
Open Educational Resources in Teaching and Learning in Higher Educational Institutions: New Opportunities and Challenges

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Abstract

Globalisation and the rapid development of Information Communication Technology (ICT) have led to an explosion in the use of, and engagement in digital activities in teaching and learning. Burgeoning on the digital explosion, is a growing interest in the use of open educational resources (OER) for learning. But while educators seek to leverage the opportunities for quality education, they also struggle to harness its full potential. The purpose of this paper is to review available literature to present an overview of the OER movement - what is known about OER, their challenges and opportunities, and how they have been integrated into institutions of higher education. This paper is relevant since after more than a decade of research and funding, OER still fail to be a part of mainstream curriculum, especially in the Caribbean. It is suggested that there is still need for awareness among practitioners in the education environment in the Caribbean.

Keywords: OER Caribbean; OER challenges; OER Latin America; OER movement; OER opportunities; OpenCourseWare; open educational resources (OERs).

Introduction

Initiatives to make learning more open, began with the learning object project, and evolved into the OER movement (Nkuyubwatsi, 2018). The OER undertakings are part of the open education movement that might be traced back to the late 20th century with the exponential growth of distance education. However, the term “open educational resources” was formally adopted at UNESCO’s 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries. It was at this conference that Massachusetts Institute of Technology (MIT) unveiled the first open courseware (Nkuyubwatsi, 2018). Since then, the scholarship on OER has been growing steadily, albeit at a pace much slower in the Caribbean area.

Definitions – Bringing Clarity to the Concept

According to the literature, there is no one universal definition for OER, and there is still a lack of understanding regarding what constitutes OER. Literature proves that the terms “open content” and “open educational resources” are sometimes used interchangeably. As quoted in Atkins, Brown and Hammond (2007), Hewlett Foundation, the co-sponsor of the first initiative,

defines OER as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others” (p. 4). The Organisation for Economic Co-operation and Development (OECD) report, however, succinctly describes it as teaching, learning and research materials that make use of appropriate tools, such as open licensing, to permit their free reuse, continuous improvement and repurposing by others for educational purposes (Orr, Rimini, & Van Damme, 2015, p. 17). This paper accepts a practical definition of OER as “educational materials and resources that are offered freely, are openly available to anyone and, under some licences, allow others to reuse, adapt and redistribute them with few or no restrictions (Hoosen, Moore, & Butcher, 2016, p. 2). A common thread is the idea that use of resources are for ‘free’.

OERs are not limited to free web sources only. They include quite a number of print and non-print resources namely: full courses, course materials, modules, textbooks, streaming videos, tests, software, lecture notes and slides, lesson plans, textbooks, handouts given to students, videos, online tutorials, podcasts, diagrams, entire courses, and any other material designed to be used in teaching and learning (Bates, 2015; Hoosen et al., 2016; Commonwealth of Learning, 2013; Hoosen & Butcher, 2019). This shows that there is no boundary to what constitutes OER. They can range from large textbook or small single photographs, an entire course or curriculum or a text used to enhance existing textbooks (Hoosen et al., 2016).

In a study conducted by Allen and Seaman (2014) regarding the awareness of OER among faculty in the USA, it was demonstrated that many academics have only a vague understanding of what constitutes OER, and that it is often confused with other terminologies such as ‘free’, and ‘open source’ and ‘open access’. A similar sentiment is implicitly reflected in the reports from the Commonwealth of Learning Report (Lockwood & Latchem, 2002). As an attempt to clarify, Wiley (2015), explained that OER must satisfy the principles of the 5Rs. Therefore, not only should users have free access, but they should be able to:

1. reuse – use the work verbatim, just exactly as you found it
2. rework – alter or transform the work so that it better meets your needs
3. remix – combine the (verbatim or altered) work with other works to better meet your needs

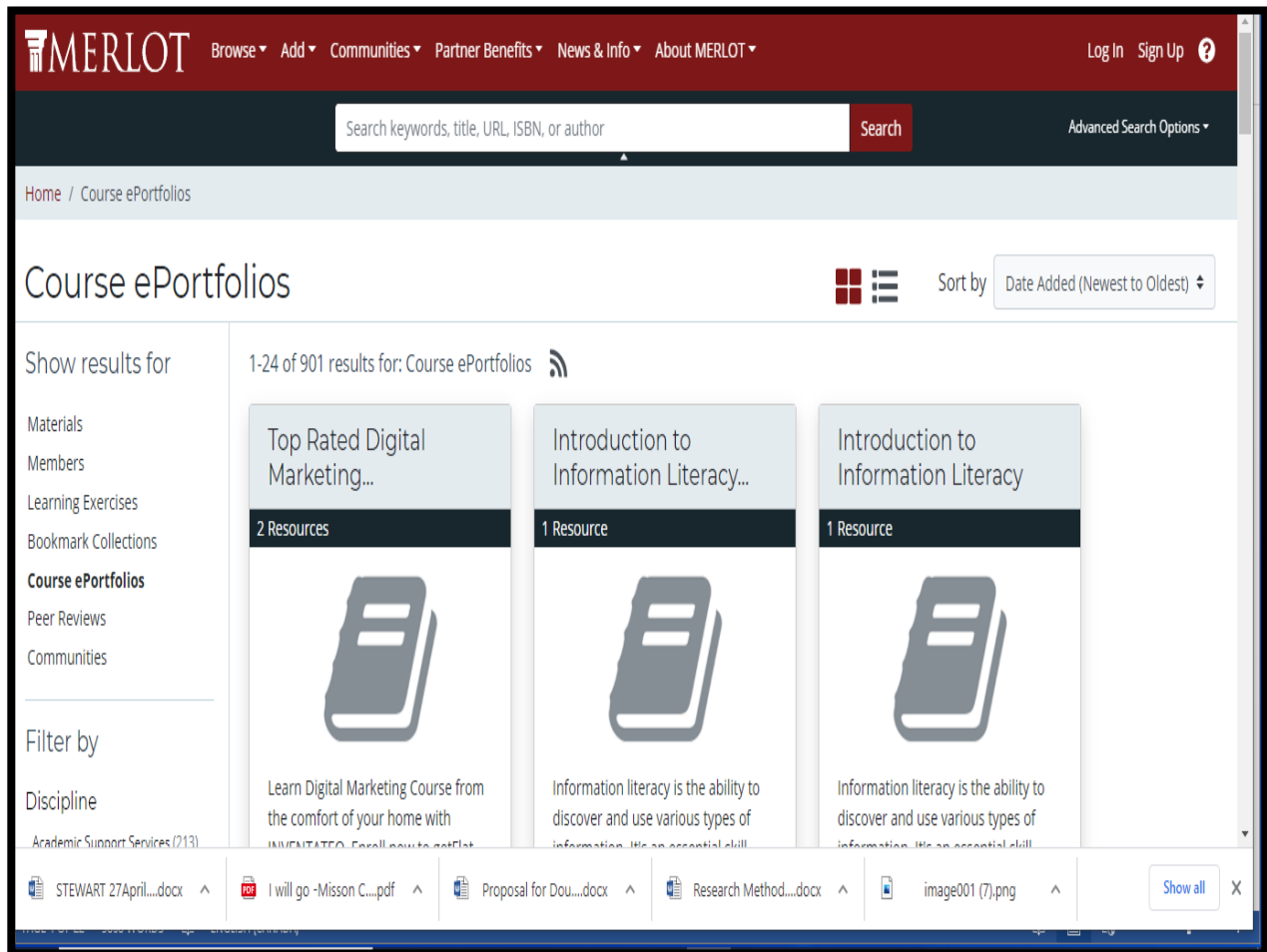
4. redistribute – share the verbatim work, the reworked work, or the remixed work with others
5. retain - make and own a copy

In this sense, a teacher or student is able to take the original work from other providers, and adapt and repurpose the material to produce a new learning resource. This process is usually facilitated through a liberal licensing model.

OER - Content Types

The OER forms vary to include free or very low-cost educational resources for all. These consist of “open access to programmes that lead to full, recognised qualifications; open access to courses or programmes that are not for formal credit; OER that instructors or learners can use for free; open textbooks, online textbooks that are free for students to use; open research and open data” (Bates, 2015, p. 400). Academic interest in OER is showcased mainly in the creation of OpenCourseWare (OCW) platforms, along with the development of open online courses, and the various open textbook projects. All these initiatives are usually archived in repositories and made available on website/s for use, modifications, and dispersions. A close examination of these websites showed content in the form of text, audios, videos, animations, and multimedia; thereby appealing to learners in the 21st century.

The Multimedia Education Resource for Learning and Online Teaching (MERLOT) repository, is a typical example of an institution’s repository. The repository comprises of assessment tools, assignments, case studies, drill and practice, ePortfolios, and workshop and training materials. See Figure 1 below.

Figure 1*MERLOT Repository Website*

Note. Screenshot from: MERLOT: Multimedia Educational Resource for Learning and Online Teaching

Other repositories include but are not limited to the OER Commons which is a multidisciplinary collection of OER; the World Lecture Project that provides researchers and educators with academic videos from around the world; the Open Course Library project that comprises a collection of activities, readings, and assessment tools that can be shared, and Open Michigan at the University of Michigan. The Creative Commons (CC) repository is one of the

most used, and it allows searches of CC licensed materials. “The issues of dispersion of resources and the complexity of discoverability standards may have been addressed by creating [these] consortia in which OER are shared” (Nkuyubwatsi, 2018, p. 2).

OCW

Through the inclusion of OCW, distance education has been greatly enhanced. OCW are free and open digital publication of high-quality university level educational materials that are organised as courses. They include course planning materials, evaluation tools, and thematic content, under a CC license (Vladoiu, 2011). OCW is accessible to anyone, anywhere, and anytime via the Internet. The focus is on developing and sharing freely available, stand-alone, online courses, and teaching materials.

Although the OCW movement had its genesis in the 1990s, it is safe to say the movement became official in 2002, and that the MIT serve as the precursor (Nkuyubwatsi, 2018). Subsequent to the presentation made by MIT, similar projects came on stream, and today, OCW, and by extension open online courses are provided through Ivy League universities such as Yale, Harvard, and within community colleges worldwide - see Figure 2 below. Projects they provide include the Carnegie Mellon Open Learning Initiative, Harvard Medical School’s MyCourses, Webcast Berkeley, Rice University’s Connexions, OpenCourseWare Consortium, Open Education Resources Commons, and the Saylor Foundation’s Free Education Initiative to name a few.

Figure 2*MIT OpenCourseWare Website*

Note. Screenshot from: Massachusetts Institute of Technology

All these developments are made possible through the:

Creative Commons' Attribution-Noncommercial-ShareAlike 3.0 license. This license permits the free use or re-purposing of the open courseware materials by others. Under this license one is allowed to download, redistribute, remix, tweak, or build upon these materials to produce new materials, provided that they are used non-commercially, and the originators of the materials are credited. Additionally, one must license any new use of the new materials under identical terms (Vladoiu, 2011, p. 272).

As a part of the OCW and by extension the OER initiative, universities make some or all their courses open online. Structured courses are sometimes offered within a university via learning management systems, or as open and distributed learning as in the case of Massive Open Online Courses (MOOCs). This recent development in global open education was aimed at

unlimited participation and open access via the web. According to Venkatanaman and Kanwar (2015), MOOCs provide a space for learners to complete their program 100% online, interact with classmates and faculty within a community and complete assignments. Unfortunately, MOOC participants do not earn college credits, instead they earn a certificate of completion, competence or participation at the end of the course (Venkatanaman & Kanwar, 2015). MOOCs were “never about higher education, they were in response to larger societal needs relating to education and training” (Siemens, 2015, p. xiv). For this reason, they are often seen as a means of professional development. Although less is written about MOOCs in developing nations, Venkatanaman and Kanwar (2015) accounted for a MOOC, Mobiles for Development (M4D), built and offered by the Commonwealth of Learning (COL) in partnership with the Indian Institute of Technology. The COL is the world’s only intergovernmental organisation solely concerned with the promotion and development of distance education and open learning (The Commonwealth, 2020). The MOOC intake accounted for more than 2000 participants from 116 countries, and of that number more than 90% were from developing nations. These data suggest that MOOCs have a future in the Caribbean, and tertiary level institutions should invest in these initiatives. Siemens (2015) concluded that learning through connection has a place in the knowledge society where learning goes beyond a four to five-year education process.

Open Textbooks

Due largely to the systematic and continued rising cost of commercial textbooks, there has been a commensurate call for a shift to OER especially among disadvantaged learners. “Some textbooks cost US\$200 or more, and in North America a university undergraduate may be required to spend between \$800-\$1,000 a year on textbooks” (Bates, 2015, p. 411). Two textbooks used in the Caribbean at the Department of Library and Information Studies at the University of the West Indies are examples of the exorbitant cost of textbooks, ranging between US\$150 to US\$200 much to the disadvantage of the students who are already overly burdened with high tuition.

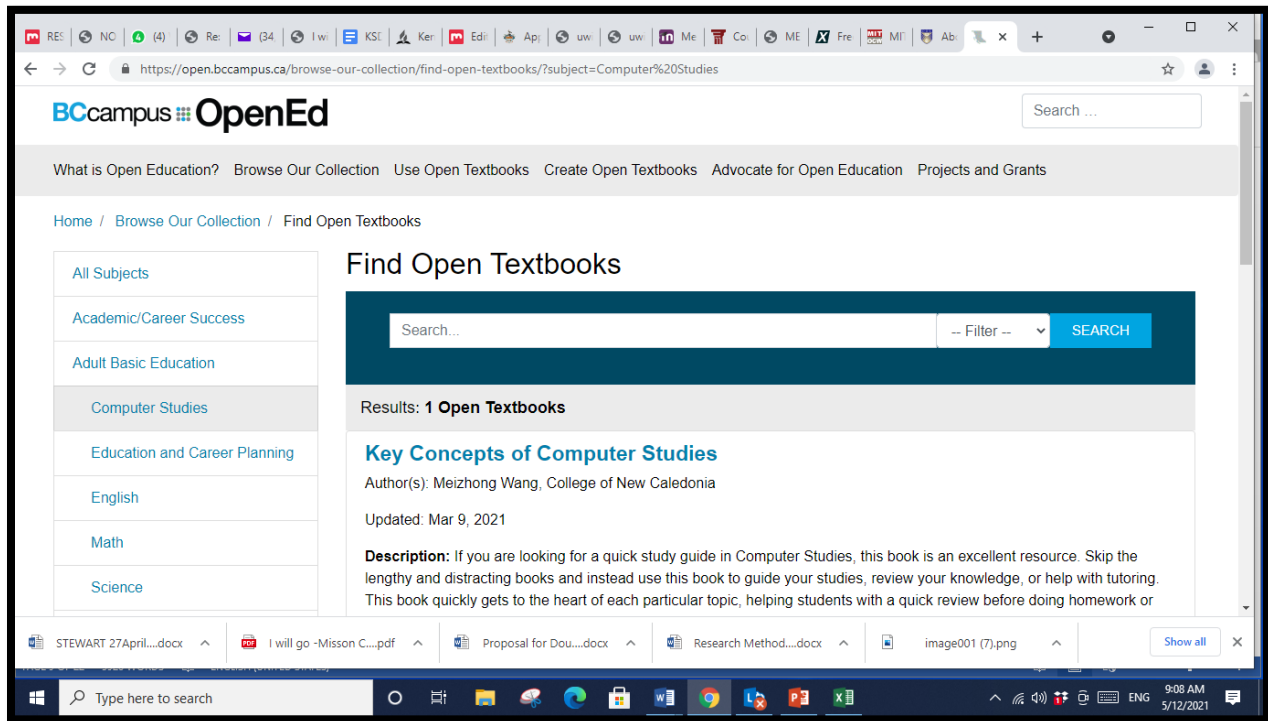
The open textbook is licensed under an open copyright license that makes content available online to be freely used by students, teachers and members of the public. Although there is consensus on the benefits of OER as a substitute for commercial textbooks, these books

are not “widely used and progress towards large scale adoption is slow” (Annand & Jenson, 2017, p. 1). Nevertheless, there are indications that the open textbook movement, is gradually gaining momentum in higher education. As part of the broader OER movement, open textbooks are increasingly being seen as a solution to the challenge of affordability of traditionally published textbooks. The defining difference between open textbooks and traditional textbooks is that the copyright permissions on open textbooks allow the public to freely use, adapt and distribute the material (Annand & Jenson, 2017). Open textbooks either reside in the public domain or are released under an open license that grants usage rights to the public as long as the author is attributed. Many open textbooks are distributed in either print, e-book, or audio formats that may be downloaded or purchased at little or no cost. This new means of textbook production and distribution have not only revolutionised learning but have also caused a decline in the cost that students will need to pay for course materials.

Annand and Jenson (2017) explained that the University of Athabasca (a leading user of OER in the provision of online learning) negotiated with the author, and received permission to, update and revise, the 2nd edition of a commercial textbook following the decision by the author not to produce a 3rd edition. The institution was granted permission to use the ‘new’ 3rd edition as the textbook for a particular course. With further revision, the 4th edition was licensed as an OER. This approach removed the financial barrier that once existed. Another notable open textbook initiative is the British Columbia Open textbook project that creates, repurposes and shares the digital contents from textbooks for educational and personal use - see Figure 3 below.

Figure 3

British Columbia University Open Textbook Initiative



Note. Screenshot from: BCcampus (2021)

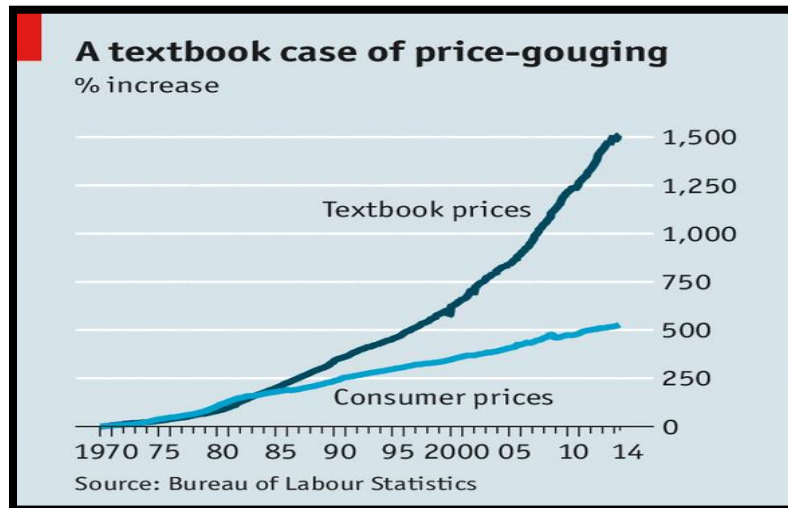
Opportunities and Challenges

As indicated earlier, over the last 15-20 years, interest in OER increased steadily in both developed and developing nations. It is suggested that the growing interest is as a result of the potential for OER to make learning more affordable and remove many of the barriers to accessible and equitable education. OER, it is argued, provide equal access to knowledge for all; enhance students' academic reputation, attract talented students and staff; and improve learning materials and research through open sharing (Navarrete, Luján-Mora, & Peñafiel, 2016). Although it was assumed that by making the cost of learning more affordable, and in this case free, and that faculty would be more willing to incorporate these resources in their teaching and learning programs, the contrary is observed (Allen & Seaman, 2014). Faculty are skeptical about their use and authenticity, and hence the adoption is minimal (Bates, 2015, p. 408). While

educators seek to leverage the opportunities for quality education, they also struggle to harness its full potential.

The ‘openness’ of education is premised on the removal of technical, social and geographical barriers. However, this can be realised only if practitioners concede to “changes to the content, the teaching process and the support services offered to learners” (Orr et al., 2015, p. 22). The slow adoption of OER in mainstream curriculum is due to a lack of understanding (Allen & Seaman, 2014). Many in education do not understand the potential of OER and feel that it threatens their ownership of intellectual property. Many teachers and learners are not aware of the differences between freely accessible content on the Internet and OER; they believe that all web resources are OER (Chen & Panda, 2013). With awareness exercises, persons will come to recognise that open licenses, as provided by CC, serve only to make the sharing process easy while protecting the copyright.

Perhaps one of the most important benefits of OER is the financial value to the institution. Institutions of learning benefit from a reduction or elimination of the cost that would be involved if it were a commercial textbook. Students usually suffer as the cost of textbooks continue to increase. According to the Economist, in the last two decades, textbook prices have increased almost fifteen times since 1970, and three times the rate of inflation (see Figure 4).

Figure 4*Textbook Prices Over the Last Two Decades*

Note. The graph in Figure 4 shows that the prices of textbooks have been doubled from 2005 to 2014. From: *The Economist* (2014)

The COL report posited that a possible reason for the high costs of textbooks is that a significant percentage of them are published outside of the Caribbean region. Many institutions of learning either revert to a rental system or the use of OERs. As an imperative for developing nations, OERs:

can contribute to solving the educational challenges related to: learning for the 21st century, fostering teachers' professional development, containing educational costs, continually improving the quality of educational resources, widening the distribution of high-quality educational materials, and breaking down the barriers to high-quality learning opportunities. Of particular importance among these challenges are teachers' development and educational costs (Orr et al., 2015, p. 16).

OERs, therefore can ensure that all students have access to course materials. This global free exchange suggests that knowledge is not only accessible but also reusable by learners and teachers in a variety of formats. Anyone can access information on the Web, but if it is

restrictively licensed, it cannot be downloaded or reused, whereas OERs allow this (McGreal, 2017, p. 297).

Even though it is postulated that OER can save time and money in the development of new courses (Allen & Seaman, 2014), the implementation can be costly. It was further conveyed that there are one-time and recurring costs that must be considered. One-time costs include those of searching, transferring, adapting, assembling, etc., while the recurring costs are for the infrastructure and updating. It is also highlighted that similar costs exist when commercial content is being implemented. The cost to implement and maintain OER projects brings to the fore concerns regarding the sustainability of OER initiatives (Atkins, Brown, & Hammond, 2007). Many of the OER initiatives that began in recent years were dependent on one-time start-up funding from the government and other funding agencies. Even with strong institutional backings, challenges arise whenever the initial funding wanes within a few years. Without proactive maintenance policy, the resources will become obsolete and irrelevant. It is critical to figure out how to sustain these initiatives in the long run before implementation. “Unless the OER site is able to first gain and maintain a critical mass of active, engaged users, and provide substantial and differentiated value to them in its start-up and growth phases, then none of the available and/or chosen revenue models will be likely to work for the OER in the long run” (Atkins et al., 2007, p. 25).

Schulte (2017) alluded to the flexibility and increase in students’ success as educational values of OER. Notwithstanding the lack of research data comparing the learning outcome of students who participate in courses that use OER compared to the outcome of those using commercial products, there is evidence that digital learning materials such as OER can improve students’ performances, resulting in better learning outcomes, and improved grades (Bluestone, 2016). Similar studies have also indicated no difference in the result (Annand & Jansson, 2017). For instance, Salt Lake Community College (SLCC), USA, a large open enrolment college began offering students access to OER in 2014 as a means of reducing textbook costs. Faculty recognised that the expense associated with attaining a degree is a hindrance to students’ completing a programme. Schulte (2017) examined OER’s impact on course grade, likelihood of passing, and likelihood of withdrawing, and found that there is no difference between courses using OER and traditional textbooks for continuing students. A similar result was obtained in a

study done at the Athabasca University, one of the largest Open University in Canada (Annand & Jensson, 2017). Importantly, there is evidence that there are less dropouts and withdrawals from courses that are OER oriented (Bluestone, 2016; Annand & Jensson, 2017). In the study by Annand and Jensson (2017), 6.4% fewer students withdrew from the OER version of the courses. This would suggest that whether the material is free or expensive, quality does matter, and the instructors' pedagogical approach to using the resource will influence the students learning outcome.

The creators tend to benefit because OER are customisable and content providers are able to remix, reuse and redistribute resources for wider access. The educational value of the material is enhanced as it is modified by other like-minded faculty from around the world. In addition, OER creators have the benefit of designing materials that are suitable for their classes and are therefore able to use the best resources in their classes as opposed to textbooks that have their strengths and weaknesses all in one package.

The increasing volume of OER that is becoming available represents an opportunity for teachers and learners everywhere. But with the subsequent vast quantity of resources that are available, the matter of quality assurance takes centre stage. It is often difficult to identify, locate and evaluate OERs for relevance, authority and credibility. However, this technological barrier is mitigated through the use of more robust and capable search engines. Additionally, OER repositories are becoming available for searching out content in the major subject areas. The lack of infrastructure such as appropriate devices, access to high bandwidth, either by wire or wireless, also poses problems for countries in developing nations and the underserved remote regions in the developed nations (Bates, 2015).

OER Initiatives in Latin America and the Caribbean

The World OER Congress 2012, organised by the COL and UNESCO and supported by the William and Flora Hewlett Foundation, led to the adoption of the OER Paris Declaration by delegates from 70 countries. Among the participants were the Latin America and the Caribbean (LAC) OER Regional Consultation stakeholders who committed to develop policies around OER with the help of the COL and UNESCO. They shared policy initiatives and OER practices, and discussed concerns and issues for mainstreaming OER to support inclusive and equitable quality

education. The environmental scan provided by the COL Report (2012) showed that similar to other regions, members recognise the need for OER, but the efforts to implement such are sparse and invariably, there is no policy. The following overview was provided by COL (2012):

Antigua and Barbuda

- ICT policy speaks of provision of infrastructure for OER
- Productions with government funds should be CC licensed
- Teacher training initiative. OER textbooks on entrepreneurship - monitoring and evaluating e-textbook; created e-texts on OERs.
- COL-funding OER, training for development in OERs
- Some teachers received training on OERs

Grenada

- Grenada does not have a national OER Policy. However, there is a draft national ICT in Education Policy. The Ministry of Education, Human Resource Development and the Environment intends to host consultations on the draft and submit the same to Cabinet for approval in a year.
- Grenada's involvement in capacity building activities:
 - Training of ten (10) teachers and one (1) Curriculum Development Officer (Mathematics) in the development of OER content materials. This was done with the assistance from a COL expert.
 - Development of OER Mathematics modules for Forms 1 and 2, the development of Science modules will follow
 - Training of two tertiary lecturers in the delivery and development of online materials
 - Using the e-learning platforms for course delivery at the tertiary (post-secondary) level

St. Lucia

- No national OER policy currently exists. A new ICT in Education Policy and Strategic Plan that is expected to be completed in a year will include OER Policy for the education system. The University of the West Indies Open Campus which has a base in St. Lucia, has institutional OER policy in place.

- Capacity building for OER include:
 - use of OER training for course writers
 - use of eLearning Platform training for tertiary educators
 - development of OER textbook for grade 5 Mathematics
 - development of OER Technical and Vocational Education and Training (TVET) courses
- Government provides no funding for OER development. The Caribbean Examinations Council is aiming to work with St. Lucia to develop OER for Modern Languages for their NotesMaster platform. However, no funding is proposed. Digicel, a major telecommunication company has introduced a free platform to be used by schools. The other major telecom provider, FLOW, also has a platform that they are hoping to introduce to schools. So far, all OER projects in St. Lucia have been funded by COL. There is room, however, to engage more private sector partners in developing OER.
- The stakeholders include the Ministry of Education, teachers, school leaders, parents and the private sector. ICT integration skills are a prerequisite for advancing skills in the use, adaptation and sharing of OERs. Training must be provided for teachers and school leaders in OER development, course development and e-tutoring. Parents also would benefit from training in accessing OER materials.

St. Vincent and the Grenadines

- No OER policy, but ICT policy. Working with COL. Distance learning policy (NTRC) - Ministry of Education in transition.
- Using NotesMasters platform.

Jamaica

- The COL reported that Jamaica is making strides towards OER, particularly through the Caribbean Research and Education Network (C@RIBNET). To date there is no evidence that this has been initiated. However, there is an ICT policy which includes the use of ICT to “facilitate the achievement of lifelong learning and a knowledge based society by providing ubiquitous access to information which supports improved education, skills acquisition and innovations; and promote information literacy programmes and the development of local content” (Government of Jamaica ICT Policy, p. 30). This will set

the platform for educational institutions to give wider access to the globally available electronic resources.

OER: Implications for Quality Teaching and Learning in Higher Education

Due to the steady growth and availability of OER, Bates predicted that in the future almost “all academic content will be open and freely accessible over the Internet ... students will increasingly look to institutions for learning support and help with the development of skills needed in a digital age rather than with the delivery of content (2015, p. 395). This will have major consequences for the role of teachers/instructors as they prepare students to be lifelong learners. The emphasis on access to information and its utilisation suggests that the role of libraries and librarians has been shifted to that of mediators of learning, connecting the learners to the relevant resources (Goswami & Biswas, 2011).

UNESCO and COL proposed that Commonwealth nations get involved with the OER movement in order to improve pedagogy and access. From the practitioner’s perspective, Stagg (2014) proposed five stages or levels at which a practitioner might choose to operate. Stage 1 of the continuum is described as the awareness or access stage, in which there is little or no institutional support, or policy direction. Due to a lack of knowledge, the practitioner only includes and uses OER content in his/her classes. Stage 2 is the Original Sharing stage. At this point, the practitioner not only uses the work of others but creates his own work and licenses it through open licencing and shares with others in the community. Dissemination is usually through an institution’s repository, or even via a personal space on the web. A practitioner’s action might also occur at the 3rd stage, the Passive Remix stage. Here, the practitioner “locates a single artefact which aligns well (but not completely) to their learning and teaching needs, ...and changes the content (either superficially or substantively) to suit the local context, and then releases the work. At this stage, the focus may be on context-driven reuse, rather than sharing” (p. 158). The 4th stage, Active Remix, is a bit more complex, and requires more understanding and commitment to the OER movement. Instead of repurposing or remixing a single artefact, the practitioner, repurposes multiple open resources or an entire course into a new resource. At the 5th and final stage, Developing (Student Co-Creation), there is active learning, collaboration and engagement on the part of the students. “Students become involved in the discovery, use, and

reuse of OER to support active learning” (p. 159). Students become motivated as their work is further released into the open community to be reused and remixed by other practitioners.

Jhangiani, Pitt, Hendricks, and Lalonde (2016) reported on a research conducted in British Columbia that reflect OER engagement at each level of the continuum. A survey was conducted among 78 educators from 17 higher educational institutions. The purpose of the research was to determine if faculty members were using OERs. The findings show that faculty are aware of OERs and use OERs in different ways. Sixty percent of those surveyed adopt OERs for use in the classroom, another 60% adapt OERs to suit their specific classroom context; and 28% created OER content. Participants frequently use a variety of resources to supplement the teaching and learning process. Sixty-three percent of those surveyed use videos, and another 47% use images. A little more than a third of the sample reported using open textbooks (35%), while slightly fewer (32%) reported using elements of a course. More than 50% of the participants were fully aware of the importance of open licensing and the role of CC making this happen.

Sawant’s (2016) comprehensive compilation of OERs in the field of Library and Information studies (LIS) represents a significant corpus of resources in the open domain. This attests to the commitment of LIS practitioners to the OER movement. In reality, it is impossible for any library or library school to subscribe to all published works within the discipline, so OER fills a necessary gap. Librarians who teach, play a pivotal role in helping in the awareness and use of these resources. Librarians who engage in teaching information literacy instruction programs, have the options to participate in the OERs programme at any level they are most comfortable. They can exploit information resources and participate in the creation of learning artefacts. Goswami and Biswas (2011) claimed that librarians, as experts in their field, are to lead in collaborative creation, evaluation, and sharing of open content and learning experiences. It is “the resourceful librarian with vision, who stays abreast and remains open to the changing trends in the educational world, who is knowledgeable of available resources both print and online, and who also gains experience with changing technologies, becomes an essential partner in the collaborative educational efforts of both instructor and student” (Goswami & Biswas, 2011, p. 89).

Way Forward

OERs promise to greatly improve the quality of education in the Caribbean, especially within higher education, but much more need to be done. It requires the decisive efforts of all, and partnership and collaboration to move the OER movement forward. Brown et al. (2007) provides some practical advice. They encouraged the ‘converted’, those already in OER projects to market and seek buy-in from stakeholders at the institutional level and beyond. They further posited that the consortia membership should further distribute, and share cost and expertise. It is also essential that practitioners move beyond use of OER to the creation of resources, and have students actively involved in the development of these resources. Despite being free and open, quality learning can only be realised if the resources are “well designed and embedded within a rich learning environment” for effective learning experiences” (Bates, 2015, p. 395).

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