist as text — drafted bills of law and a decree — and they range from a more abstract, strategic document to the decree, which establishes very concrete steps with regard to OER development and adoption by a local city government. Such instruments are new to Brazilian legislative history, but mirror an important moment in the country's democratic history, when a society awakened to the importance of policy that enables access to knowledge, open Internet governance and data transparency,

such as free culture and open source software. The OER-related policies are the result of very intricate advocacy work undertaken since the end of 2008 and supported by a coalition of foundations, policy makers, institutions, civil society and academic representatives.[29]

The development of these policy tools aims to answer the following question: "Once society has paid for the creation of resources through taxes, how should the resources be managed and made available?" They take into consideration that education policy and projects need to combine infrastructure investment with a coherent, networked, open and generative[30] approach to content creation and distribution, in order to have a significant positive educational impact and to integrate learners into the "information society". This is achieved only through the creation of pedagogies that ask the learner to participate in the creation, or the remixing, of educational content, rather than pedagogies that tend to focus simply on the consumption of prepared content.

The 2011–2020 National Plan of Education

The National Plan of Education (PNE) represents the highest level of educational policy in Brazil. Formulated through a participatory process, which resulted in a text that benefited from more than 3,000 changes and involved civil society, government and Congress, the Plan sets guidelines, goals and priorities to be implemented by 2020. It was preceded by the PNE 2001–2010 and intends to present a systemic view of education through 20 goals (Santos, 2011).

Having started at the end of 2008, the OER-Brazil Project arrived late in the multiyear, multistakeholder discussions of the PNE. However, through targeted alliances, for example with the National Campaign for the Right to Education[31] and with policy makers at the House of Representatives, the OER-Brazil Project was able to secure a presence in some developmental moments. One of them was the Brazilian National Conference on Education (CONAE 2010), a conference organised by the Ministry of Education[32] as a democratic and open space for discussion of the drafted text of the National Plan.[33] With the final inputs from this conference, the ministry consolidated the PNE draft text and sent it to Congress for a final round of reporting and a vote.[34]

At CONAE,[35] the OER-Brazil Project secured a booth to present and discuss OER, chat with teachers, and distribute materials focussed on OER and the reform of specific articles of the copyright law relevant for education and access to educational resources.[36] Project members had the opportunity to talk to almost 2,000 teachers from all over Brazil (to whom 2,000 copies of the supporting materials were distributed), thereby learning how difficult access to and use of educational resources were, and how many — if not the majority of — teachers felt that they live under the shadow of, as they refer to it, "piracy" (copyright infringements).

To make their efforts memorable, project members also handed out apples, symbolic both of the teacher–student relationship and of the difference between a digital object, which can be copied and shared at little additional cost, and a physical one like an apple. When the booth ran out of apples, no more copies could be made. This simple exercise was very effective in communicating the concept of non-rivalrous goods, a key element of open policy.

Within the National Planning process, volunteers from the OER community were able to attend follow-up regional meetings at which a variety of groups discussed the regional implementation plan and strategies for CONAE's results and for the 2011–2020 PNE. In these meetings, the participants elected delegates who would then represent society in future negotiations with government regarding the 2011–2020 PNE content and implementation. Amongst those elected delegates was a member of the OER community whose mission was to keep OER on the national and regional policy agendas.

Additionally, the OER-Brazil Project organised, with the Commission on Education of the House of Representatives, a public testimonial to introduce the topic of OER to the Commission,[37] discuss the inclusion of OER within the PNE, and prepare the representative members of the Commission for the soon-to-be introduced OER federal bill of law, which will be discussed in the following section.

As of November 2011, in the House of Representatives, a group of legislative consultants is finalising the House draft of the PNE, under the guidance of the House member who was designated to be the PNE draft *rapporteur* (Representative Angelo Vanhoni, from the Working Party). In this new version, OER is mentioned in two different directives as part of the educational targets for 2020, specifically targets 7.10 and 7.12 of the latest version of the PNE bill. This is a great victory, but the work is not finished, since there are still some months to go before the final version of the PNE is approved, changes may still occur, and from 13 proposals to include language focussed on OER in the official text, just these two remain.[38]

The OER Federal Bill of Law

The OER Federal Bill of Law[39] was introduced in the House of Representatives in June 2011, by House Representative Paulo Teixeira). Paulo Teixeira is a political leader on issues of urbanism, the environment, access to medicine and access for HIV-positive patients to treatment and technology, and reform of the copyright law to facilitate access to knowledge (A2K).[40] Rep. Teixeira was already an A2K advocate and, because A2K is an appropriate framework for the OER discussion in Brazil, a natural ally of OER advocates from the OER-Brazil Project and the broader OER community in the country. This alliance was reinforced by past work developed in related areas, which created the necessary trust between the OER advocates and Rep. Teixeira. OER has become an official flag of this policy maker's work and political campaign.[41]

After a series of meetings — including one with the Minister of Education[42] (facilitated by Rep. Teixeira) — testimonials and conferences, one of which was institutionally supported by UNESCO,[43] Rep. Teixeira agreed to participate in a joint effort with the OER-Brazil Project and other civil society and academic organisations to develop and introduce a bill of law which would establish that educational resources paid for by the government should be openly licensed.

However, this was not an easy task, as it required a definition of what "paid for by the government" meant. The OER-Brazil Project undertook this task with the assistance of academic researchers from GPOPAI. With this research in hand, the OER-Brazil Project defined "resources paid for by the government" to include those that resulted from contracts for the development of specific resources

and purchases made by the government, those that resulted from the work of professors at public institutions and universities, and those that resulted from research funded by government through specific grants and scholarships for researchers and students.

To regulate these issues, the bill had to propose changes to two main laws: the copyright law (Law No. 9610/1998) and the public procurement law (Law No. 8666/1993). This was also not easy, due to the politicised nature of such legislation and the current debates taking place around changes to the Brazilian copyright law — considered one of the most restrictive copyright laws in the world.[44]

In sum, the bill provides for the procurement and open licensing of creative works subsidised by the government and those private sector corporations where the majority of the stock is controlled by public entities, including self-governing public bodies. It determines that the government, within its grants, should also acquire the copyright — not just the physical units of material — and license the materials under a Creative Commons license.

The bill also determines that when these creative works are equivalent to educational resources, the work of public servants, whether engaged in full- or part-time work (including teachers and researchers from public universities in the exercise of their professional duties), shall not be subject to an exclusive license to private entities and shall be made available and licensed to society under an open license.

Additionally, the bill indicates that when the administration purchases educational resources, or when it provides complete or partial public subsidisation of, or contracts for, services to develop educational resources under the public procurement law, it shall provide for purchase of copies of the works and the copyright embodied in the works, so that the public administration can make them available to society under an open license. The educational resources to which intellectual property rights have been granted to the administration, pursuant to Article 111 of the public procurement law, are then to be made available and licensed by the public administration under an open license.

Finally, the bill provides guidance on how to treat technological aspects of OER, indicating a preference for open technical standards and free software, and that the administration should foster the development of an institutional and federated system of repositories for OER.[45]

Currently, the bill has been assigned to Angelo Vanhoni,[46] a traditional ally of Paulo Teixeira. The OER-Brazil Project has been working with his legislative assessors to improve the first version of the OER federal bill and to guarantee broader community participation in this debate. To facilitate this, the OER federal bill will be placed in the e-Democracia portal,[47] a project launched in June 2009 by the Brazilian House of Representatives that aims to engage citizens in the law-making process (Faria, 2010). After input from society, the OER-Brazil Project will assist policy makers to review and consolidate a new version of the OER federal bill, which will then be presented for revision to various commissions at the House, such as the Commission on Education.

The OER São Paulo State Bill of Law

In July 2011, the OER-Brazil Project, supported by State Representative Simao Pedro,[48] was able to organise a public conference in São Paulo state with the State Legislative Assembly (ALESP).[49,50] This conference, like previous ones, brought together national and international guests and speakers. It included representatives from the USA, such as Hal Plotkin[51] and Cable Green,[52] both known for their political, technical and legal work to foster OER policy adoption and development in the United States and abroad. It also brought together representatives from Internet companies such as Google, deans of technical colleges and universities, leaders of civil society groups, and academics. The discussions focussed on policy, but also included presentations on specific hands-on OER projects, from institutions that have recently joined the Open Courseware Consortium, and on the Projeto Folhas outlined above.

After the Assembly recessed in July, further background legislative research, and the drafting of an OER bill of law for the state of São Paulo, Rep. Pedro presented to ALESP an OER Bill (Bill No. 989/2011),[53] aimed at regulating educational materials produced with public investment. This bill is crucial since, whilst the city decree would impact mostly basic and fundamental education (equivalent to K–12), the state OER Bill has the potential to impact what is produced by public state universities. This is especially important because São Paulo state has some of the best universities in Brazil.

The OER Bill defines OER as educational resources available for copy, redistribution and remixing (derivatives) under the condition of noncommercial use, with the provision that the derivatives are also to be openly licensed (ShareAlike). The language here is intentionally equivalent to the Creative Commons (CC) BY-NC-SA[54] license. The bill includes the following key elements:

1. Materials developed by government (direct and indirect administration, which includes state universities) should be directly openly licensed under the defined license (Article 1).
2. Materials resulting from contracts where the government is the party paying for the development of educational resources should be openly licensed under that defined open license, and contracts and calls for proposals already in place should also be revised to conform with this mandate (Article 2).
3. Openly licensed educational resources should be made available using technical standards that are free in terms of cost and operable on different hardware platforms (Article 3).
4. The bill, if approved, will enter into force from the date of its publication (Article 4).

The OER São Paulo City Decree

São Paulo city is one of the wealthiest state capitals in Brazil and one of the biggest in terms of numbers related to education. For instance, the city serves almost one million students registered in its public schools.[55] The OER-Brazil Project first started talking to the Municipal Secretary in 2009, to understand textbook production and purchasing processes in the city. As has been noted, São Paulo city

(and São Paulo state) chose not to use textbooks pre-approved by the Ministry of Education under the National Textbook Plan, and has thus secured contracts with local foundations and consultants to develop textbooks adopted by the public schools under its jurisdiction. Some of the funds to develop and purchase these textbooks have come from the federal government through the National Fund for Education Development.[56]

Those initial contacts, which have also involved ongoing discussions of how to change textbook development,[57] opened the door to interaction on how the city manages the intellectual property it receives under those contracts for textbook production.

Unlike at the federal level, the city has retained the copyright of works for which it has paid, which has facilitated implementation of an open copyright governance regime favourable to OER. The OER-Brazil Project and the Creative Commons Brazil team worked with the municipality of São Paulo to start the process of openly licensing all of the educational resources to which they already had the rights. They did this by working with the municipality's public lawyers to define what steps would be necessary to regularize internal licensing or assignment contracts and which works could be directly openly licensed. This work was completed through meetings and preparation of written legal opinions.

Alexandre Schneider, the Education Secretariat, noted that "we didn't have an appropriate way to license our content ... We hold the rights to our content because we created it, and we realised it would be right to release it under a license that allows everyone to use and adapt what was created with public money" (Mandelli, 2011).

The resources that have been openly licensed are textbooks and pedagogical and educational material focusing on K–12 education, adult education, special education for people with disabilities, use of technology, education focussed on racial issues, toolkits and brochures with didactic orientation and directives, and materials setting teaching methodologies and curricula, as well as resources produced under the programme Ler e Escrever ("Read and Write").

To implement and regulate this action, the city promulgated Decree 52681/2011,[58] establishing that all of the works listed above, when developed or paid for by the city, will be licensed under a CC BY-NC-SA license. Currently, the OER-Brazil Project and Creative Commons Brazil are assisting the city to implement this decree and to define what, for the city, is meant by a "noncommercial" restriction.[59] The OER-Brazil Project also started discussion on a technology strategy to improve archiving, distribution and collaboration on OER, since the city has indicated that it wants to provide an online platform in which people can collaborate, improve, remix and adapt the open textbooks provided by the municipality.

Both the Mayor and the Education Secretariat, with whom the OER-Brazil Project has liaised in developing and implementing an OER policy and technological strategy, are from Partido da Social Democracia Brasileira,[60] the traditional opposition to the Working Party (PT). This attracted criticism from some people within the open community, particularly those with affiliations or loyalties to PT, but the decree represents an important achievement in a cause that is and should be non-partisan.

A Crucial Element: Foster an OER Community

Policy cannot and should not be seen as an end in itself. The relevance of policy, specifically in the Brazil case, is (i) to regulate how the government uses its copyrights to educational resources that it funds directly and indirectly and (ii) to ensure that such materials are made available in a way that is efficient and transparent, and are freely accessible by the general public, teachers, students and self-learners (in particular), via the Internet.

The adoption of OER policy, besides solving the issue of public access to publicly funded resources, recognises that OER has the potential to realise more fully the constitutional mandate of the right to education, since it offers the possibility of access to learning for everyone and particularly for non-traditional groups of students, such as those in adult education or whose lifestyle does not allow participation in traditional institutional routines. Thus, it can widen participation in education, promote lifelong learning and bridge the gaps between non-formal, informal and formal learning.

However, policy without social acceptance and change tends to be worth no more than the paper it is written upon. Taking this into consideration, the OER-Brazil Project has commenced extensive work to foster the birth, growth and independence of an OER community in Brazil. In that work, the OER-Brazil Project creates connections with opinion leaders from sister communities — such as the free software community, open access community and librarians, amongst others — and leaders identified within the OER community, to contribute to OER awareness-raising and project development.

For that, a constant presence in social media is crucial, but so are regional workshops, conferences, participation in digital culture related events, such as Campus Party or the Digital Culture Forum, and meetings.[61] Such activities have developed better understandings of regional issues and needs, and helped the OER-Brazil Project to build a dialogue with regional communities of educators, students, policy makers and other stakeholders to assist them in appropriating open education and OER topics for their realities. These meetings continue and allow us to build a clearer and more appropriate understanding about how OER methodologies, projects and ideas could contribute to meeting regional needs.

Additionally, the OER-Brazil Project has been working both proactively (identifying needs and opportunities) and reactively (receiving questions and requests for support) with institutions. This has included ongoing work with schools like Porto Seguro and Dante Alighieri in São Paulo,[62] institutes such as Serviço Federal de Processamento de Dados,[63] individual projects, and non-profit organisations such as Educarede and Sempreviva (an organisation focussed on feminist rights), amongst others, to develop and adopt OER practices and projects. Often, such work is focussed on the implementation of a Creative Commons license or a change from a more to a less restrictive license. In this work, the OER-Brazil Project specifically provides training on licensing educational resources openly, using platforms such as Connexions to collaborate, and creating strategies for open business models[64] based on OER (Rossini, 2010b).

Finally, the OER-Brazil Project believes that collaboration with international initiatives, communities and discussions are relevant and provide legitimacy to community and policy efforts, besides allowing us to be on top of the most current

discussions and to circulate information from those discussions around Brazil. For example, the author was involved as early as 2005 in international OER discussions driven by UNESCO,[65] and also experimented with hands-on projects, idealising and building OER in the classroom[66] and assisting in the development of an open course.[67]

Such engagement has provided opportunities to support the creation of links and relationships amongst nationals and foreigners and to motivate the community to engage. For institutions, such engagement may mean the possibility of international partnerships; for politicians, it means recognition that the topic has international relevance; and for authors, it means the opportunity to open new doors for publication and adoption of their materials.

Conclusions

The OER philosophy identifies educational materials as common and public goods from which all should be able to benefit. This view is supported by the notion that knowledge itself is a collective social product that naturally forms a commons which should be accessible to all. Scholars see evidence of this commons formation in free software, access to scholarly literature, "free culture", and other areas in which the network has both disrupted traditional "read-only" culture and enabled the emergence of an empowered individual creator existing within a community of creators.

A key element of these communities is that the cost of copying and distributing new content drops to nearly zero after its production. In the education context, this change allows for the debate to focus on educational resources, which are often publicly funded. The question then becomes: "Once the public has paid for these resources (through taxes), how should the resources be managed and made available?"

OER — when it is properly designed and reflects legal and technical interoperability — encourages and enables the open production and sharing of, as well as access to, educational content and resources. This alone is a valuable societal good, increasing the potential value of investments made in education. But OER creates the opportunity for a more fundamental and transformative change: *the move from passive consumption of educational resources to the formal engagement of educators and learners in the creative process of education content development itself.* In Brazil, Projeto Folhas and the recent "Ambassadors" education initiative of the Wikimedia Foundation[68] are clear examples of such potential.

Brazil and Brazilian institutions are experimenting with openness in education, hoping to realise these fundamental changes, but we are just at the beginning of the journey. OER has a crucial role to play in a democratic, inclusive and open education, and recognition of this role is vital to engage policy makers and stakeholders who will support OER policy and projects.

The OER-Brazil Project provides some early lessons on how to bring a large, complex nation into the OER debate, and how to engage and push the debate from essentially nowhere to the highest levels of federal policy. It is not something that can be done on one front at a time. It requires community building, diligent relationship construction with politicians and their staff, and painstaking, constant alliance building and collaborative work. It also requires at least a small

group of people who are willing to commit to making the change to OER a part of their daily lives, as well as at least a small amount of external funding. Above all, it requires a good understanding of the educational systems, textbook dynamics and the market, as well as how and how much public funding goes into the development and purchasing of educational resources.

These experiences may offer something of a map for countries and organisations wishing to make a similar push for OER in their local context. But nothing can replace study of the local market and local investment in educational resources, or time spent building relationships at local, state and federal levels. OER is not something that can become policy through the efforts of one, or two, or even ten people. It demands the consciousness-raising of an entire set of communities — but it is very much achievable.

Notes

1. "The initiative outlines four key commitments to be undertaken by participating governments: a) increase the availability of information about government activities; b) support civic participation; c) implement the highest standards of professional integrity; d) increase access to new technologies for openness and accountability. Until September 20, the OGP declaration had been endorsed by Indonesia, Mexico, Norway, Philippines, South Africa, UK, US, and Brazil" (Lemos, 2011).
2. http://g1.globo.com/politica/noticia/2011/10/senado-aprova-fim-do-sigilo-eterno-de-documentos.html and www.article19.org/resources.php/resource/2791/en/brazil:-senate-approves-access-to-information-bill
3. http://softwarelivre.org/furusho/blog/governador-sergio-cabral-do-rio-sancionou-ontem-a-lei-59782011-sobre-odf
4. www.capetowndeclaration.org
5. The concept crafted by UNESCO in 2002 established that OER encompasses "[t]he open provision of educational resources enabled by information and education technologies, for consultation, use and adaptation by a community of users" (see www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources).
6. An online community formed in January 2009 and having a great diversity of members, who are interested in OER discussion and development and who co-operate in OER and related projects development. The community is present in social media platforms, such as Facebook, Twitter, blogs and mailing lists. One mailing list can be accessed at http://groups.google.com/group/rea-lista, and as of 7 November 2011 it had 140 members. The OER-Brazil Project also has a fixed presence on the Web through a variety of Web 2.0 channels, ranging from a website — which includes a blog, resources, a bibliography, policies, and an area for policy discussion (www.rea.net.br) — to Twitter (@reanetbr) and Facebook (www.facebook.com/groups/reabrasil). We also have a Flickr presence (www.flickr.com/photos/reanetbr) dedicated to related events and activities, and we are building a video channel to accumulate Brazilian experiences, for which we hope to gather international contributions. We built a hub within Wikimedia Brazil (http://br.wikimedia.org/wiki/Rea), which acts as an incubator of spin-off projects from the Brazilian OER community; the success of this "hub" was its "death", since OER projects are starting to pop up within the community without the need for a centralised structure. A series of materials and presentations (e.g., http://reabrasil.files.wordpress.com/2010/03/folder-rea2.pdf) were developed as supporting materials. We have also supported the development by Universidade Estadual de Campinas (UNICAMP) of an OER toolkit for teachers (http://educacaoaberta.org/wiki/index.php/Caderno_REA). Finally, as an additional way to put the spotlight on innovative community members and to exchange experiences, we have been developing a series of interviews, and plan to develop podcasts, chats and meetings.
7. This discussion happened mainly through the following discussion lists: oer-forum@lists.esn.org.za — which as of November 2011 had more than 340 participants from around the world — and rea-lista@googlegroups.com, a Brazilian discussion list.
8. For a discussion of free software developments in Brazil, see Shaw (2011).
9. "Open data principles", at the *Panton Principles* website, http://pantonprinciples.org
10. www.soros.org/openaccess
11. http://portaldoprofessor.mec.gov.br

12. http://portaldoprofessor.mec.gov.br/sobre.html

13. On legal and technical interoperability, see the following Creative Commons resources: http://wiki.creativecommons.org/Creative_Commons_and_Open_Educational_Resources, http://wiki.creativecommons.org/RDFa, http://wiki.creativecommons.org/Metadata and http://wiki.creativecommons.org/CcREL

14. Day by Day Education home page. In *Portal Dia a Dia da Educacao*. Retrieved 10 December 2011 from www.diaadiaeducacao.pr.gov.br. As of 23 January 2012, 507 Folhas have been published; see www.diadiaeducacao.pr.gov.br/portals/folhas/frm_resultadoBuscaFolhas.php. It is important to note that the Parana state has reformed its Web presence, changing the website from www.diaadiaeducacao.pr.gov.br to www.educacao.pr.gov.br.

15. See www.educadores.diaadia.pr.gov.br/modules/conteudo/conteudo.php?conteudo=6

16. The textbooks are available at www.alunos.diaadia.pr.gov.br/modules/conteudo/conteudo.php?conteudo=13

17. Brazilian Association of Reprographic Rights home page. Retrieved from www.abdr.org.br/site/

18. Currently, ABDR has abandoned the "Copying Books is a Crime" campaign — at least in its direct, aggressive form — and has switched to efforts at fostering new business models to facilitate access to educational materials through the closed and fee-based project "Professor Virtual Folder". See *Pasta do Professor* at https://pastadoprofessor.com.br/portal

19. "Article 150. Without prejudice to any other guarantees ensured to the taxpayers, the Union, the states, the Federal District and the municipalities are forbidden to: ... VI - institute taxes on: ... d) books, newspapers, periodicals and the paper intended for the printing thereof" (Constitution of the Federative Republic of Brazil, 1988).

20. There is no annual or monthly tuition, but students are responsible for the cost of books and living expenses. To attend the most prestigious public colleges and universities, students have to take a national examination and, if successful, they start school a couple of months later. Under the Lula administration, the government also adopted a programme of quotas for students who declare their race as black (which has driven great discussion and a current judicial lawsuit, since for many, inequality in Brazilian universities is caused by poverty, not race).

21. Brazil National Textbook Programme: www6.senado.gov.br/legislacao/ListaPublicacoes.action?id=218965

22. Brazil National Textbook Programme for Secondary Education: http://portal.mec.gov.br/index.php?option=com_content&view=article&id=13608:programa-nacionaldo-livro-didatico-para-o-ensino-medio-pnlem&catid=195:seb-educacao-basica

23. Brazilian National Textbook Programme for Youth and Adult Literacy: http://portal.mec.gov.br/index.php?option=com_content&view=article&id=12381:pnlafuncionamento&catid=314:pnla&Itemid=639

24. Brazil Literacy Programme: http://portal.mec.gov.br/index.php?option=com_content&view=article&id=12280&Itemid=86

25. Data retrieved from www.fnde.gov.br/index.php/pnld-dados-estatisticos

26. The salary-education tax was instituted in 1964 and is a social contribution (tax) destined towards the financing of projects, actions and programmes that are geared towards basic public education. That contribution is laid out in section 212, § 5º, of the Federal Constitution and is regulated by laws 9.424/96, 9.766/98, Decree nº 6003/2006 and Law nº 11.457/2007. This tax is calculated on a 2.5 per cent basis on all remunerations paid by companies. It is collected and inspected by the Federal Revenue Agency, an agency connected to the Treasury. The taxpayers of the salary-education tax are companies in general, as well as public and private entities connected to the pension system. It is up to FNDE to redistribute the resources obtained from these tax revenues.

27. Brazilian Law nº 9394, of 20 December 1996; see www.planalto.gov.br/ccivil_03/leis/L9394.htm

28. For a timeline and other discussion on the reform of the Brazilian copyright law, see Paranagua (2011).

29. Examples of such organisations are: the Open Society Foundations (www.soros.org); IDEC (www.idec.org.br); Creative Commons Brazil at Fundação Getúlio Vargas Law School (www.creativecommons.org.br); GPOPAI at University of São Paulo (www.gpopai.usp.br); the Open Access Group at USP, a group of professors and librarians leading the open access movement in that institution (www.acessoaberto.usp.br); Wikimedia Brasil, the volunteer community of the Wikimedia projects in Brazil (http://br.wikimedia.org); the OER Nucleus at the University of Campinas (http://educacaoaberta.org/rea); and a series of individuals from a variety of backgrounds and interests, including schools such as Dante Alighieri and Porto Seguro — which have started OER projects initiated within their core technology for education department, amongst others. This latter ad hoc coalition also includes individuals who support the OER cause and are

key to fostering institutional change. This includes personnel from Google Brazil, legislative consultants from the House and the Senate, hackers from the House of Digital Culture, personnel from the legislative department at the Brazilian presidency, and personnel at the Justice Ministry. Whilst such support does not constitute institutional endorsement, it assists in getting the debate going and also shows that the OER debate could flourish within such institutions when the time is right.

30. The "generative" effect of the networked society we associate with explosive innovation comes from the combination of open technologies, (free) software platforms that allow creative programming, the right to make creative reuse of content, and the widespread democratisation of the skills and tools required to exercise all of those rights. This idea was conceptualised by Jonathan Zittrain in his paper "The Generative Internet" (2006). It boils down more or less to a dynamic combination of utility, adaptability, ease of mastery, and accessibility. The fact that anyone can develop code to perform unanticipated functions and distribute it to the rest of the world with ease is the essence of generativity.

31. The National Campaign for the Right to Education was created in 1999 by a set of civil society organisations that participated in the World Education Forum in Dakar, Senegal. Today it is considered the broader and plural coalition within this field in Brazil, with more than 200 groups involved. See the Campanha Nacional pela Direito à Educação website, www.campanhaeducacao.org.br

32. See http://conae.mec.gov.br

33. See http://conae.mec.gov.br/index.php?option=com_content&view=article&id=363:pne&catid=100:mais-noticias

34. See http://conae.mec.gov.br/index.php?option=com_content&view=article&id=362:lula-envia-ao-congresso-nacional-pl-com-as-metas-para-2011-2020&catid=102:destaque

35. See the OER-Brazil Project website: http://rea.net.br/site/news-from-brazil-the-power-of-the-apples-and-open-educational-resources

36. Pictures of OER-Brazil Project members and volunteers at CONAE 2010 are on the project's Flickr channel: www.flickr.com/photos/reanetbr/sets/72157623620801571

37. The Encaminhamentos da Audiência na Câmara dos Deputados. See the OER-Brazil Project blog: http://rea.net.br/site/encaminhamentos-da-audiencia-na-camara-dos-deputados

38. PNE Bill. Brazilian House of Representatives website: www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=490116

39. OER Bill. Brazilian House of Representatives website: www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=505535

40. See http://pauloteixeira13.com.br/historia-de-luta

41. The 2009 campaign site for Paulo Teixeira brings OER under his proposals on education: http://pauloteixeira13.com.br/educacao

42. Audiência sobre REA no Ministério da Educaçao. In *OER-Brazil Project blog*. Retrieved from: http://rea.net.br/site/audiencia-sobre-rea-no-ministerio-da-educacao

43. REA vai a Brasilia! – UNESCO TIC para Educacao. In *OER-Brazil Project blog*. Retrieved from: http://rea.net.br/site/rea-vai-a-brasilia-inscreva-se/ and http://eventos.unesco.org.br/ticeducacao/Login.aspx

44. "Brazil, Egypt and United Kingdom among worst copyright regimes in the world, new consumer study reveals" (on the Brazil A2K website: www.a2kbrasil.org.br/wordpress/lang/pt-br/2011/04/brazil-egypt-and-united-kingdom-among-worst-copyright-regimes-in-the-world-new-consumer-study-reveals).

45. See the Wikipedia entry for "Institutional repository": http://en.wikipedia.org/wiki/Institutional_repository. Federated repositories are organised collections (heterogeneous databases) located in different places but searched transparently as one database via merging and mapping (federating). See http://dli.grainger.uiuc.edu/glossary.htm

46. See "PL 1513/2011," in *Projetos de Leis e Outras Proposições*: www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=505535

47. http://edemocracia.camara.gov.br

48. Home page of State Representative Simao Pedro: http://simaopedro.com.br

49. REA na Alesp and REA na Alesp: uma rica troca de ideias e experiências. In *REA*. Retrieved from: http://rea.net.br/site/rea-na-alesp-uma-rica-troca-de-ideias-e-experiencias/

50. See Toneto (2011).

51. On Hal Plotkin, see www.plotkin.com/HalsBioPage.htm

52. On Cable Green, see http://creativecommons.org/tag/cable-green

53. For Bill No. 989/2011, see www.al.sp.gov.br/portal/site/Internet/ListaProjetos?vgnextoid=b45fa965ad37d110VgnVCM1000006000014acRCRD&tipo=1

54. For details of the Creative Commons Attribution-NonCommercial-ShareAlike license, see http://creativecommons.org/licenses/by-nc-sa/3.0

55. From the São Paulo City Secretary of Education website: http://portalsme.prefeitura.sp.gov.br/AnonimoSistema/BannerTexto.aspx?MenuBannerID=23

56. See the Textbooks FAQ on the FNDE's website, www.fnde.gov.br/index.php/perg-livro-didatico, under the question "Por que em São Paulo é diferente?" ("Why is São Paulo different?").

57. One of the main ideas discussed in these interactions was how to replicate efforts such as the Projeto Folhas and how to include OER practices within the city's professional training curricula.

58. Decreto sobre REA em vigor em São Paulo! In *OER-Brazil Project* blog. Retrieved from: http://rea.net.br/site/decreto-sobre-rea-em-vigor-em-sao-paulo. Also, Explicando o Decreto sobre REA de São Paulo e suas implições legais e práticas. In *OER-Brazil Project* blog. Retrieved from: http://rea.net.br/site/explicando-o-decreto-sobre-rea-de-sao-paulo-e-suas-implicoes-legais-e-praticas/

59. This is necessary because the noncommercial restriction of the Creative Commons suite of licenses is not defined at length by the licenses themselves. There is also a lack of agreement within the legal community and the community of CC users regarding what noncommercial means, which is reflected in the *Defining Noncommercial* study report developed by Creative Commons (2009); see http://creativecommons.org/weblog/entry/17127.

60. www2.psdb.org.br is the party's home page.

61. Since 2008, the OER-Brazil Project has organised seven meetings in different regions of Brazil, including São Paulo and Brasilia.

62. The OER-Brazil Project has documented our work in the *OER-Brazil Project* blog at www.rea.net.br, but some examples of projects we assisted are: REA Dante (www.colegiodante.com.br/rea) and Porto Seguro/OCW (www.ocw.portoseguro.org.br). Both Dante and Porto Seguro are amongst the most traditional private schools in São Paulo. Additionally, we have made numerous presentations on OER at specific fora and meetings, including, for example, the Brazilian Open University working group, which is reviewing the university's copyright policy.

63. Serpro licencia 14 cursos EAD em Creative Commons. In *OER-Brazil Project.* Retrieved from: http://rea.net.br/site/serpro-licencia-14-cursos-ead-em-creative-commons

64. See the OpenBusiness Project: www.openbusiness.cc/about

65. See OER-WIKI, http://oerwiki.iiep.unesco.org

66. See Cadernos Colaborativos at the *FGV-Direito Rio* website: http://direitorio.fgv.br/graduacao/wiki

67. Copyright For Librarians, at the Berkman Center for Internet & Society (Harvard): http://cyber.law.harvard.edu/copyrightforlibrarians/Main_Page

68. See the Wikimedia Brazil Ambassadors program: http://br.wikimedia.org/wiki/Arquivo:Juliana_Bastos_-_embaixadores.ogv

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CHAPTER 15

Opening Education in New Zealand: A Snapshot of a Rapidly Evolving OER Ecosystem

Wayne Mackintosh

Abstract

This case study provides a summary of the context of development of open educational resources (OER) in New Zealand, including the culture, the society and the higher education sector challenges specific to that country which have prepared the ground for a number of open education initiatives. A series of small government-initiated interventions have culminated in the establishment of a national framework for open access licensing of government copyrighted content. Otago Polytechnic is an exemplary OER pioneer, becoming one of the first tertiary education institutions to adopt a default open intellectual property policy, which seeded the establishment of the OER Foundation and the OER university network that is now headquartered in New Zealand. The New Zealand case study highlights an incremental approach to open education, drawing on the interplay between government and institutional-led initiatives, which, over time, have contributed to more substantive change and subsequent open policies and approaches.

Keywords: *NZGOAL, OER Foundation, OER university, open licensing policy, Otago Polytechnic*

Introduction

Successful implementation of open education approaches[1] creates unprecedented possibilities for all countries to provide free learning opportunities for their students, especially those learners currently excluded from the formal sector.

New Zealand, as a small country, has made reasonable progress in establishing the foundations necessary for scalable take-up and integration of open education approaches in the formal education sector. Each country and context is unique, but nonetheless, important lessons can be derived from the New Zealand experience for practitioners and policy makers who are interested in considering

the challenges and opportunities for more sustainable education provision using open education approaches.

Some open education advocates suggest that achieving the vision of more affordable education by requiring integration of open education approaches may necessitate radical policy interventions, whereas those responsible for policy development are often more conservative in their approaches. New Zealand has implemented both radical and incremental examples at both policy and organisational implementation levels. This country case study will explore the interplay of factors within an evolving national experience of working towards a self-organising and self-sustaining ecosystem to support greater adoption of open education practices in the formal sector. The value of the open model lies in how the New Zealand experience might be reused, adapted and modified locally and elsewhere in fostering the development of sustainable and scalable open educational resource (OER) ecosystems.

New Zealand has succeeded in implementing open education related initiatives on a number of fronts:

- *Open source software in education*. The Open Polytechnic, with funding support from government, succeeded in pioneering the world's first enterprise-scale implementation of the Moodle open source learning management system, serving 35,000 students in 2004. This was a significant milestone for open source software in eLearning. The Open Polytechnic implementation triggered an international wave of adoptions by large providers, including, for instance, Athabasca University, in Canada, and The Open University, in the United Kingdom (Wyles, 2006). In a relatively short time frame, the majority of post-secondary institutions in New Zealand have subsequently migrated to open source software solutions as their preferred technology for learning management systems.
- *Open access licensing of Crown copyright*. The New Zealand Government Open Access Licensing framework (NZGOAL) was approved by Cabinet on 5 July 2010. NZGOAL encourages use of the most open of Creative Commons licenses for public sector information by state services agencies and Crown entities (see: http://nzgoal.info).
- *Implementing open intellectual property policies at the institutional level*. Otago Polytechnic was the first post-secondary institution in the world to adopt a default Creative Commons Attribution intellectual property policy and the first institution in Australasia to sign the Cape Town Open Education Declaration. To date, two New Zealand schools have also adopted open intellectual property policies.
- *New Zealand's role in the OER Tertiary Education Network and the OER university initiative.* New Zealand is host to the OER Foundation, an independent, non-profit organisation which works nationally and internationally to provide leadership, networking and support for educators and education institutions to achieve their strategic objectives using open education approaches. The New Zealand context and favourable policy environment provides fertile ground for hosting this organisation. The OER Foundation co-ordinates the OER Tertiary Education Network (OERTen), which is an international innovation partnership of accredited colleges, polytechnics and universities

organising implementation of the OER university. Of particular relevance to this case study is New Zealand's leadership in achieving what appears to be a critical mass of national institutions that are participating in this global OER network.

The case study commences with an overview of the New Zealand context, which underpins the innovations in and implementation of open education approaches. It then presents a succinct analysis of selected OER exemplars to provide a useful framework for considering the relationships between policy and practice, before concluding with reflections on lessons learned from these activities.

Context: Preparing the Ground for Open Education

"*We haven't the money, so we've got to think.*" — Ernest Rutherford

The interplay of local contextual factors with strategic government and institution-based interventions has prepared fertile ground for the growth of open education initiatives and policy interventions in New Zealand. Nurturing the development of a thriving open education ecosystem is arguably more important for sustainability and mainstream adoption of open education approaches than individual projects alone. The New Zealand experience confirms that, in open education, the "whole can be greater than the sum of the parts".

New Zealand is a small country with a population of only 4.3 million people. It has an impressive history of innovation, attributable to a local culture of resourcefulness combined with a social phenomenon of egalitarianism. The country's education system is well regarded internationally (see, for example, Shepard, 2010). However, mounting financial pressures in the tertiary sector will necessitate reconfiguration of the operational models to improve cost-efficiency and rationalisation of the system. Over the last decade, government has implemented a number of initiatives which have the potential to improve the system using open education approaches. Collectively, these contextual factors inform and sustain open education innovation in New Zealand.

Kiwi Culture and Society

New Zealand has a striking innovation track record (Mackintosh, 2004). Consider, for example: Robert Dickie's invention and patent of the world's first stamp vending machine; Richard Pearse's achievement of flying a self-built monoplane eight months before the Wright brothers' flight at Kitty Hawk, North Carolina; Harold Gillies' pioneering work in establishing the "discipline" of plastic surgery; Ernest Rutherford, the nuclear physicist and Noble Laureate for Chemistry, who was the first person to knowingly split the nucleus of an atom; Colin Murdoch's invention of the disposable syringe and tranquiliser dart gun; or Britten's V1000 racing motorcycle that dominated the international racing circuits in the 1990s.

This culture of resourcefulness can be attributed to the early pioneers, who were geographically removed from the rest of the world and building an existence on the "edges of the earth". The "No. 8 wire" metaphor of making anything from a piece of number eight fencing wire exemplifies the "can-do" attitude of New Zealanders as a cultural identity. The culture of being prepared to "try new things

out" is in part responsible for the willingness of New Zealand educators and leaders to experiment with the implementation of open education approaches.

There is a social phenomenon and strong ethic of egalitarianism in New Zealand. On the one hand, this supports the practice of collaboration for the benefit of society. On the other, it gives rise to the "tall poppy syndrome", a pejorative term which refers to the "New Zealand habit of denigrating or 'cutting down' those who are successful or who are high achievers" (Deverson, 1998). The paradox of "No.8 wire" innovation combined with the "tall poppy syndrome" provides opportunities for open education collaboration, but simultaneously curtails the rate of organic innovation leadership. In this context, building an OER ecosystem comprising many nodes is likely to be more successful than large-scale, single-institution-based projects.

Funding and Efficiency Challenges in the Tertiary Education System

New Zealand is positioned fourth on the OECD world rankings for education, compared, for example, with larger European counterparts like Germany (16th), France (18th) and the United Kingdom (20th), using the performance indices for reading, math and science (see Shepard, 2010).

New Zealand's state-funded tertiary education sector comprises eight universities, 20 regional-based institutes of technology and polytechnics, and three Wānanga (publicly funded institutions guided by Māori principles and values). The universities, polytechnics and Wānanga all have authority to award degrees registered with the New Zealand National Qualifications Authority (NZQA), in accordance with the Education Act 1989. Degree-awarding authority is not restricted to the university sector, ensuring parity, equivalence and quality of degree credentials registered with the NZQA.

New Zealand's universities, including the University of Auckland, the University of Otago, Massey University, the University of Canterbury and Victoria University of Wellington, are ranked within the top 500 universities in the world, according to the 2010 Shanghai Jiao Tong University Academic Ranking of World Universities (Smart, 2010).

The relatively high number of tertiary education providers for a small population, combined with a high gross enrolment ratio of 84 per cent for the 18 to 24 age cohort, places considerable pressure on the sector's funding model. Until 1989, government grants for tertiary study covered about 90 per cent of the student costs for tuition. Rapid growth in enrolments during the 1990s resulted in considerable reductions in the proportion of government grant coverage for equivalent full-time students and signalled a shift to a "user-pay" system. During the period from 1991 to 1999, average student fees increased by 170 per cent, compared with an increase of only 13 per cent in the consumer price index for the same period (New Zealand Ministry of Education, 2006). In 1992, government introduced a student loan scheme. Progressively, national student debt is becoming a decision barrier for potential students, with debt amounting to levels which are hard to repay for new entrants into the labour market. In response to these challenges, in 2004, government introduced a fees maxima regime, which restricted the amount by which tertiary education providers could increase student fees, thus placing further fiscal constraints on the system. In 2010, the new government introduced

the Annual Maximum Fee Movement, policy which also restricts the amounts by which fees can be increased.

The historical funding model has traditionally encouraged competition amongst tertiary providers. Competition can promote quality, but can also contribute to unnecessary duplication and inefficiencies within the system. This is particularly evident in New Zealand, given the relatively high number of providers for a small population that is geographically dispersed. The problem is amplified when organisations use a proprietary intellectual property model for course resources. Citing an extreme example, there are currently 62 registered qualifications available in New Zealand that are intended for the education and training of tertiary teachers, serving an average intake of approximately 1,000 learners per annum (Projects International, 2010). The NZQA is undertaking a comprehensive review of the system to reduce duplication and proliferation of qualifications. It is hoped that, as a Crown entity, government's open accessing licensing framework will inform strategies for rationalising the qualifications framework using open education approaches. For example, generic national qualifications like the NZ Diploma in Business, which can be offered by all accredited institutions, could use the framework to map the availability of OER courses produced by New Zealand institutions and those recontextualised from elsewhere to avoid similar subjects being duplicated by closed course alternatives within institution-approved credentials programmes. Open and transparent development of the processes and frameworks for rationalising qualifications would foster the principles of self-organisation within the sector when institutions propose new qualifications or decisions favouring closed course developments.

The funding challenges facing tertiary education in New Zealand provide fertile ground for the sector to explore the potential of open education approaches as a mechanism for reducing costs and improving efficiency in the state-funded sector.

Early Government Interventions and Foundations for Open Education

Various government initiatives have contributed to a favourable policy environment for open education futures in New Zealand. For example, government established the E-learning Advisory Group in July 2001, culminating in a report published in March 2002, entitled "Highways and Pathways: Exploring New Zealand's e-Learning Opportunities" (ELAG, 2002). Essential outcomes of the report worthy of mention include:

1. The recurring theme of collaboration and dialogue within the sector as a necessary prerequisite to achieve sustainable eLearning futures.
2. The emphasis on local leadership to forge an eLearning vision with a New Zealand identity.

Another good example of a government initiative was the establishment of the e-Learning Collaborative Development Fund, which invested $28 million over four years from July 2003 to June 2007. This was a relatively small investment compared to similar investments abroad at the time. However, this competitive fund was designed to enhance the system's capability with a conditional requirement for inter-institutional collaboration. Whilst not requiring open licenses at the time, the funding agreement stipulated that the outcomes were to be made available for use across the tertiary sector. The e-Learning Collaborative Development

Fund facilitated networking and relationship-building amongst individuals and institutions who had previously worked in isolation under a very competitive model. A number of the networks and relationships established as a result of this development fund are currently driving OER innovations in New Zealand.

The Ministry of Economic Development also announced government's draft Digital Strategy in 2004. This whole-of-government strategy was developed by several departments using an open consultation process. Its vision was for New Zealand to become a world leader in using information and communication technology to realise its economic, social, environmental and cultural goals, for the benefit of all its people. The Digital Strategy was a precursor to subsequent work on government's open licensing framework (discussed below).

In 2006, the National Library convened a meeting to discuss the establishment of a Creative Commons project under the New Zealand Digital Strategy. The Council for Humanities agreed to host the project. The development of Creative Commons Aotearoa New Zealand (CCANZ) is unique in that a number of government departments, including the National Library, the Ministry of Education, and the State Services Commission, were instrumental in securing a three-year government grant for the establishment of the New Zealand Creative Commons affiliate, which is now hosted at the Royal Society of New Zealand.

The national networking and experience-based knowledge gained from these government-initiated projects prepared the way for policy interventions, leading to radical improvements to support open content initiatives for state-funded resources.

Kiwi Open Education Initiatives

The Adoption of Open Source Software in Tertiary Education

The New Zealand Open Source Virtual Learning Environment project was one of the initiatives funded by government's e-Learning Collaborative Development Fund. The Open Polytechnic, as project lead, initiated a sector-wide consortium, which grew to 20 universities, polytechnics and training enterprises collaborating on the review and selection of an open source learning management system, followed by an investment of NZ$1.6 million in code development to improve the security and scalability of the Moodle open source platform. Code developments and improvements to the software were shared back with the community in accordance with the General Public License obligation, thus meeting the collaborative fund's requirement to make the outputs accessible for the sector. In November 2004, the Open Polytechnic implemented an enterprise-scale deployment of Moodle serving 35,000 learners. Large organisations were now in a position to migrate to Moodle with the evidence of a large-scale deployment that would support their students at an enterprise production level. Government's e-Learning Collaborative Development Fund also financed a collaborative venture involving Massey University, Auckland University of Technology, the Open Polytechnic of New Zealand, and Victoria University of Wellington to develop the popular Mahara open source e-portfolio system, which is also increasingly being used in the New Zealand school sector.

This project represented a relatively small investment from government, but the requirements to collaborate and share outputs as a condition of funding has contributed to sector-wide adoption of open technologies. Today, 77 per cent of New Zealand's tertiary education institutions in the formal sector have now migrated to Moodle, compared with Moodle's global market penetration of 10 per cent in 2010 (see Moodle, 2011).

As New Zealand is a small country, the continued maintenance funding that would be required, for instance, for a nationally agreed technology platform would not have been affordable. However, the foresight of investing strategically in an open source project to address improvements needed for an enterprise-scale implementation at the Open Polytechnic enabled all New Zealand institutions to benefit because of the open source code base. Moreover, New Zealand continues to benefit from the code improvements provided by the international development community, long after the initial investment.

Strategic government investment in open technologies can also be a catalyst for new business opportunities in the corporate world. For example, the tacit knowledge and experience in collaborating with the Moodle development have resulted in new corporate ventures like Totara Learning Systems, which provides services for corporate training organisations both nationally and internationally to deploy enterprise-level learning management platforms using customised versions of Moodle. These services include customisations of the Moodle system for corporate training, and learning design services.

The New Zealand Government Open Access Licensing Framework (NZGOAL)

The State Services Commission and the Department of Internal Affairs led work to develop the New Zealand Government Open Access and Licensing framework (NZGOAL). Following two years of research and consultation, the NZGOAL framework was approved by Cabinet on 5 July 2010, making New Zealand's the first government in the world to implement a Creative Commons licensing framework for public sector information.

From 2008 to early 2009, the State Services Commission conducted research into the reuse of public sector information, and reviewed the Creative Commons New Zealand licenses as a legal tool to standardise the licensing of Crown copyright. In March 2009, a discussion paper was released and, after wide consultation with many government agencies (including feedback and support from external interested individuals and organisations), the framework was tabled for approval by Cabinet. The international recognition and standardisation provided by Creative Commons licenses — which had already been ported for the New Zealand Copyright Act by CCANZ — provided an enabling and trusted legal foundation for the framework. The savings in taxpayer dollars that resulted from discontinuing the legal overhead costs associated with administering custom license permissions of public sector information provided a compelling motivation for adoption. Moreover, government has recognised that reuse of taxpayer-funded information by third parties may hold significant creative and economic benefits for its citizens. The NZGOAL framework states:

> It is widely recognised, in New Zealand and abroad, that significant creative and economic potential may lie dormant in such copyright and non-copyright material when locked up in agencies and not released on terms allowing reuse by others. That potential is two-fold:
>
> - potential for individuals, non-profit and commercial organisations to leverage this material for creative, cultural and economic growth, improved environmental sustainability, greater productivity, and the wider public benefit; and
> - potential for experts and others to contribute to improved policy development and more efficient financial performance by government through being able to access, manipulate and provide feedback on such material. (State Services Commission, 2010)

The NZGOAL framework encompasses a series of policy principles that embrace concepts of open access, open licensing, creativity and open formats. In short, all public service departments are directed to license copyrighted works under open terms and implement the principles of NZGOAL. Other Crown entities are strongly encouraged to do likewise, whilst school boards of trustees are invited to implement the NZGOAL principles. Unfortunately, though, tertiary education institutions have been excluded from NZGOAL. The principle recommendation of NZGOAL is that:

> State Services agencies should make their copyright works which are or may be of interest or use to people available for re-use on the most open of licensing terms available within NZGOAL (the **Open Licensing Principle**). To the greatest extent practicable, such works should be made available online. The most open of licensing terms available within NZGOAL is the Creative Commons Attribution (BY) licence. (State Services Commission, 2010)

The State Services Commission has developed a series of support resources, including guidelines for agencies and for users intending to reuse public sector information. An impressive online decision tool has been developed, which produces a detailed report containing recommendations on license alternatives and recommendations for agencies implementing the framework. These resources are available on the NZGOAL website, and licensed under the most open Creative Commons license (see http://nzgoal.info).

The successful adoption of the NZGOAL framework by national government was in part predicated by earlier successes in smaller, but influential, projects. Leadership from a few government agencies involved in fostering the establishment of CCANZ was also important in building trust with open licenses.

The preceding government initiatives, including the e-Learning Collaborative Development Fund and the Digital Strategy, have contributed towards creating a favourable environment to adopt the ground-breaking NZGOAL policy. This suggests that a series of smaller interventions can contribute to substantive policy change.

In the case of New Zealand, government departments championed the establishment of the national Creative Commons affiliate with open community engagement, albeit from comparatively small funding contributions from different

state agencies. This shared ownership and porting of the Creative Commons licenses for the national Copyright Act ensured high levels of trust by the policy decision makers prior to adoption of the NZGOAL framework by Parliament.

NZGOAL and the supporting resources are available under a Creative Commons Attribution license. Therefore, these resources can be reused, adapted and modified by other countries for their own purposes, thereby saving time and cost in the implementation of open licensing frameworks elsewhere.

Implementing an Open Intellectual Property Policy at Otago Polytechnic

In February 2009, Otago Polytechnic adopted an intellectual property policy which provides for intellectual property produced by staff to be licensed under a default Creative Commons Attribution license. Otago Polytechnic was the first post-secondary institution in the world to adopt a default Creative Commons Attribution licensing policy.

Prior to this, the polytechnic had no formal policy on intellectual property and was operating under the normal provisions of the Copyright Act, whereby the intellectual property of works produced in the course of employment belonged to the employer under "all rights reserved" copyright. The polytechnic's executive saw the need to formalise an institutional policy, and sought legal expertise to help draw up an initial framework to circulate for consultation.

According to this initial proposal and very different framework, Otago Polytechnic would have owned the copyright of material developed at the institution, in alignment with the default "all rights reserved" Copyright Act provisions. The draft framework proposal was not well received by staff, who felt that the organisation did not have the right to own their thinking. Students also objected to the policy proposal, which would have contractually attributed custodianship of their intellectual property in course outputs to the institution. Some students protested, suggesting that they would do what was necessary to get a qualification, but would keep their best work and creative ideas to themselves for employment prospects after graduation. From an educational perspective, it seemed that a policy of taking ownership of people's intellectual property could constrain learning, creativity and knowledge development.

Following a two-year consultation and revision process, Otago Polytechnic proposed a unique and appropriate solution for a digital age. The new policy provides dual ownership of intellectual property by the institution and its creators, on condition that it is licensed under a Creative Commons Attribution license. In this way, the institutional investment in teaching materials and research output is protected, but with the freedoms for staff and students to reuse, adapt and modify their creative works for any purpose, including commercial activity. The policy enables Otago Polytechnic staff to publish and disseminate research findings freely, without compromising their intellectual property rights. The policy has resulted in a win-win solution for all stakeholders.

Otago Polytechnic's ground-breaking intellectual property policy has created a precedent for New Zealand schools to reconsider their intellectual property policies. The Boards of Trustees of Warrington School and Albany Senior High School have approved open licensing policies using Creative Commons licenses,

based on the Otago Polytechnic example. The Ministry of Education has also seen the value of open licensing policies for schools. The NZGOAL framework provides a policy incentive for boards of trustees of New Zealand schools to release teaching materials under the most open Creative Commons licenses. The Ministry is collaborating with CCANZ in hosting a series of information sessions for school boards, and is targeting the adoption of open license policies at 30 schools within the next year.

A robust and open consultative process spanning two years, combined with a willingness from the polytechnic's executive to address concerns associated with intellectual property, has resulted in a world-leading solution enabled by the Creative Commons legal framework. A number of tertiary education providers postulate that the open licensing of courses could result in decreased student enrolments. Of particular interest is that the open policy at Otago Polytechnic has not resulted in changes to enrolment patterns, nor in decreased student registrations at the institution.

Since the adoption of an open intellectual property policy, course resources shared under open licenses are increasing steadily at the polytechnic. Opening course design and development practices has improved collaboration on campus. But whilst changes in intellectual property policy are important enablers, Otago Polytechnic experience indicates that they are not sufficient to guarantee adoption and integration of OER into mainstream practice. Policy changes need to be supported by corresponding operational plans and clearly defined targets. In 2012, Otago Polytechnic will thus develop a strategy, milestones and targets for OER adoption.

The international profile of this small regional polytechnic, and the resultant global collaboration networks, have increased considerably since the adoption of OER-friendly policies and practices. Institutions considering replication of this approach may argue that Otago Polytechnic has a "first-mover" advantage and that followers would not derive the same levels of benefit from international exposure, or that Otago Polytechnic's advantage may recede over time, should more institutions join the move to open intellectual property policies. However, open policy and open educational practices are non-competing strategies because simultaneous "consumption" of open practices does not erode individual benefits. The more institutions that join a network of those opening their practices, the greater the returns will be for individual institutions, because the multiplier effect rapidly scales beyond what individual organisations can achieve on their own.

The OER Tertiary Education Network and OER University Initiative

The OER Foundation is an independent, not-for-profit organisation that works internationally to support mainstream adoption of OER in the formal education sector. Within the context of this case study, the national track record of policy developments towards openness, combined with a context and cultural predisposition to nurture the growth of a charity dedicated to OER, was a significant factor in the Foundation's decision to locate the headquarters of this international OER initiative in New Zealand. Otago Polytechnic's leadership in open education and sustainable education practice provided an ideal home environment for the offices of the OER Foundation. As the first post-secondary

education institution in the world to adopt a default open intellectual property licensing policy, Otago Polytechnic had the capability and maturity in open approaches for its council to implement an executive decision to establish the OER Foundation as an independent non-profit entity in 2009.

The OER Foundation is co-ordinating the OER Tertiary Education Network, an innovation partnership of accredited universities, colleges and polytechnics from around the world that are collaborating on the implementation of the OER university (Mackintosh, Taylor, & McGreal, 2011). The OER university (OERu) aims to provide free learning to all students worldwide using courses based solely on OER, with pathways to gain credible qualifications from recognised education institutions.

By combining OER with the community service mission, it is possible to create what Taylor has called a "parallel universe" of higher education delivery to complement and augment existing provisions, especially for those who lack the means to follow traditional learning paths. Moreover, the OER university concept is a means whereby education at all levels can be more accessible, more affordable and more efficient by reinvesting savings of shared course development back into the formal teaching operations. The OERu model can provide high-quality, independent-study OER courses mapped to credentials. Partner institutions will provide assessment and credential services on a fee-for-service basis or using alternative revenue sources, including government grants and subsidies.

The OERu network will be able to accredit OER learning in Africa, Asia, North America and Oceania from 13 founding anchor partners: Athabasca University, Canada; Dr. Babasaheb Ambedkar Open University, India; Empire State College (State University of New York), USA; Nelson Marlborough Institute of Technology, New Zealand; NorthTec, New Zealand; Open Polytechnic, New Zealand; Otago Polytechnic, New Zealand; Southern New Hampshire University, USA; Thompson Rivers University, Canada; the University of Canterbury, New Zealand; the University of South Africa, Republic of South Africa; the University of Southern Queensland, Australia; and the University of Wollongong, Australia.

The earlier investments by government in the e-Learning Collaborative Development Fund and other national collaborative eLearning projects have established collaborative networks within the New Zealand tertiary sector that have extended beyond the lifecycle of the funded projects. The resultant personal relationships between individuals and institutions have enabled New Zealand partners to respond relatively quickly to taking the decision to join the OERu, supported by the prior knowledge and experience of the benefits of sectoral collaboration. This, combined with the unique New Zealand culture of innovation, has resulted in New Zealand contributing five founding anchor partners. Five institutions equates to approximately 16 per cent of New Zealand's state-funded tertiary institutions joining the OER Tertiary Network, which is a significantly higher percentage than in any other country currently in the network.

New Zealand may be well positioned to become the first country to achieve the theoretical threshold at which a critical mass for the OERu concept can be attained at a national level. Below this theoretical threshold, the concept will abort, but above, it will grow and scale. The critical threshold is the point at which there is

a decisive and sustainable competitive advantage relative to the current market proposition. Conceptually, having three institutions that agree to collaborate on OER courses represents the point where individual partners get more in return than they invest. For example, with three institutions, if each institution assembles one OER course mapped to an agreed credential, they will receive two courses in return.

The 13 founding anchor partners have each committed to the assembly of two courses based entirely on OER materials and are working on transfer credit recognition of the selected OER courses within the network, towards an agreed credential. The partners have also decided to provide learners with more curriculum choices at the undergraduate level by prioritising courses which would contribute towards a Bachelor of General Studies, as the first credential of the OERu network (OER Foundation, 2011). The anchor partners have agreed to launch the initial prototype courses during the second half of 2012, with the international launch of credited OERu courses planned for 2013.

OERu courses will be designed as independent study materials incorporating emergent "pedagogies of discovery", now possible through the growing inventory of OER available on the Internet — for example, using structured OER webquests or guided "e-tivities" (see Salmon, 2002). The courses will be designed to incorporate student content and student–lecturer interactions through simulated dialogue (for example, prepared feedback on learning activities). The integration of peer-to-peer learner support strategies using social software technologies will be a core feature of the delivery model.

Working in parallel with the design and assembly of OERu courses, the anchor partners are planning to implement a system of support which is tentatively called "Academic Volunteers International". Academic Volunteers International aims to develop a financially sustainable and scalable system of support for OERu learners, drawing on a gifting culture and a global network of individual philanthropy. A critical mass of interested people who, for example, donate one hour per week could conceivably scale through a strategically designed system of mass-collaboration.

Academic Volunteers International could leverage the Pareto principle, which indicates that 80 per cent of the support requirements could, for instance, be achieved by only 20 per cent of the total effort. For example, this would include a notion that 80 per cent of new students' questions have already been asked in previous offerings of a course. Consequently, it would be possible to create Frequently Asked Questions (FAQ) databases as part of the course development and maintenance process. A hybridised approach, drawing on game theory and the open source software experience, with reference to meritocracy and community kudos, could be effectively reused and modified for Academic Volunteers International. A combination of community status coupled with a pyramid design, wherein most queries can be resolved before a senior community volunteer needs to spend time on them, would be key to scalability of the model. The sequence for requesting support would then, for instance, be first to consult the searchable FAQ database, then to request peer-to-peer support from the active global OERu cohort, then to ask for help from general academic volunteer supporters, and finally to engage the academic volunteer content "experts", who have earned their status through the ranks of the system.

The OERu partners envisage a number of potential sources for community volunteers. Examples include:

- Retired academics who could be recruited using an "honour referral" approach.
- Existing academics, with community service recognition being integrated into the staff appraisal systems of the OERu anchor partner institutions.
- Students who participate in community service learning courses, with course credit being provided for OERu service hours.
- OERu senior students, who could qualify for rebates or discounts on assessment and credential services from OERu anchor partners, in return for providing support through Academic Volunteers International.

Academic Volunteers International is not intended to replace conventional tuition services offered by traditional institutions, but rather to generate an international social networking space to support OERu learners with a "parallel learning universe" (Taylor, 2007), especially for learners who are excluded from the formal post-secondary sector.

OERu learners are not formally registered as students until the point that they decide to acquire assessment services from one of the OERu anchor partners. At this point, OERu learners may be required, for instance, to submit a structured learning portfolio as specified in the OERu course or sit a challenge examination, depending on the learning outcomes and/or policy requirements of the respective anchor partner. The OERu anchor partners will agree to credit-transfer arrangements for OERu courses, within the existing course articulation and matriculation requirements of the respective anchor partners. Credentials will be awarded by the respective anchor partner where the OERu learner chooses to graduate.

The OERu model is gaining traction because the founding members have been careful not to innovate beyond the society's or economy's capacity to accept a credentialing model based on OER courses. Quality assurance and the awarding of credible credentials provide the foundations on which the model is being designed. The notion of disaggregating university services is not a new phenomenon. The University of London, 150 years ago, started providing an "examination-only" service, irrespective of where students had acquired their learning through their external studies programme. If students could pass the University of London examinations, they could get a degree. The OER university concept is building on this model, but using a global networked approach, combined with new digital technologies for delivery and peer-to-peer learning support.

The strength of the OERu model lies in leveraging the benefits of a global network whilst retaining institutional autonomy at the national level. Implementation strategies are based on a capability maturity model, which uses existing organisational polices rather than requirements to change organisational policy to fit an idealised view of the future. So, for example, most institutions have procedures for recognising transfer credit of courses from other institutions, and the OERu will function within these parameters. Many of the founding anchor partners have in place robust policies on recognition of prior learning (RPL),

providing a policy precedent for formal recognition of OER learning acquired outside of the traditional classroom. It would appear that institutions that have more progressive RPL policies will derive greater benefits from the OERu than those who do not.

The financial model appears to be economically sustainable because recurrent costs for assessment services will be recouped on a cost-recovery basis or from alternate revenue sources (for example, government sponsorships). The marginal cost of replicating digital learning materials should be near zero, and sharing the capital development costs of producing high-quality learning materials amongst multiple institutions improves cost efficiencies. Moreover, from an investment-decision perspective, participation in the OERu network does not require new money, but rather a reallocation of existing staff time to releasing selected development outputs under open licenses for the OERu network. On the demand side, existing delivery models are not able to meet the international demand for post-secondary education. Many countries do not have the resources to build the number of conventional universities that would be required to meet the future demand for tertiary education.

As New Zealand has a small population and a relatively high number of post-secondary institutions, several of these tertiary education institutions have recognised that sustainable integration of OER into mainstream operations locally necessitates collaboration on a global scale. In the absence of this global networking, the OERTen would not have achieved the critical mass of course contributions for the OERu model, and done so within the relatively short period of eight months since proposing the logic model for the concept and since the OERu 2011 meeting of founding anchor partners. Moreover, the more institutions and countries that participate in these networks, the greater the return on investment should be for national and individual institutions.

Reflections on Lessons Learned

The New Zealand experience is best described as a sectoral capability maturity model,[2] developing capacity and tacit knowledge in networked digital collaboration. A cultural disposition and willingness to experiment with new ideas has increased the return on investment from government-initiated projects and policy developments. Three distinctive phases can be observed:

1. Early government interventions built capability for eLearning in the sector, requiring collaboration as a condition for competitive funding proposals.
2. Government and institutional policy catalysts functioned as enablers for further innovation. Notable examples include the establishment of CCANZ with strong leadership and support from a few state agencies, building on the earlier work of the Ministry of Economic Development in developing a Digital Strategy for New Zealand. In parallel, the Otago Polytechnic implemented an open intellectual property policy at the institutional level, and Lincoln University is in the process of discussing an open access policy for research publications.
3. The above activities led to adoption of a national government open licensing framework for Crown copyright resources funded by taxpayers.

The New Zealand experience demonstrates that relatively small government interventions over a sustained period that complement innovations in the sector can contribute to more significant policy catalysts, which in turn fuel further implementation and innovation in the sector as a recursive process. Interplay between the various initiatives should not be underestimated. These appear to function as nodes within a dynamically evolving OER ecosystem. For example, the New Zealand Open Source Virtual Learning Environment project, funded by government, has resulted in a comparatively high level of adoption of the Moodle open source platform in the New Zealand tertiary sector. Apart from the direct benefits, senior managers within the tertiary sector have gained valuable experience in the benefits of the essential freedoms underpinning open source software. This provides a frame of reference for appreciating the potential benefits of "open source learning material", corresponding with the OER permissions associated with the four "Rs", namely the ability to Reuse, Revise, Remix and Redistribute open content learning materials (Hilton, Wiley, Stein, & Johnson 2010). The experience of using open source software at a large number of institutions has provided a sector-wide frame of reference for understanding the mechanics of the OER model.

The principles of NZGOAL could contribute to improvements in the efficiency of the New Zealand education system. However, it is unfortunate that the framework did not include state-funded tertiary education institutions. To be fair to government, the inclusion of tertiary education institutions in NZGOAL would have infringed on the academic freedom and autonomy of these institutions. Also, the "user-pay" component of funding of the tertiary sector creates complexities in determining which content assets are funded by taxpayers through government grants to institutions. Similarly, a stronger directive than "invited", in the case of school boards of trustees, would have reduced the transaction costs required to lobby and consult with each individual board in the school sector. Given these complexities, NZGOAL sends a strong signal to the formal education sector that the preference of government for taxpayer-funded information is to use the most open of Creative Commons licenses.

Otago Polytechnic's adoption of an open intellectual property policy demonstrates that this can be done without losing students. The traditional "all rights reserved" intellectual property policies, used at the majority of state-funded education institutions where copyright is assigned to the institution, are intended to protect organisational investment in the development and maintenance of teaching resources. For example, these policies serve to ensure that the institution can continue to use teaching materials in the event that an academic should move to another institution. But using the Creative Commons Attribution or ShareAlike licenses similarly protects such investment for ongoing use of these teaching materials in the organisation, irrespective of whether the copyright is assigned to the creator, institution or a joint-ownership scheme. The adoption of closed intellectual property policies is problematic for two reasons. First, it excludes organisations from saving money and time through shared development amongst multiple organisations. Second, it potentially contributes to taxpayers having to pay more for their teaching materials. Consequently, it seems more effective to implement open licenses as a default and deal with an "all rights reserved" copyright as the exception, for commercially sensitive developments.

Each enterprise operates within a specific value network, comprising a nested network of producers and market users. Similarly, educational institutions have processes for developing and delivering teaching and learning to their students within a complex educational market. There are technologies that will enhance the performance of existing processes, and conceivably there are technologies that could result in a new value network from both an economic and a pedagogical perspective. Christensen's (2003) seminal research identified the notion of "disruptive technologies" that are closely aligned with certain types of innovation because they result in new market propositions that did not exist before. Providing free learning opportunities using digital technologies and courses based solely on OER, combined with a global network that can accredit these OER learners, is potentially a disruptive innovation. That said, the 13 founding anchor partners of the OERu network have agreed to implement this model in an incremental way. Therefore, the OERu network partners will have a competitive advantage above those institutions which prefer not to integrate OER into their delivery models. The strategic approach is to create an environment for all institutions to consider the integration of OER approaches in order to remain "competitive" within their own markets. In this way, the OER Foundation achieves its strategic mission to assist all institutions in mainstreaming OER adoption.

The New Zealand case study gives rise to the question of the relative merit of evolutionary versus revolutionary policy change. On the one hand, evolutionary change is stable, predictable and easier to manage. Also, assuming that organisations, society and the economy can maintain a sustained series of incremental changes, the combined effect of these minor changes may collectively come to represent fundamental transformation. On the other hand, revolutionary transformation may be a necessary catalyst to push organisations through turbulent times associated with far-reaching changes in their respective operational environments. In such a situation, the absence of radical change strategies and corresponding policy interventions may impact negatively on the continued success and efficiency of the education sector.

It is difficult to know which strategy to recommend. However, it appears that successful organisations are those that have the capacity "to perceive evolutionary and revolutionary change as faces of the same coin, and to recognize when each is appropriate" (Goldsmith & Clutterbuck, 1997). This is the approach that New Zealand is implementing on its journey towards more sustainable education solutions. The e-Learning Collaborative Development Fund was an early intervention aimed at building capacity for eLearning through collaboration, and resulted in the unanticipated outcome of significant progress in the adoption of open source software infrastructure technology in the New Zealand tertiary sector. Such projects are examples of evolutionary strategies which established the context and foundations for institutional preparedness to consider the implementation of more revolutionary policy interventions, like NZGOAL.

Open education enthusiasts frequently cite the need for substantive policy interventions as a prerequisite to facilitate the mainstream adoption of OER (see, for example, Green, 2011). Notwithstanding the compelling logic for policy reform to enable systemic adoption of open education practices, and New Zealand's experience with government's policy for radical open licensing reform of public sector resources, the relationship between policy and implementation is more

tenuous than policy makers and open education practitioners would care to admit. Policy is not developed in a vacuum, and policy alone will not effect the changes needed for mainstream adoption of OER. For example, to date, Parliament's adoption of NZGOAL has not resulted in active engagement by the tertiary sector, commencing with policy reform in opening intellectual property policies at the institutional level. It would appear that grassroots institutional initiatives which succeed in challenging the status quo of closed course approaches by generating competitive advantage through the use of open education approaches are equally important in contributing to the transformation needed for mainstream integration of OER.

Conclusion

New Zealand has achieved a number of world-first policy and sectoral implementations that integrate open education into mainstream operations in the education sector. In part, this can be attributed to a cultural identity and disposition to "get things done". The New Zealand case study highlights an incremental approach drawing on the interplay between government and institution-led initiatives which, over time, have contributed to more substantive changes and subsequent open policies. Transparent consultation and planning processes contribute to improved rates of adoption at a national level, as evidenced by the five tertiary education organisations joining the OERu as founding anchor partners. New Zealand is nurturing the development of an OER ecosystem encompassing multiple nodes of government interventions, institutional innovations and international partnerships. This approach is resilient and sustainable because it is not singularly dependent on any intervention or dedicated funding stream.

Growing numbers of organisations in New Zealand are beginning to see OER as a means by which education at all levels can be made more accessible, more affordable and more efficient. For individuals, OER can facilitate access to the world's best learning materials whilst lowering the cost of study through open textbook initiatives. Using OER approaches, institutions can reduce the cost and time required to produce high-quality courses, and they can realise untapped potential to diversify curriculum offerings, especially for low-enrolment courses, in a cost-effective way. Governments and whole education systems can improve the return on taxpayer dollars by providing systemic incentives to ensure release of education materials under open content licenses.

Notes

1. In the context of this chapter, open education approaches refer to a range of concepts referencing openness in education, including OER, open education practices, open source software, open philanthropy, open governance, etc.

2 The capability maturity model originated from software development approaches as an objective assessment model to gauge, manage and improve the implementation of processes required for quality outputs. The model recognises that institutions may demonstrate different levels of maturity regarding the range of core processes, and can therefore implement cycles of continuous improvement through monitoring and benchmarking of these processes.

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Conclusion: Reflections on Practice

Jenny Glennie, Ken Harley and Neil Butcher

The chapters of this book cover different kinds of OER initiatives and strategies across a range of disciplines and institutions in varied countries and contexts. The interplay between policy and practice, and OER "take-up" in general, are the most powerful themes covered.

Do the chapters collectively yield insights that might help to shape OER development in ways that enhance teaching and learning in higher education?

In answering this question, it is important to remain mindful of the selective nature of the knowledge base informing our discussion. With the exception of the contributions of Badarch, Knyazeva and Lane, and of Myers, success rather than setbacks and obstacles dominates the chapters. Likewise, authors were selected on the basis of their experiences of grappling with OER implementation issues of some kind, so they tend to be — at least in principle — ideologically in favour of opening access to educational resources. There is not much counter-evidence with which to balance our reliance on generally positive developments! In accordance with the norm, readers are thus left with the task of comparing our interpretations of the chapters with theirs, in light of their own OER insights and experiences.

Overall Conclusions

Changes in Teaching and Learning — and the Impact of Technology and Open Access

In the broader literature, much has been written about the effects of managerialism and new forms of accountability on higher education, and in particular on teaching and learning. However, as this collection suggests, external political pressures are unlikely to affect teaching and learning as profoundly as technology and the concurrent rapidly increasing availability of openly licensed

materials. There is a wealth of resources "out there", as Levey demonstrates, and anyone with access to the Internet and a little know-how can select what they wish to use. They can also choose when, how and the extent to which they wish to use the knowledge they access. As a result, as Phillips notes, teachers are increasingly required to occupy the role of "curator" rather than conveyor of knowledge.

The responsibility of "curatorship" has major implications. Worldwide, in recent years, teachers in all sectors of education have been subject to calls that they move towards becoming "facilitators" of learning. The concept of "facilitator" refers mainly to the pedagogic relationship between the teacher and the learner. Teaching should become more interactive; it should encourage active, enquiry-based learning, with students taking more initiative and responsibility for their own learning. Curatorship pushes teachers into an even more challenging role by assigning them responsibility for locating and selecting the resource or knowledge base to underpin the "facilitation" of learning. No longer is this base comprised simply of catalogued library books and journals. While the term "curator" has always been associated with fixed museum- or heritage-type artifacts, it now refers to management of sources of knowledge that are boundless, dynamic and ever expanding.

Most fundamentally, as Lane points out, social relationships between institutions, teachers and students have changed. Even our notion of "students" has changed (or, at least, needs to change).

The world in which the academy and higher education operate has transformed dramatically. In this conclusion, we discuss some of the issues that emerge as significant, before ending with the most important question of all: How do institutions reposition themselves meaningfully within the new information-rich world in which information is accessible as never before?

Broad Affirmation of the Concept and Viability of OER

With the caveat noted above, our chapters collectively affirm the promise of OER as a way of providing enhanced quality education to potentially greater numbers of students. However, they do so not as simple, straightforward OER "success stories". Affirmation is more powerfully inferred from the fact that OER successes — even if on a limited scale — have been recorded across initiatives that differ markedly in terms of starting points and strategies, as well as in emphases on policy and practice.

Notwithstanding these many differences, there is a binding element of commonality. Positive outcomes in OER policy making and practice occur where initiatives are compatible with the nature of conditions and cultures within particular contexts.

Benefits beyond Formal Aims

Of course, interventions have unintended consequences. Those reported in the literature are most usually of a negative kind that, in severe cases, may subvert the intention behind the intervention. Our chapters give examples that suggest the opposite. Instances of *beneficial* unintended consequences — or unplanned extensions of interventions — are found. For example, new institutional

arrangements in the two Ghanaian institutions (Omollo, Rahman and Yebuah) combined OER design work in the health sciences with enhanced professional preparation for students in the Department of Communication Design charged with responsibility for translating the OER script into actual productions. Significant progress in institutional policy development has also had impacts beyond the two universities. Likewise, in working at securing copyright clearance for suitable resources, students were actively engaged in processes that developed their research skills (Mawoyo and Butcher).

In addition, we had at least three instances where OER initiatives had "knock-on" effects: OER in teacher education (described by Phillips) encouraged other faculties to embark on OER initiatives; Mackintosh reported on local initiatives spreading to a broader national level; and Lesperance described how collaborative OER development in small Commonwealth states paved the way for a Transnational Qualifications Framework.

The Flip Side of the Coin: The Whole is More Than the Parts

The first issue to temper any excessive optimism is that successes outlined in the various chapters are not *holistic* OER successes. Most involve success in more narrowly focused segments of higher education or in the legislation of particular countries. For open licensing to become the default, normative method of sharing intellectual capital in higher education, and for OER to be used to create more effective teaching and learning environments (rather than remaining with the "early adopters" of new technologies [Stacey, 2010]), both would need to be embedded systemically. This would probably entail the alignment of layers of government, institutions, academics and students in ways that reconcile structures, cultures and identities. Wolfenden expresses a view on alignment with which other authors would probably agree (even if implicitly):

> This synergy with national and institutional aims, and the potential for TESSA OER to address current concerns and challenges, has played a critical role in ensuring both continued motivation of individuals within the TESSA consortium and engagement of key stakeholders — institution leaders, ministry officials and government ministers.

Mackintosh's description of developments in New Zealand is probably an unusual national example of the "synergy" to which Wolfenden refers. Here, it was interplay between government- and institution-led initiatives that led to substantive change and subsequent open policies and approaches. At a purely individual level, Rybicki's account shows how fortuitous events combined with personal interests and a passion for teaching, in a way that ultimately led from isolation to connection with like-minded individuals and developments in his own institution. This account may be as unrepresentative of broader developments as that of New Zealand.

Despite the advances reported in the chapters of this book, a more universal step from project- or case study-type success to the systemic embedding of OER has yet to be taken.

All of the chapters dealing with policy are quick to point out that OER-supportive policy is a necessary but insufficient accomplishment. Policy and practice are two sides of the same coin. The problem of lack of alignment between OER intention

and structures/cultures is clearly evident in the chapter by Badarch, Knyazeva and Lane on the OER in the Commonwealth of Independent States, and in Myers's vignette. In neither case were difficulties related to flaws in the concept of OER. In the former, the difficulty was government policy and social culture in general; in the latter, the mode of operation was not aligned with national regulatory frameworks.

What We Might Learn About Stepping from Segmental to Systemic Successes

Readers could draw many precepts and possibilities from the rich variety of experience and reflection captured by our authors. We mention just five.

Initiatives to Promote OER

Two promising principles for planning OER initiatives emerge from our chapters. The first concerns funded projects. A broader literature provides a good deal of evidence demonstrating how successful "communities of practice" can be.[1] The chapters by Sapire, Reed and Welch and by Wolfenden provide examples of how wide-scale projects may fruitfully use this concept. In both, however, impetus came from expert-led collaboration in encouraging individual "buy-in" and "bottom-up" OER production that fed back into the broader community.

Second, OER initiatives would do well to recognise the importance of working within the specificities of particular contexts. Put differently, interventions should allow institutions' own missions, strategies and contexts to determine the logic in terms of which the initiatives unfold. Such a mode of operation is antithetical to the "logframe" theory of causation favoured by some funders. Omollo et al. provided a striking example of the benefits of institutions determining the type and method of OER production. In that case, OER met real needs and were designed and produced in the way that institutions identified as feasible and appropriate.

Recommendations for promoting OER were offered in several chapters. Broadly, these fall into "push" and "pull" categories. With regard to the former, Hoosen and Butcher suggest:

> Possibly the most effective way to accelerate open licensing and sharing of higher education resources would be adoption/adaptation and approval of an appropriate national open licensing framework, with clearly defined options for use by all higher education stakeholders, ideally as part of an overarching policy framework on IPR and copyright in higher education that spans both research and teaching activities.

An interesting "pull" factor in Conole's chapter is the account of the OPAL Awards scheme for quality and innovation through open educational practice. Awards are made in the three categories of policy making, institutional arrangements for encouraging OER, and learning networks. It is still too soon to assess the impact of this incentives scheme.

How We Understand OER

Lane argues that "improvements are unlikely if teachers do not take account of the ways in which students might view and engage with a greater range and variety of OER, not just those offered to them by their own teachers or institutions." While his article shows the validity of this view, for the moment we focus only on understanding OER from a formal curriculum perspective.

The term "OER" refers denotatively to the legal status of an artifact with respect to ownership and rights of use. As a legal concept, it has financial implications for institutional business plans. However, when it comes to OER use or reuse, curriculum issues come to the fore. Curriculum variances are sufficiently great to make the homogeneity that "OER" implies unhelpful. Educational resources can be of different kinds and intended to meet different purposes. For example, the experience recounted by Omollo et al. on medical education in Ghana refers mainly to video productions to support the mainstream curriculum. These afford medical students an opportunity to view what they might otherwise not be able to see as clearly, and students can view the productions in their own time. These materials *support* the mainstream curriculum. OER of this kind underpin Harishankar's argument that "chunking" enables ready OER take-up and reuse. The point, however, is that not all OER are of the kind that simply support the mainstream curriculum. In the chapter by Sapire et al. on maths teacher education in South Africa, and in Phillips's account of the BEd and MEd programmes at the Asian e University, for example, the materials *are* the mainstream curriculum. Their function is more that of "being the teacher" than of supporting the teaching, and as such it could be misleading to think of them as "chunkable".

This comes back to the fundamental point that the purpose of OER is to provide a better learning experience for students. Learning experiences are formally packaged into curricula. And any discussion on curricula needs to be guided by a clear notion of the nature and function of the OER being considered. Without such clarity, deliberations about design strategy are prone to misunderstanding. If an openly licensed resource is being adapted, it might be helpful to know something about the authorial intention of its creator.

Pedagogy

To take the curriculum argument one step further, a vast literature on the pedagogy and strengths of resource-based teaching does not appear to have informed OER development.

In many instances, practitioners seem to talk about OER as if it is a different *type* of educational material, rather than reflecting an understanding of OER as fulfilling the functions of any type of educational material, but with the added benefits of being usable and adaptable without the expense of paying licensing fees or securing permissions explicitly from copyright holders. By *not* making the connection with this wider literature on the design and use of teaching and learning materials in general, users of OER are often committing themselves to traversing a well-worn pathway of learning about educationally effective uses of resources through practice rather than using the shortcut of learning from the researched and documented experiences of other practitioners.

The argument that OER discourse would benefit from being connected with the well-developed broader literature is evident in Kanuka and Gauthier's chapter, which does exactly that:

> The diverse ways of teaching and learning unique to each discipline — referred to as "pedagogical content knowledge" — has been widely discussed, researched and generally accepted as being imperative to effective design and development within higher education.

This chapter also advances our understanding of the challenges of applying open educational resources between and across diverse cultures. One could take the connection with the mainstream literature further by asking questions related to the basic characteristics of OER. For example, teachers might need to build the implications of multiple voices of "authority" into their teaching. Do teachers guide students in using OER in ways that maximise learner opportunity for learning at their own pace, and possibly in a sequence not envisaged in the curriculum? As noted earlier, educators at all levels are subjected to calls and pressures for more "learner-centred", interactive teaching. OER lend themselves naturally to learner-centred styles of teaching. This is a feature (or asset) of OER that merits much greater consideration.

OER and All Disciplines?

The fields of health education and teacher education are most strongly represented in our chapters. This might be coincidence, or it might be a reflection of the basis on which authors were recruited for this book. It could also be that these are the fields most favoured by donors, which could lead to further questions in light of the priorities of national governments. Or it might be that the relevant professions and semi-professions are most readily receptive to OER. These certainly are fields in which case study approaches are widely used in teaching, and OER lend themselves to case study design.

Nonetheless, Kanuka and Gauthier's concept of "pedagogical content knowledge", with different pedagogies being called into play across the unique knowledge structures of disciplinary content, provides a theoretical basis for asking an important question: What are the implications for OER across the range of disciplines offered in higher education? One would certainly like to know more about OER compatibility with a far greater range of disciplines than are represented in this book. Indeed, we need to know this if OER practices are to be "scalable".

OER Take-Up in the Broader Academy

OER take-up can refer to OER in policy (e.g., at the government and/or institutional level) or in practice (e.g., by academics and students, in both formal and non-formal learning situations). Chapters in this book provide insights that highlight OER take-up across multiple interest groups that include: students, individual OER "champions", enterprising individuals, individual institutions, funded projects, governments and international organizations.

However, what of take-up beyond these initiatives and experiences? We limit discussion here to institutions and academics more generally — which we refer to simply as "the academy" — because it is here that the issue of OER take-up

remains the most important of all. Without take-up by the academy, opportunities provided by open licensing become redundant. Educational resources remain no more than materials used by individual academics for teaching their own courses, or by individual students to supplement the formal experiences of *their* own courses.

For us, the most telling sentence in the book is: "It appears that OER initiatives at most universities are still largely project-driven rather than an institution-wide, integrated process" (Hoosen and Butcher). Institutions are found to be lagging behind governments in promoting open licensing to create more effective learning environments. There are at least two reasons why this state of affairs seems almost inexplicable.

First, the inherited mission and very rationale of universities is knowledge generation and teaching. One would expect institutions to engage OER not only through curiosity and the prospect of providing better teaching environments, but also as a way of resolving budgetary constraints together with other pressing challenges such as increased student numbers.

Etienne Wenger, one of the pioneers of the "community of practice" concept, writes:

> there are fewer more urgent tasks than to design social infrastructures that foster learning.... the whole human world is itself fast becoming one large organization, which is the object of design and which must support the learning we need in order to ensure there is to be a tomorrow. Those who can understand the informal yet structured, experiential yet social, character of learning — and can translate their insight into designs in the service of learning — will be the architects of tomorrow. (Wenger, 2003, p. 225)

This leads to the second point. Universities that do not engage OER are bypassing their role as "the architects of tomorrow". They are also foregoing the opportunity to regularise sharing practices through proper forms of licensing. And information-sharing practices are increasingly not limited to what may be shared in accordance with appropriate licensing arrangements such as Creative Commons. As Levey points out, in a situation in which "sites sometimes include non-OER resources, such as materials that are fully copyright protected or bear no license information at all", widespread practices are blurring the distinction between OER and "non-OER". Access to non-OER may even be arranged through means that are quite legal. Phillips points out that "[t]o make up for the shortfall in open OER for certain topics and subject areas, non-OER are used through hyperlinking". Within the regularised OER domain, Mawoyo and Butcher's chapter provides an indication of the type and scale of approaches and initiatives in adapting existing teaching resources as OER "for improved access to quality teaching materials in under-resourced contexts."

In failing to engage OER, universities are not only bypassing opportunities to access high-quality resources in cost-effective ways. If they do not reposition themselves in the new digital world in which information is freely shared, they may themselves be on the road to redundancy. If their own research and other products remain hidden behind proprietary firewalls, these may suffer that fate of not being used by students and other interest groups. In the face of "closed"

practices, why would potential users not simply turn to what is freely available, and to guides on what is freely available, such as Levey's chapter? Similarly, other agencies will — indeed, already are — taking advantage of this increased openness and flexibility to compete directly with universities across a wide range of areas. If universities are not redefining and improving their core functions of research, teaching and learning in light of these external changes, it will become increasingly unclear to both governments and students what value they are adding to justify the government subsidies and student fees that they require to operate.

Sir John Daniel's Foreword eloquently captures the way in which OER has removed the most intractable obstacles to the sharing of education materials. Nonetheless, we clearly have a long way to go before take-up reaches the threshold at which the promise of OER is fully realised. In their respective works *1984* and *Brave New World*, George Orwell and Aldous Huxley offer competing views of the future that have analogies to the removal of obstacles to accessing resources. Postman (1985) describes their views as follows:

> What Orwell feared were those who would ban books. What Huxley feared was that there would be no reason to ban a book, for there would be no one who wanted to read one. Orwell feared those who would deprive us of information. Huxley feared those who would give us so much that we would be reduced to passivity and egoism.
>
> Orwell feared that the truth would be concealed from us. Huxley feared the truth would be drowned in a sea of irrelevance. Orwell feared we would become a captive culture. Huxley feared we would become a trivial culture, preoccupied with some equivalent of the feelies, the orgy porgy, and the centrifugal bumblepuppy. (xix–xx)

The year 1984 has come and gone, and OER has proven Orwell profoundly wrong. While we fear that much of popular culture lends credence to Huxley's view, we hope this book will play a role in contributing to OER take-up in the academy — and to proving Huxley was as wide of the mark as Orwell.

Notes

1. According to Wenger (2006), communities of practice are groups of people who share a concern (or a passion) for something they do and learn how to do it better as they interact regularly. A striking example of the concept in action in the field of healthcare can be found in Cummings and van Zee (2005).

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OPEN EDUCATIONAL RESOURCES AND CHANGE IN HIGHER EDUCATION: REFLECTIONS FROM PRACTICE

In the last decade in particular, the promotion, sharing and use of open educational resources (OER) have been growing exponentially. However, as with any new phenomenon or paradigm, our knowledge of OER's ramifications and achievements to date necessarily lags behind actual developments. The concept of OER has multifaceted dimensions and implications. For educational institutions, the dimensions are legal, managerial, financial, technical, technological and pedagogical; for practising educators, at stake are ways of teaching that are normative, together with a sense of identity that is both personal and professional. It would be astonishing if research, which by its very nature must be clearly focussed, were able to keep abreast of all such aspects of OER.

Although OER activities are taking place globally, most large and well funded projects have been in North America and Europe. As a result, little is known about important questions such as how the more acute levels of resource constraint typical of developing countries impact on demand for OER and on their reuse. The case studies and reflections in this book cover OER practice and policy in a diverse range of contexts, with a strong focus on events in developing countries. However, the focus on experiences from the developing world is not exclusive, as valuable "generic lessons" applicable also to developing countries can be drawn from research in the more developed countries.

The world in which the academy and higher education operate has transformed dramatically. How do institutions, in both developed and developing countries, reposition themselves meaningfully within the new information-rich world in which information is accessible as never before? How can organisations such as UNESCO and the Commonwealth of Learning foster governmental support for OER internationally? How might proponents of OER garner greater governmental, institutional and educator "buy-in" to the principles of open educational practices, and to the policies and programs necessary to realise and sustain OER?

The 28 contributors to this book bring to these questions and many others a wealth of knowledge, experience and insights about OER policy and practice at both national and international levels. With some astute caveats, their findings collectively affirm the promise of OER as a way of providing enhanced quality education to potentially greater numbers of students. Policy makers and practitioners will be able to draw many precepts and possibilities from the rich variety of experience and reflection contained within this volume.

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