

An empirical framework for mainstreaming OER in an academic institution

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Abstract

Purpose – There is immense potential in open educational resources (OER) for encouraging systemic change within academic institutions toward increasing access and equity in education. The purpose of this paper is to propose an empirical framework and a checklist for mainstreaming OER in an academic institution.

Design/methodology/approach – The empirical framework and the mainstreaming checklist is formulated based on an extensive review of literature and case studies strengthened by the author's personal experience as an academic, researcher, practitioner, policymaker and international development expert in the field of OER.

Findings – The proposed empirical framework and OER mainstreaming checklist identifies several processes to be completed by key stakeholders for successful mainstreaming of OER in an academic institution.

Practical implications – The proposed framework assumes that the institution which is undergoing mainstreaming of OER follows the principles of outcomes-based education and that it has an established mechanism for measuring the mastery of learning outcomes and the role of OER in accreditation.

Originality/value – One key feature of the framework is its horizontal structure where stakeholders take a team-based approach to completing the required tasks for mainstreaming OER. This, in turn, increases ownership of the mainstreaming process leading to higher success rates and sustainability. Second, the mainstreaming checklist breaks down each process into several achievable tasks and assigns them to the relevant team. Third, the framework supports continuous quality improvement which encourages institutions to periodically revisit the processes to make necessary course corrections and enhancements.

Keywords Open educational resources, OER from commitment to action, OER mainstreaming, OER mainstreaming checklist, OER mainstreaming framework

Paper type Conceptual paper

Introduction

Open educational resources (OER) are fast gaining traction as a global movement which can potentially increase equitable access to quality education in alignment with the Sustainable Development Goal 4 (SDG4). The most up-to-date definition of OER reads:

Toward the realization of inclusive Knowledge Societies, Open Educational Resources (OER) support quality education that is equitable, inclusive, open and participatory. OER are teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the framework of intellectual property rights as defined by relevant international conventions to respect the authorship of work. OER are a strategic opportunity to improve knowledge sharing, capacity building and universal access to quality learning and teaching resources (UNESCO, 2017a, p. 1).



The advantages of OER include improved access to textbooks, improved quality, improved teacher professional practice, increased access to non-English language resources, cost savings for learners, support for lifelong learning and cultural diversity (Commonwealth of Learning, 2017a). Realizing the immense potential of OER in transforming education on a global scale, the “Ministerial Statement” (UNESCO, 2017b) adopted during the 2nd World OER Congress, held in Slovenia, states:

[...] in order for OER to reach its full transformative potential for supporting the realization of SDG4, OER needs to be more integrally a part of educational policies and practices from early childhood education to post-secondary, technical vocational educational training, higher education, lifelong learning and teacher training (UNESCO, 2017b, p. 1).

However, the “Ljubljana OER Action Plan 2017” (UNESCO, 2017a) identifies five main challenges to mainstreaming OER which are the capacity of users to find, reuse, create and share OER; language and cultural issues; ensuring inclusive and equitable access to quality OER; changing sustainability models; and developing supportive policy environments. To address some of these issues, the “Open Educational Resources: Global Report 2017” (Commonwealth of Learning, 2017b) recommends strengthening capacity building for OER to assist key stakeholders in retaining, reusing, revising, remixing and redistributing OER; focusing on teacher integration of OER in teaching and learning; and keeping the learner at the center.

Resulting from the OER Regional Consultations organized by the Commonwealth of Learning and UNESCO in the lead up to the 2nd World OER Congress, the “Open Educational Resources: From Commitment to Action” report (Commonwealth of Learning, 2017a) recommends that educational institutions must take several concrete actions to mainstream OER. These actions are develop and implement an institutional OER policy; create institutional mechanisms for OER quality assurance (QA); recognize faculty contribution to OER; institute an award for best OER; create an institutional repository for OER; regularly organize capacity-building programs for teachers; conduct and support research on OER; collaborate with other institutions to avoid reinventing the wheel; take steps to improve the institution’s ICT infrastructure; and develop accessible OER. However, what the report fails to identify is a framework and a systematic methodology for mainstreaming OER in an academic institution. As a potential solution, this paper proposes an empirical framework and a mainstreaming checklist for systematically and holistically mainstreaming OER in an academic institution.

The empirical framework

The instigator of the OER mainstreaming process at an institution is the top-level decision to adopt the philosophy. For some institutions, it is a viable strategy to reduce costs (Hilton *et al.*, 2014; Bliss *et al.*, 2013; EMARGE Ed. Consultants Inc., 2017) or shorten course development times (Abeywardena, 2013a). For others, it is an opportunity to improve the quality of teaching and learning (Gourley and Lane, 2009; Daniel *et al.*, 2007). A third category, particularly in developed countries, adopts the philosophy of OER for philanthropic reasons (Annand, 2015; Abelson, 2008). OER is of particular value to institutions in the global south as they help increase access to education and create equity by reaching the unreached such as marginalized communities, girls and women (Ferreira and Kamal, 2016). Dhanarajan and Abeywardena (2013) list the perceived benefits of accessing and using OER in Asian academic institutions which include gaining access to the best possible resources, promoting scientific research and education as publicly open activities, bringing down costs for students, bringing down costs of course development for institutions, providing outreach to disadvantaged communities, assisting developing countries, becoming independent of publishers, creating more flexible materials, conducting research and development and building sustainable partnerships.

Although the decision to adopt OER at an institutional is typically made at a senior management level, the quantum of success of the implementation depends entirely on the execution. Furthermore, there are several key players involved in the decision-making process (Allen and Seaman, 2014). To this extent, Abeywardena (2012) proposes a top-down approach which encapsulates the key stakeholders in a hierarchy. In this model, the academic staff are tasked with the implementation of OER in the institution, following the directive from the management, with support from the educational technology unit, library and IT support. However, from a practical perspective, this model creates a disconnect between the key stakeholders and the original reason for adopting the philosophy of OER because the exercise is perceived as an additional workload (Yawan and Ying, 2013). This, in turn, leads to frustration and lack of ownership in the adoption of OER for teaching and learning. To address these issues, I propose a horizontal approach (Figure 1) where all parties have an equal stake in ensuring the successful holistic adoption of OER in the institution. The collaborative team-oriented nature of this approach leads to increased ownership, transparency and the sharing of responsibilities among the key stakeholders resulting in higher success rates.

In this proposed model, the stakeholders form teams to systematically execute multiple processes required for OER mainstreaming. Furthermore, the learners are also considered key stakeholders as the quality of the teaching and learning directly impacts their mastery of learning outcomes. By measuring the mastery of learning outcomes, the model allows for continuous quality improvement (CQI) which transforms a unidirectional mainstreaming process into an evolving iterative activity.

Each process executed by the stakeholder teams comprises a set of tasks which needs to be achieved for the process to be considered complete. Table I maps each process against the respective tasks and the stakeholder teams concerned to provide a usable checklist in the OER mainstreaming exercise.

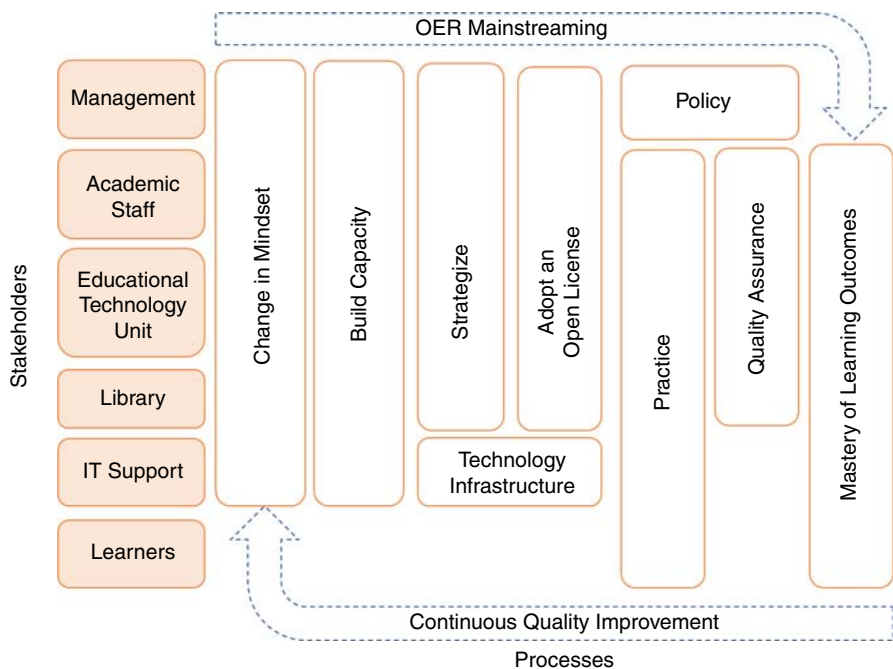


Figure 1.
Empirical framework
for OER
mainstreaming
in an academic
institution

Process	Mainstreaming tasks	Management	Academic staff	Stakeholder Educational technology unit	Library	IT support	Learners
Change in mindset	Decided to reuse and produce OER?	✓	✓	✓	✓	✓	✓
	Changed mindsets: open is good?						
Build capacity	What are OER?	✓	✓	✓	✓	✓	✓
	What are the types of OER?						
	What is open and accessible?						
	What is copyright and open licensing?						
Strategize	How to create, reuse, revise and remix OER using FOSS?						
	Identified the need for OER in terms of cost, quality and access?	✓	✓	✓	✓		
	Identified short-, medium- and long-term goals for OER?						
	Identified representatives from each stakeholder group for task teams?						
Adopt an open license	How open is the institution?						
	How open are current materials?	✓	✓	✓	✓		
	Allow commercial use?						
	Enforce Share-alike?						
	Allow derivatives?						
Technology infrastructure	No rights reserved?						
	Have sufficient technology infrastructure?						
	Have sufficient technical personnel?					✓	
	Invest in cloud-based technologies and services?						
Policy	Setup a FOSS repository?						
	Adopted an institutional OER policy?	✓					
	Updated HR policies to recognize and reward OER activities?						
	Recognize additional work in OER?						

(continued)

Table I.
OER mainstreaming
checklist

Table I.

Process	Mainstreaming tasks	Management	Academic staff	Stakeholder Educational technology unit	Library	IT support	Learners
Practice	Made OER a key performance indicator (KPI)?						
	Developed a system for remuneration and encouragement?						
	Mainstreamed open educational practices?						
	Which courses to make OER?						
	Developed a systematic approach to OER content development?						
	Formed course development teams?						
Quality assurance (QA)	Identified useful OER for course development?						
	Developed/adapted course successfully?						
	Developed pilot OER?						
	Added metadata and built a catalogue?						
	Formed an OER QA Team?						
	Is this content suitable for our learners?						
Mastery of learning outcomes	Is it pedagogically sound?						
	Is it open and accessible?						
	Do we have tech support?						
	Are assessments correctly mapped against the learning outcomes?						
	Learner exceeds the requirement, meets the requirement or needs improvement?						

Change in mindset

A key inhibitor to the propagation of OER as a movement is the reluctance of academics and academic institutions to embrace a culture of openness (Aguilar and Montoya, 2013). When considering academics, most believe that their intellectual prowess is defined by copyright (Lane and McAndrew, 2010). This is true of many institutions as well who presume that opening up intellectual property would jeopardize their academic standing (Harishankar *et al.*, 2013). The “Open Educational Resources in the Commonwealth 2016” report (Phalachandra and Abeywardena, 2016) indicates that out of the 657 teachers surveyed from 214 institutions distributed in 28 Commonwealth countries, 65 percent used OER directly in teaching and learning while 60 percent used it to supplement existing lessons. Ironically, 72 percent indicated that they do not share their teaching material openly. One comment from the report reads “Personal work and effort should not be copied; only resources can be shared” (Phalachandra and Abeywardena, 2016, p. 12). However, according to Springer Nature (Emery *et al.*, 2017):

We found that Springer Nature OA [Open Access] books perform better than non-OA books published by Springer Nature in all three categories that we assessed:

- Downloads: On average, there are just under 30,000 chapter downloads per OA book within the first year of publication, which is 7 times more than for the average non-OA book.
- Citations: Citations are on average 50% higher for OA books than for non-OA books, over a four-year period.
- Online mentions: OA books receive an average of 10 times more online mentions than non-OA books, over a three-year period (p. 4).

Furthermore, the philosophy of OER allows an institution to increase its reach by encouraging the global academic community to reuse, revise, remix, redistribute and retain (Wiley, 2015) content while receiving due credit. It is a numbers game where more exposure to the intellectual property of an institution results in increased visibility, reputation and potential learners (Hodgkinson-Williams, 2010).

Build capacity

In the framework, capacity building on the philosophy, benefits and the methodologies for reuse, revising and remixing OER is considered the second logical step. It is a key enabler in the mainstreaming process which leads to empowerment of stakeholders through an enhanced understanding of the use of OER in modern pedagogy utilizing free and open source software (FOSS). Resources such as “Understanding Open Educational Resources” (Commonwealth of Learning, 2015), “A Basic Guide to Open Educational Resources” (Butcher, 2015), “Instructional Video Production for Teaching and Learning” (The Open University of Sri Lanka, 2017) and “Creating and Repurposing OER Using FOSS: A How-To Guide for Teachers and Learners” (Kasinathan and Ranganathan, 2017) provide a systematic and comprehensive approach to capacity building to harness the full potential of OER.

OER strategy

Having a coherent strategy for mainstreaming OER is paramount to ensure success. While strategizing, the institution should map clearly the intentions behind its move toward OER in relation to cost, quality and access. To this extent, an OER strategy team should be formed representing the key stakeholders identified in Table I. Initially, “Open Educational Resources: Innovation, Research and Practice” (McGreal *et al.*, 2013) can be used as a key resource which helps the strategy team to understand how OER are widening the

international community of scholars, various approaches to releasing and opening content and pedagogical, institutional, personal and technical issues relating to OER mainstreaming. To establish the short-, medium- and long-term goals for OER within the institution, “Guidelines for Open Educational Resources (OER) in Higher Education” (Commonwealth of Learning, 2011) provides recommendations for the institution, academic staff, student bodies, QA/accreditation bodies and academic recognition bodies.

Adopt an open license

It is important to choose an institution-wide open license at the outset of the mainstreaming exercise to minimize future complications which might arise from copyright. Both the “OER in the Commonwealth 2016” report (Phalachandra and Abeywardena, 2016) and the “OER: Global Report” 2017 (Commonwealth of Learning, 2017b) highlight a lack of awareness among policy makers and practitioners when it comes to open licenses and the freedoms they provide. Considering OER, the Creative Commons is the *de facto* licensing scheme used globally. The multiple derivations of the license based on the concepts of attribution (CC BY), share-alike (CC BY-SA), non-commercial (CC BY-NC) and no derivations (CC BY-ND) allows users to define the rights permitted on an intellectual property. An updated version of Abeywardena *et al.*’s (2012) map of the six derivations of the Creative Commons license to the four “R”s framework (Hilton *et al.*, 2010) is shown in Table II. It should be noted that the restrictions of the Creative Commons license start at the redistribute/retain level.

The restrictions imposed by the Creative Commons license are reciprocal whereby the creator and the user abide by the same rules. For example, if an institution decides to adopt a CC BY-NC-SA license which dictates that the user must give attribution; use it for non-commercial purposes; and share any derivations under the same license, the institution must abide by the same rules. This, in turn, restricts the pool of OER available to the institution for revising and remixing. As argued by Bissell (2009):

[...] the key lies in helping OER creators (who are also users) to ask the right questions and embrace the positive potential that is best achieved with the most open and liberal licensing choices (p. 103).

Therefore, the selection of appropriate open license has an immediate impact on the quantum of success of the OER mainstreaming exercise.

Technology infrastructure

Although sometimes underestimated, IT support plays a critical role in the OER mainstreaming process because OER are predominantly digital. Among their

Table II.
Mapping of the
creative commons
licenses to the
five ‘R’s

Permission (in ascending order of openness)	Creative Commons License
Reuse	None
Redistribute/Retain	Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND) Attribution-NoDerivatives (CC BY-ND)
Revise	Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) Attribution-ShareAlike (CC BY-SA)
Remix	Attribution-NonCommercial (CC BY-NC) Attribution (CC BY) No Rights Reserved (CC0)

Source: From Abeywardena *et al.* (2012)

responsibilities, IT support should facilitate the mainstreaming of OER by ensuring that all staff have access to devices which can be used to access the latest digital content. This includes the timely updating of the devices and ensuring that access to key OER repositories such as YouTube or Wikipedia is not restricted. Furthermore, the inherent nature of OER, such as multimedia and video, demands additional bandwidth. Additionally, IT support needs to consider innovative technologies such as Aptus (Commonwealth of Learning, 2014) to ensure that teachers and learners have unrestricted access to the institution's OER repository even in low bandwidth settings. It is the responsibility of the IT support team to ensure that sufficient budgetary allocations for infrastructure and trained staff are in place.

Another integral part of the mainstreaming process is to setup an institutional OER repository. Typically, the library website is the default choice. There are advantages to using the library website as the OER repository such as availability of infrastructure, ease of search and discoverability, availability of copyright expertise, availability of data storage and expertise in metadata and indexing (Kleymeer *et al.*, 2010). On the other hand, setting up a separate OER repository using a FOSS technology such as DSpace (Moore and Butcher, 2016) or Weko (Yamada, 2015) allows for more accessibility and better management of infrastructure. In both scenarios, scalability is a key consideration keeping in view the exponential growth in storage and bandwidth requirements for a growing OER repository which includes multimedia. It would be beneficial in the longer term to consider the use of scalable cloud-based infrastructure and services from the outset.

Policy

The "Open Educational Resources: Global Report 2017" (Commonwealth of Learning, 2017b) states:

Despite lack of OER policies at the national level, many educational institutions have adopted OER policies. Adoption of institutional OER policies could strengthen the OER movement by focusing on teachers and students as major stakeholders. This will also improve the challenges related to equity and quality of OER (p. 57).

An institutional OER policy is a mechanism which helps to streamline the OER adoption process as well as document the strategy developed by the strategy team. Additionally, a policy helps to safeguard the best interests of the institution, staff and students when mainstreaming OER. The "Institutional OER Policy Template" (Commonwealth of Learning, 2016), available in English, Tamil and Spanish, is a readymade tool which encourages institutions to develop their own OER policies without any external expertise or support. The template provides comprehensive policy statements on definitions; policy declaration; policy statements; policy objectives; scope and applicability; copyright and licensing; QA and review system; liability; and institutional arrangements. Furthermore, an official institutional OER policy can potentially influence the revision of other policies such as recruitment and promotion. A recent example is the policy decision by the University of British Columbia, Canada, to include language recognizing OER in the institution's tenure and promotion guide (Yano, 2017). By revising related HR policies to include OER as a key performance indicator, the institution can ensure increased ownership of the OER mainstreaming process through remuneration and encouragement. This, in turn, will lead to the sustainability of OER within the institution.

Practice

From a practical perspective, policy follows practice in many instances. Glennie *et al.* (2012) state that "At the institutional level, however, personal conviction has to be translated into policy and practice" (p. 2). Glennie *et al.* (2012) further state that "Although a picture emerges

of no standard sequential development, most institutions appear to have addressed policy as a reactive measure” (p. 10). It is therefore important to approach OER practice systematically to ensure high success rates, policy formulation and sustainability. As indicated in Figure 1 and Table I, OER practice is a team effort which involves academic staff, educational technology unit, library and most importantly the learners. Lane (2012) elaborates how learners play key roles in OER mainstreaming at different stages of their engagement with the institution. According to Lane, prospective learners use OER as a showcase, guide and community; registered learners use OER as a reinforcement, fallback, primary source, enrichment, community, public product and training ground; while alumni use OER as a refresher and enrichment. Summarizing the Teacher Education in Sub-Saharan Africa project, Glennie *et al.* (2012) state that “New learning materials, jointly created by teacher and students, provided evidence of ingenuity and creativity seldom found in school classrooms” (p. 9) reinforcing the importance of involving the learners in OER practice. In this regard, resources such as the “Open Educational Resources (OER) Guide for Students in Post-Secondary and Higher Education” (Hoosen *et al.*, 2016) can be used to orient learners on the concepts of OER.

Abeywardena (2013a) documents the experience of developing an OER-based undergraduate technology course delivered using open and distance learning at Wawasan Open University. Recounting his practical experience, Abeywardena highlights a systematic approach to OER content development which is summarized in Table III.

QA

Increasingly, QA is playing a major role in the mainstreaming of OER. The “Ljubljana OER Action Plan” (UNESCO, 2017a) states three recommendations in support of QA mechanisms for OER which are: ensure systems for peer-review quality control when creating or revising OER – this could include, systems for collaborative open reviews, social ratings and comments by users (e.g. learners) and by producers of content (e.g. educators); make OER subject to regular QA mechanisms, external and institutional, that are used for all educational resources of an institution – this includes improving the capacity of QA professionals to understand OER and its integration in teaching and learning; and develop national and institutional standards, benchmarks and related QA criteria for the QA of OER. To address these recommendations in an institution, an OER QA team can be setup which includes academics, educational technologists and library staff as shown in Table I. According to Abeywardena (2013a, p. 179), a “belt and braces” approach should be adopted when quality assuring OER due to the voluntary peer-review nature of OER available online (Wheeler *et al.*, 2008; Abeywardena *et al.*, 2012). This belt and braces approach can be achieved by adopting a comprehensive OER QA framework such the “TIPS Framework” (Kawachi, 2014) which focuses on teaching and learning purposes; information and material content; presentation product and format; and system technical and technology. Encapsulating these checkpoints, the “External Review Toolkit for ODL and eLearning Courses” (Smulders, 2016) provides a readymade and easy-to-use tool for conducting QA on courses at an institutional level.

CQI

Hogg and Hogg (1995) define CQI in Higher Education as “teaching people in an organization to view themselves as part of a larger systematic operation” (p. 37). This definition stems from total quality management which is defined as “Continually serving customers better and more economically, using the scientific method and team-work, and focusing on removal of all forms of waste” (Hogg and Hogg, 1995, p. 1). From the perspective of outcomes-based education (OBE), CQI strives to ensure that all students are equipped with the knowledge, competence and qualities needed to be

Table III.
Systematic approach
to OER content
development at
an institution

Step	Considerations and actions
1 Selecting the course	The availability of required material as OER The availability of published textbooks and technical manuals which can be used to cross-check the integrity of the OER material The composition of the course, which included theory and practical exercises The subject-matter expertise available in the course development team (CDT)
2 Forming the CDT	The composition of the CDT needs to be perfect with respect to expertise as well as team dynamics The CDT members needed to have a general acceptance of the concept of OER and a thorough understanding of how to use it within the Creative Commons license framework
3 Locating relevant OER	A shortlist of reputable and peer-reviewed OER repositories created in consultation with the CDT Each repository manually trawled to locate the relevant OER material CDT to assess the quality, relevance and license compatibility of the OER before finalizing the material to be used
4 Adapting OER	Produce the draft course material Add pedagogical and instructional design input Repeat process until the CDT agrees on a final draft
5 QA	Material reviewed by internal and external experts CDT to use a “belt and braces” approach by crosschecking with published textbook or technical manual
6 Licensing	Release the course material under an open license based on the institutional OER policy Retain the provision for claiming copyright for content developed by the institution Add a caveat informing users that the institution will not grant any credit or qualification for the completion of the course unless the user is a registered student for the course
7 Curation	Create the appropriate metadata facilitating cataloguing and efficient searching Upload course onto the institutional OER repository Publicize the availability of the OER course to increase reuse, revision, remix, redistribution and retention

Source: From Abeywardena (2013a)

successful after they exit the educational system; and structuring and operating institutions so that those outcomes can be achieved and maximized for all students (Spady, 1994).

As shown in Figure 1, CQI applies to all key stakeholders across all processes in retrospect. The process of implementing OBE in an institution is beyond the scope of the proposed framework shown in Figure 1. As such, it is assumed that the institution which is undergoing mainstreaming of OER follows the principles of OBE. The potential positive contribution of OER toward the mastery of learning outcomes has been discussed widely in literature (Fischer *et al.*, 2015; Hilton *et al.*, 2016; Robinson *et al.*, 2014; Wiley *et al.*, 2017). Therefore, the framework further assumes that the institution has an established mechanism for measuring the mastery of learning outcomes (Abeywardena, 2013b) and the role of OER in accreditation (Conrad *et al.*, 2013). Based on the mastery of learning outcomes, the proposed empirical framework and the mainstreaming checklist (Table I) encourage institutions to periodically revisit the processes outlined in Figure 1 to make necessary course corrections and enhancements to achieve the ultimate goals of OBE.

Conclusion

There is immense potential in OER for encouraging systemic change within academic institutions toward increasing access and equity in education. Furthermore, OER can play a key role in reaching the unreached such as marginalized communities, women and girls living in hard-to-reach geographic, socio and economic environments. The recently concluded 2nd World OER Congress and the “Ljubljana Action Plan 2017” (UNESCO, 2017a) highlight the pivotal role OER can play toward achieving the 2030 Agenda for Sustainable Development and SDG4. The “Open Educational Resources: From Commitment to Action” (Commonwealth of Learning, 2017a) reports ten recommendations for mainstreaming OER in an institution. However, the report fails to identify a framework and a systematic methodology to guide the mainstreaming process. As a potential solution, this paper proposes an empirical framework and a mainstreaming checklist formulated using relevant literature, case studies and personal experience.

The proposed empirical framework and OER mainstreaming checklist identifies several processes to be completed by the key stakeholders for successful mainstreaming of OER in an academic institution. One key feature of the framework is its horizontal structure where stakeholders take a team-based approach to completing the required tasks for mainstreaming OER. This, in turn, increases ownership of the mainstreaming process leading to higher success rates and sustainability. Second, the mainstreaming checklist disassembles each process into several achievable tasks and assigns them to the relevant team. Third, the framework supports CQI which encourages institutions to periodically revisit the processes to make necessary course corrections and enhancements. I am currently engaged with the Ministry of Education and Training in Tonga to mainstream OER in the Tonga Institute of Education and Tonga Institute of Higher Education based on the framework proposed in this paper.

In sum, OER are just one part of an already prominent open movement. Ultimately, all these movements should converge into an Open Culture where shared knowledge forms the basis of a much wiser human race.

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