ARTICLE

Revisiting the Reusability and Openness of Resources in the Massachusetts Institute of Technology Open Courseware

Bernard Nkuyubwatsi

The marketing of the Massachusetts Institute of Technology (MIT) Open Courseware gives the impression that it has the potential to contribute to quality open learning and opening up higher education globally. It is from this perspective that the potential contribution of Open Educational Resources (OER) units in the MIT Open Courseware to opening up higher education in Rwanda was investigated. Ten OER units were sampled as objects of the study. I took the role of an archive analyst, giving full attention to any item that constituted each unit. Results indicate that only one unit had enough openly licensed resources to enable its potential adaptation for use in opening up higher education. In other units, only metadata (course information, the syllabus, course calendar, and the list of required and suggested readings), assignments and/or quizzes/exams were openly licensed. Most (if not all) of the required and suggested readings, which are the core learning materials learners need to engage with for quality learning, had to be purchased, mostly from the Amazon website. On the basis of these findings, I argue that the MIT Open Courseware served the marketing agenda (probably for the purpose of acquiring funding), rather than the open access agenda. The study may benefit funding organisations, educators and institutions that are interested in supporting or engaging in the production, adaptation and use of OER with an agenda to contribute to opening up higher education.

Keywords: OER; OER units; MIT Open Courseware; marketing; open licence; opening up higher education

Introduction

Efforts to make learning resources open started with the production of learning objects: digital entities that can be used, reused or referenced during technology supported learning (Rehak & Mason, 2003, p. 21). The learning objects initiative was catalysed by the need to increase access to education in many countries, both developed and developing ones (Littlejohn, 2003, p. 1). The idea behind learning objects was that sharing and reusing learning resources would help expand access to education cost-effectively. According to Weller (2014, pp. 69–72), the learning objects initiative failed due to three reasons: 1) the complicated reusability of learning objects, 2) the dispersion of learning objects in diverse learning management systems, which led to the development of standards for their discoverability that eventually became complex, and 3) the lower levels of recognition of contributions made to learning object repositories, compared to the level of recognition given for publishing research findings in journal articles. This lack of recognition of contribution to learning objects discouraged academics from engaging in related practices. Consequently, there was no critical mass for the sustainability of the learning objects initiative.

After its failure, the learning objects movement evolved into the OER movement. The concept of Open Educational Resources (and its acronym: OER) was coined at the 2002 UNESCO meeting in which the MIT Open Courseware model was presented (D’Antoni, 2009). Thanks to the global representation at the meeting, the idea of providing educational materials free of charge propagated quickly. Barriers that led to the failure of the learning objects initiative seem to have been addressed in OER. The reusability issue was addressed by different open licences (see Creative Commons licences in Figure 1, for example) under which OER content is released. These licences grant permissions to access, download, print out, use, reuse, redistribute and adapt the content, and disseminate the derivative work across settings. The issues of dispersion of resources and the complexity of discoverability standards may have been addressed by creating consortiums in which OER content is released. These licences grant permissions to access, download, print out, use, reuse, redistribute and adapt the content, and disseminate the derivative work across settings. The issues of dispersion of resources and the complexity of discoverability standards may have been addressed by creating consortiums in which OER content is released.
been addressed by the publication of journal articles under an open licence in blind peer review open access journals.

Open licences include Creative Commons licences and the public domain, which is the most accommodating open licence: there is no known restriction on materials released in the public domain (see Figure 1). Creative Commons (CC) licences were developed on the basis of four properties: Attribution (BY), Non-Commercial (NC), No Derivative work (ND) and Share Alike (SA) (Bissell, 2009, p. 101). From the most accommodating to the most restrictive, Creative Commons licences are: 1) Creative Commons Attribution (CC BY), 2) Creative Commons Attribution-Share Alike (CC BY-SA), 3) Creative Commons Attribution-NonCommercial (CC BY-NC), 4) Creative Commons Attribution-NoDerivatives (CC BY-ND), 5) Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) and 6) Creative Commons Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND). More information on these licences is available at https://creativecommons.org/licenses/. According to Green (2012), there has been effort to get rid of licences that have the No-derivative work and Non-commercial features since they are restrictive and controversial respectively. The controversy around the non-commercial feature is likely to emerge when resources are used in education across settings. There is no universally accepted clear divide between a non-commercial and a commercial educational institution, which makes this aspect ambiguous.

Various declarations related to open access, open education and OER have been made. These declarations include the 2002 Budapest Open Access Initiative (Open Society Foundations, 2002), the Cape Town Open Education Declaration (Shuttleworth Foundation & Open Society Foundations, 2007) and the Paris OER declaration (UNESCO, 2012). Despite these declarations, levels of use of the large amount of existing openly licensed content which are available has not been satisfactory (Lane, 2010; Ehlers, 2011; Conole, 2013). Learners’ engagement with OER-based learning may have been inhibited by many barriers, including the lack of recognition of related accomplishment (Lane & Van-Dorp, 2011) and limited access to technologies (Wolfenden, 2012; Wolfenden, Buckler & Keraro, 2012). These two barriers were relevant to the study, and the second one permeates the results of the 2012 national census in Rwanda: access to electric power, computers and the Internet in Rwanda was 18%, 2% and 7%, respectively (National Institute of Statistics of Rwanda, 2014, pp. 87–100). The most ubiquitous technologies in Rwanda were found to be radio (which was accessible to 64% of households) and mobile phones (which were accessible to 54% of households). These challenges that prevail in Rwanda were taken into consideration in the evaluation of OER Units in the MIT Open Courseware.

The expansion of OER initiatives triggered new business models, five of which are discussed in this paper. The first business model consists of an open licence that requires a commercial contract and the payment of licence fee for the commercial use of the materials (Fitzgerald, 2007, p. 12). The second business model consists of the inclusion of advertisement of commercial products in electronic materials copyrighted under an open licence (Fitzgerald, 2007, pp. 12–13). In this business model, the resources released under an open licence may simply serve the marketing agenda. The third business model consists of releasing parts of courses as OER to attract independent learners to the paid complete versions. While Didderen & Verjans (2012, p. 11) refer to this strategy as an “extensive teaser”, Downes (2006) refers to it as the conversion model. The fourth business model consists of sponsorship (Downes, 2006): in this model, open access is provided via TV, radio and other media with possibility for the sponsor to add intrusive marketing messages. The final OER business model consists of commercialisation of various services such as assessment, additional content, content explanation and credentialing to OER-based learners (Jacobi & Woert, 2012). Those services are referred to as open educational services (Ouwehand, 2012; Nkuyubwatsi, 2014 and 2016a) or open learning services (Mulder & Janssen, 2013, p. 36). This study was conducted with an explicit goal of determining the potential contribution of the MIT Open Courseware resources to opening up higher education in Rwanda. In this country, access to higher education has increasingly become challenging due to the shortage of funds for student loans.

Methods

The study was conducted as part of PhD research on opening up higher education in Rwanda. Research on the potential contribution of OER units in the MIT Open Courseware to opening up higher education in Rwanda was conducted in the light of the research question “Which OER units can be adapted for use in opening up Rwandan higher education?”. 1 concentrated on OER units as a content/archive analyst. The MIT Open Courseware (http://ocw.mit.edu/courses/find-by-topic/) was selected based on the apparent absence of barriers...
that could inhibit access to the content (as opposed to some other repositories in which access was limited to approximately 10% of OER units/course units): From a surface view, units in the MIT Open Courseware seemed to be completely open. The MIT Open Courseware was also assumed to host big OER (Weller, 2011, p. 105) whose quality check would be trusted since it is run by a higher education institution. Equally, the repository was thought to contain a wide variety of OER units and, therefore, offer plenty of options to choose from. The apparent openness of the MIT Open Courseware also related to the goal of the study: determining OER resources that may potentially contribute to opening up higher education in Rwanda.

Ten OER units were selected for the study (See Table 1). These units were found using the “Course Finder” tool that offered three alternatives to find courses: 1) search by topic, 2) search by course number and 3) search by department. I used the first alternative, search by topic, to find the OER units I used in this study. Sampling of OER units was purposive (Bouma & Ling, 2004) in that I selected the units in the fields in which I was interested and of which I had prior knowledge. This enabled me to meaningfully engage with, and maintain my attention on, all resources in the unit. Basing my choices on personal interest also enabled me to simulate the experience of students, learners and academics who find resources to use in their learning or teaching.

Prior to conducting the study, I had developed a protocol/rubric that was mostly adapted from Achieve’s (2011) rubrics for OER content evaluation. The rubric adaptation had focused on tailoring the instrument to ensure that collected data could respond to socioeconomic and infrastructural/technology access challenges in Rwanda, discussed in the previous section. In data collection, however, most of this rubric became irrelevant due to the fact that core resources that may lead to quality learning were not openly licenced. This detail was absent in the literature that advanced the MIT Open Courseware as a good example of OER repository. After noting this reality, the study focus was limited to examining the openness of the resources, without which legal adaptation for use in opening up higher education in Rwanda was unlikely to happen.

### Results

All OER units were archives of resources used in courses taught at MIT in the past. These units consisted of metadata (course information, course calendar, syllabus, a list of required and suggested readings), projects assigned to students and handouts for some units. In all units, these types of materials were copyrighted under CC BY-NC-SA.

The number of readings varied from unit to unit (See Figure 2). The How to Develop “Breakthrough” Products and Services unit had the fewest required and suggested readings (11 in total) and the Technological Tools for School Reform unit had the highest number of such readings (88 readings). Unlike the list of required and suggested readings that was openly licensed, the degree of openness of the readings per se was diverse. Most of these core learning materials were not openly licensed. A significant number of them had to be purchased from Amazon.

Figure 3 illustrates how Amazon’s web pages from which the required or suggested readings in OER units had to be purchased were linked to the list of the readings provided in those units.

Many other readings could be purchased from other commercial websites such as the MIT Sloan Management Review website or the Harvard Business Review website. Links to these websites were also provided. The payment for the readings could be done either by buying copies of the files, or by paying periodical subscriptions to the websites.

In some units, short versions of the required or suggested readings were available free of charge. However, the full versions of most of these resources had to be purchased.

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**Table 1:** OER units analysed in the study.

<table>
<thead>
<tr>
<th>No</th>
<th>OER unit</th>
<th>Year</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Media Education and the Marketplace</td>
<td>2005</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>2</td>
<td>Technology Tools for School Reform</td>
<td>2005</td>
<td>Graduate</td>
</tr>
<tr>
<td>3</td>
<td>How to Develop Breakthrough Products and Services</td>
<td>2012</td>
<td>Graduate</td>
</tr>
<tr>
<td>4</td>
<td>Corporate Entrepreneurship: Strategies for Technology-based Development</td>
<td>2007</td>
<td>Graduate</td>
</tr>
<tr>
<td>5</td>
<td>Global Entrepreneurship Lab: Latin America, the Middle East, and Africa</td>
<td>2010</td>
<td>Graduate</td>
</tr>
<tr>
<td>6</td>
<td>Designing and Leading the Entrepreneurial Organization</td>
<td>2003</td>
<td>Graduate</td>
</tr>
<tr>
<td>7</td>
<td>Entrepreneurial Marketing</td>
<td>2002</td>
<td>Graduate</td>
</tr>
<tr>
<td>8</td>
<td>Challenge of World Poverty</td>
<td>2011</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>9</td>
<td>Working in a Global Economy</td>
<td>2005</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>10</td>
<td>Technology for Creative Learning</td>
<td>2009</td>
<td>Graduate</td>
</tr>
</tbody>
</table>
For many other readings, access to full versions required a paid subscription. Full versions of some readings could be accessed and used free of charge, but users had to join online communities to have free access to them. Joining these communities was free of charge: it only required filling in registration forms.

Some readings could be accessed for free but this did not mean that their download, printing, reuse, remix/adaptation and redistribution was authorised (see numbers for different degrees of openness in Figure 4). The licence under which the resources were released was not clearly specified for many of them. Some readings could be downloaded after acceptance of terms and conditions which stipulated that the user should be affiliated with a licensee institution as a student, an educator, a researcher or an alumnus for downloading the resources. This was especially the case for readings that were available in the Journal Storage (JSTOR), a digital library that provides full text searches to about 2000 journals and is accessible to more than 8000 institutions (Wikipedia, 2015). A few of the required and suggested readings accessible via JSTOR could be downloaded and used for non-commercial purposes. In some OER units, a few readings could also be accessed on other websites. Some of these readings had a note that said that permission to use them for educational and research purpose had been granted.

Links to required or suggested readings in various OER units worked differently. Some of these links were broken. In most units, a few required or suggested readings had no links. However, most of these materials could be googled
and found from other websites. The degree of openness of these resources also varied.

Some units also contained videos or had a link to videos in other courses. This was the case for the following units: Media Education and the Marketplace (which had links to optional English as Second Language (ESL) videos), How to Develop “Breakthrough” Products and Services (which had four lecture videos), and Challenge of World Poverty (which had 22 videos and their transcripts). In addition, Challenge of World Poverty had seven assigned videos which were available on external websites such as YouTube. All these videos and their transcripts (where they were provided) were copyrighted under CC BY-NC-SA, with exception of the ones hosted on external websites.

Permission to download and store required/suggested readings

Only a certain proportion of required or suggested readings in some OER units could be legally downloaded and stored on hard drives. Figure 4 indicates that Technological Tools for School Reform had the highest number of required or suggested readings that could be legally downloaded and stored on a hard drive (16 readings in total). This OER unit was followed by Corporate Entrepreneurship: Strategies for Technology-Based New Business Development which had 8 required and suggested readings that could be legally downloaded and stored on hard drives.

When we move from raw numbers to look at percentages (Figure 5), “How to Develop “Breakthrough” Products and Services” led with 27.27% of required or suggested readings that could be legally downloaded and stored on a hard drive. This is probably because fewer readings (only 11) were required or suggested in this unit than in other units. Permission to download and store 3 of the 11 readings was granted. How to Develop “Breakthrough” Products and Services was followed by Designing and Leading the Entrepreneurial Organization (with 26.3%) and Global Entrepreneurship Lab: Latin America, the Middle East, and Africa (with 21.4% of required and suggested readings that could be legally downloaded and stored on hard drives).

It is worth noting, however, that two OER units had videos. How to Develop “Breakthrough” Products and Services had 4 videos, and Challenge of World Poverty had 22 videos. The transcripts of the videos were also provided in Challenge of World Poverty. All these videos in both OER units and transcripts in Challenge of World Poverty were copyrighted under CC BY-NC-SA. The videos (and the transcripts) were additional to required and suggested readings and other types of resources provided in all OER units: metadata (course information, syllabus, calendar and list of readings), projects/assignments and quizzes/exams.

Putting together videos, transcripts, required readings and suggested readings gives a total of 79 items in Challenge of World Poverty and 15 items in How to Develop “Breakthrough” Products and Services. When we consider only resources beyond metadata, assignments/projects, quizzes and exams, Challenge of World Poverty led in terms of the proportion that could be legally downloaded and stored on a hard drive free of charge. In this OER unit, 44 out of 79 resources (55.69%) could be legally downloaded.
and stored free of charge. This unit was followed by How to Develop “Breakthrough” Products and Services with seven out of 15 resources (46.6%) that could be legally downloaded and stored on a hard drive.

**Licensing in OER units**

As highlighted earlier, metadata, assignments/projects, quizzes and exams (where available) were released under CC BY-NC-SA. Lecture notes, videos and their transcripts, and some ESL/EFL materials, where provided, were also copyrighted under this licence. However, a handful of required or suggested readings in the units were OER/openly licensed (See Figures 4 and 5). Most of these readings had to be purchased from Amazon or similar selling sites (Figure 3). Other readings could be downloaded online, but they were copyrighted under All rights reserved or the licence was not clarified. When a licence is not specified, the rule of thumb is treating the resources as copyrighted under All right reserved to avoid any risk of legal difficulties related to copyright dispute (Green, 2012). Permissions to use a few required and suggested readings for educational purpose were granted in most OER units. For many other readings, such permission was limited to use for personal learning. Redistribution, even for educational purposes, was not permitted.

As illustrated in Figure 4, the Technological Tools for School Reform OER unit had the highest number of required and suggested readings that were openly licensed. In this unit, 16 (out of 88) required or suggested readings were openly licensed. That is, 18.1% of the readings required or suggested in this unit were openly licensed. Technological Tools for School Reform was followed by Corporate Entrepreneurship: Strategies for Technology-Based New Business Development with seven out of 47 (14.8%) readings being openly licensed. Then Working in a Global Economy followed with six out of 34 required and suggested readings (17.6%) being openly licensed. After Working in a Global Economy came Media and Education and the Marketplace, with five out of 30 (16.6%) required and suggested readings being openly licensed. It is worth noting that when we turn our attention to the proportions (Figure 5), Corporate Entrepreneurship: Strategies for Technology-Based New Business Development (14.8%) ranks behind Working in a Global Economy and Media Education and the Marketplace (17.6% and 16.6% respectively).

Interestingly, four OER units had no required or suggested reading that was openly licensed. Those units are 1) How to Develop “Breakthrough” Products and Services, 2) Designing and Leading the Entrepreneurial Organization, 3) Entrepreneurial Marketing and 4) Challenge of World Poverty. However, if we count videos and their transcripts along with required and suggested readings, Challenge of World Poverty led with 44 out of 79 items (55.69%) that were openly licensed as discussed earlier.

**Which OER units can be adapted for use in opening up Rwandan higher education?**

Based on the amount of openly licensed items in the OER units, only Challenge of World Poverty was found to have the potential to be adapted for use in opening up higher education. As highlighted earlier, this unit had 44 items (22 lecture videos and their transcripts) that were openly licensed. This high number of openly licensed resources, coupled with the metadata in the unit, could be the basis for designing an open course that is responsive and sensitive to socioeconomic and infrastructural/technology access challenges that prevail in Rwanda. The reading resources that were not openly licensed in this unit could be replaced by journal articles in open access journals that have been published under open licences. Other units were found to have too few resources that were openly licensed to be adapted as the whole unit and be used in opening up higher education. Openly licensed resources in those units may only be adapted and used at a granular level. Hence, those units would not be suitable
to be adapted into courses in the same way as Challenge of World Poverty would.

Discussion
Cross-cultural and cross-setting reusability of OER is often enabled by the ability to adapt the resources for their fit within the new context. According to Perryman; Buckler, & Seal (2014), it is this adaptation which makes OER useful to educators and learners. The number of core learning resources that were released under open licences which enable such adaptation was very low (if any) in most OER units investigated. As highlighted in the Results section, only one OER unit was found to have enough openly licensed core learning resources that were released under CC BY-NC-SA. This low number of openly licensed core learning resources inhibits OER units in the MIT Open Courseware from reflecting the diverse opportunities and benefits that underpin the OER movement. Those benefits and opportunities include encouraging independent learning and widening participation in higher education (Mulder, 2007), increasing education opportunities (Camilleri & Ehlers, 2011), and reducing the cost of education (Wyk, 2012), etc.

The reusability and openness of resources in the MIT Open Courseware OER units did not seem to match the way the repository has been promoted (UNESCO, 2002). The low numbers and the nature of openly licensed resources in most OER units in this repository hint at an agenda behind the release of those metadata. Quality open learning cannot occur just because open learners have read the course information, course calendar, list of readings, assignments and/or projects that students at MIT engaged with. For quality open learning to occur, open learners need to engage with full texts of books and journal articles, or/and full length audio and video materials. The materials open learners need to engage with for quality learning to occur were not released under an open licence in most MIT Open Courseware OER units analysed in the current study.

Quality open learning may be enabled by resources in a different category of OER: articles that were published under an open licence in credible open access journals. The Budapest Open Access Initiative that informed this practice recommended permissions that allow any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself (Open Society Foundations, 2002). However, not all journal articles released under an open licence are of credible quality. The practice of charging a publication fee (see Weller, 2014, p. 7) has attracted predatory and vanity publishers in the business. Some of these publishers claim that they publish articles on the day that follows the submission deadline, which raises concerns on the blind peer review process. The platinum open access publishing route (Weller, ibid) is safe from vanity and predatory publishers (Nkuyubwatsi, 2016b; Nkuyubwatsi, 2017) in that the author only contributes the content and does not pay the publication fee that lures such publishers. Hence, journal articles that are published within the platinum open access publishing route undergo a rigorous blind peer review process. Their full texts may contribute to the high quality open learning which OER in the MIT Courseware (mostly metadata) cannot enable.

Conclusion
Openly licenced resources in the MIT Open Courseware did not reflect the humanitarian benefits and opportunities of OER as championed by the OER movement. In most of the OER units, only metadata and very few (if any) reading resources were openly licenced. Only the Challenge of World Poverty OER unit was found to have the potential to be adapted to enable quality open learning. Unlike other OER units, the Challenge of World Poverty unit had enough openly licenced resources: 22 videos and their transcripts. The MIT Open Courseware initiative seems to have been developed for marketing purposes, rather than for the purpose of contributing to open learning, widening access to education and reducing the cost of education. For this reason, the openness reflected in the MIT Open Courseware OER units does not allow adaptation and redistribution of the resources for use in contexts that suffer the shortage of resources. In most OER units, no permissions were granted to adapt core learning resources for suitability to the Rwandan context (including cultural fit and dissemination through media and technologies available in
this country). For this reason, the MIT Open Courseware was found to have very limited (if any) potential contribution to opening up higher education.

Competing Interests
The author has no competing interests to declare.

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