Chapter 6

Improving the quality of educational resources

This chapter investigates how open educational resources (OER) can help facilitate the continual improvement of educational resources. This is largely made possible through the adaptability of OER. The presented cases show that the flexibility of OER leads to the need to rethink quality assurance mechanisms. The final section of the chapter discusses the possibilities of using both more open quality assurance mechanisms and applying standards to ensure that what is learnt using OER is recognised in formal education.

Main policy messages

OER keeps resources up to date. Keeping up with the rate of new knowledge and new learning theories to serve a heterogeneous group of learners is a challenge and a necessity in the fast-paced 21st century. OER offer adaptability for keeping educational resources up to date and fit for their current purpose, as well as flexibility of use and reuse.

Assessing OER quality can be a challenge. However, the openness of the OER production process and its ensuing lifecycle lead to a new challenge – assessing quality with appropriate criteria. A central concept, which makes a virtue of the dynamic nature of OER, is to see releases of OER as continual "beta versions", with the assumption that they will be changed and developed by other users over time. However, user surveys show the scepticism of users regarding products created by others. A condition of the effectiveness of open procedures is, therefore, the extent of real engagement and commitment within the producer-user community.

Various initiatives attempt to ensure OER quality. Alternatively, open processes could be used to create OER, but then the OER could be fixed at a certain stage and assessed for fulfilment by standardised criteria. Various initiatives for curating and guiding quality in producing OER and for assigning use-related meta-tags exist, including an initiative in the United States to ensure alignment to the standards of the common core curriculum.

Policy challenge

Educational resources face three key quality challenges: 1) how to keep up with knowledge development; 2) how to reflect new learning theories; and 3) how to improve services to heterogeneous learners.

Potential solution

OER can address these challenges through their adaptability, which facilitates the dynamic development of learning resources so that the best and most suitable resources can be offered. As stated by Wiley, it is not necessarily the open licence that guarantees the resource will be fit for purpose, but how the original resources can further be adapted with the aim of improving learning (Wiley, 2013). McGreal further specifies the criteria of openness that leads to quality improvements as: timeliness (including the possibility to easily update information), accessibility, usability across networks and devices, and shareability (McGreal, 2013).

However, a problem with OER is that they are frequently decentralised resources, which is a challenge for the hierarchical management of updates and a common argument used against OER by the publishing industry (FEP, 2012). The dynamic characteristics of OER lead to questions regarding how the process can be made transparent and how quality can be maintained over time. Wiley (ibid.) argues that open resources, such as Wikipedia, do not appear to suffer from inaccuracy in content and when they do, can be corrected quickly. Therefore, openness should lead to continual improvement.

Richter and Veith argue that a key success factor of OER is that they can be found and reused by anyone anywhere in the world in whatever educational context, which changes the traditional lifecycle of learning resources as a single-source production. As OER are continuously being improved, remixed, repurposed and eventually republished, there is no point in time when they reach their "peak of maturity" (Richter and Veith, 2014: 206).

McAndrew at the Open University in the United Kingdom argues that special concepts of quality in relation to OER are required. To a large extent, this recognition has grown out of the early practical

OER experience of checking though content shared via the university's repository OpenLearn (presented in more detail below). Due to this at times "frustrating" process, OpenLearn eventually adjusted its workflow to allow the release of "beta content" before final corrections had been made (McAndrew, 2011). While this approach arguably poses a risk to the overall culture of quality, it also fosters less formal models of learning following the "permanent beta philosophy", which McAndrew argues is inherent to the concept of OER.

Camilleri et al. argue that the dynamism of OER leads to a stronger requirement of trust between producers and users of OER, and that it is necessary to work on creating such networks of trust (Camilleri, Ehlers and Pawlowski, 2014):

> "The determination as to the quality of open education (whether materials or practices) will depend on the judgements of two overlapping trust-networks. The first is the open network of users, reviewers and teachers working together for quality improvement of resources, teaching and learning. The second is the existing trust-network in place in the publishing industry and in formal education."

Potential put into practice

- *Creating an experimental community to enhance the relevance and impact of resources:* As an educational website, the OpenLearn initiative (mentioned above for its "beta content" approach) set out as an experiment to explore how to offer free content. The initiative's virtual learning environment now offers over 400 structured study units to students via the "LearningSpace" as well as an area for experimentation, called "LabSpace", where educational practitioners can download, amend and adapt both current and archived course materials. OpenLearn is an example of the quality improvement of educational resources, as it allows practitioners to form their own areas within the LabSpace to personalise the materials, which increases the relevance of the content for specific learning communities (e.g. non-traditional learners). It also allows for the testing of course ideas and the development of materials based on user feedback. All OER can be reused in alternative educational settings, repurposed for a local context, and translated and built upon to form a larger open repository of derivative educational materials. The initiative thus responds to the need for a collaborative community to improve the quality and relevance of educational materials, as well as the need to adapt learning materials to specific educational contexts/settings to enhance their usefulness and impact (McAndrew et al., 2008).

- *Improving targeted searches to raise quality in teaching:* The Open Tapestry[1] platform provides tools for users to author learning resources and develop course materials, as well as to create and share modules – "tapestries" – from content that is already available on the web. It allows users (mostly instructors) to tailor learning resources to their specific educational settings quickly and efficiently. Open Tapestry currently holds about one million resources with a strong focus on higher education learning materials. While the use of open content is encouraged within the context of the platform, users also have the possibility of creating closed spaces for their institutions/organisations. Open Tapestry has repository-like features as open content repositories can be searched, metadata harvested, and resources uploaded by users. As a way of collecting metadata for all types of resource of various unit size or granularity (e.g. individual videos vs whole courses made up of various media resources), Open Tapestry provides indexing fields based on the Learning Resource Metadata Initiative (LRMI) metadata (presented below). However, Open Tapestry has found that users have tended not to fill these in. To encourage users to complete these fields in the future, Open Tapestry is currently focusing on ways to provide targeted searches for particular audience groups or use-cases (Campbell, 2014).

- *Central initiative to ensure quality of OER:* The Open, Transferable and Technology-enabled Educational Resources (OTTER) Project by the University of Leicester (2009-2010) gathered, collected and created OER based on existing teaching materials across a wide range of disciplines within the university. The project aimed to respond to the need for improving the quality of teaching and learning by making the learning environment more stimulating, while simultaneously fostering collaboration and the sharing of resources within the university (Witthaus and Armellini, 2010). To achieve this, the project developed and implemented a rigorous workflow process for transforming teaching materials into high-quality, freely accessible and open educational resources. This ensured both the abundance of OER and their individual quality.

- *Testing the recognition of OER-based learning in formal settings:* The OERTest project ran between 2011 and 2012 and worked with four universities (United Nations University, University of Granada, Open University of Catalonia, University of Edinburgh) to develop guidelines for the recognition of OER-based learning (Camilleri et al., 2012). The project found that even among co-operating universities there were issues around recognising learning that had happened outside of their control. These were, however, not specific to OER-based learning, but common problems with recognition of learning across countries, often found, for example, with the Erasmus student mobility scheme.[2] The main authors are continuing their efforts in a new project entitled Virtual Mobility Passport (VMPass), with a large part of the project based on creating a common dialogue on how to agree on recognition.[3]

Understanding the potential for impact

The cases above highlight that understanding the issues pertinent to the quality of OER requires a differentiation between the various dimensions by which OER can contribute to improving educational resources, and how the quality of OER themselves can be ensured, namely:

- keeping educational resources up to date
- enhancing the learning environment
- providing quality assurance mechanisms
- aligning OER to common standards.

Keeping educational resources up to date

A recent survey of around 8 000 school teachers in the United States found that science and mathematics classes across grade levels are likely to be using textbooks published in 2006 or earlier (in high schools, over half of the books used were at least this old) (Horizon Research, 2013: 20-21). This creates challenges in subject areas where the content requires, or would at least benefit from, frequent updating. In the United States, a quality improvement initiative to introduce Common Core State Standards (CCSS) for mathematics and English has been adopted by 43 states.[4] This initiative requires that educational materials are updated and new materials introduced. The huge cost of this reform can, in part, be contained through the extensive use of OER. The K12 OER Collaborative, led by 12 states and supported by Creative Commons, the Learning Accelerator and Lumen Learning, has been developed to build common core aligned educational resources[5] that are licensed by Creative Commons Attribution (CC-BY 4.0).

Polish digital textbooks released on open licences have been supported since 2012 by the "Digital School" government initiative. The reason behind this was that private publishers were using new releases of textbooks to keep the market buoyant, which minimised the reuse of existing textbooks and led to higher costs for users with minimal qualitative benefits (Sliwowski and Grodecka, 2013: 14-15). The

BookSprint method of fast-paced book production (presented in Chapter 5) is another way of regularly updating open textbooks.

Enhancement of the learning environment

In many cases, the quality of the learning environment itself is enhanced by the additional use of OER. A recent report in France looked at the opportunities of providing some educational resources for schools in digital format to replace the dependence on textbooks or enhance the learning environment (Leroy, 2012). The report highlights initiatives such as *lelivrescolaire*,[6] established in 2009 with the aim of developing digital, interactive and customisable textbooks for colleges. The textbooks are written by a community of authors and are freely available under a free license for all media (print versions are sold). If OER are offered with a fine granularity (i.e. as videos or quizzes), they can be flexibly joined with other resources or materials to reflect a diversity of teaching and learning methods.

A study in England on higher education showed that the choice for OER was based on relevance and the teachers' assessment of pedagogical fit (White and Manton, 2011: 17-19). Two interviewees in the study stated that "…a lot of the OER I grab off the web is to allow me to explain things in a visual or in an interactive way so that they [students] can interact with things." And, "I want something to support me, like a video clip, which I won't have the time to do or probably the expertise to do […]." (ibid.) In such cases, the discoverability of appropriate resources is more important than curriculum alignment.

Metadata and alignment to common standards

Additional studies have supported the need for user-centred mechanisms to ensure that searches do not rely too much on technical metadata (Atenas, Havemann and Priego, 2014: 38). The Learning Resource Metadata Initiative (LRMI) aims to enhance end-user search and the discovery of educational resources by creating user-centred metadata that helps potential users assess how fit for purpose resources are. The initiative has developed a common metadata framework for describing learning resources on line with the aim of ensuring a more successful and qualitatively richer search experience for educators, learners and researchers. OER that is assigned metadata can be better aligned to specific types of usage, which facilitates integration into the learning environment.[7]

An alternative way of ensuring that OER are fit for purpose is to align them with common learning standards used in an education system. Although this does not ensure the quality of the materials themselves, it does make clear in which context they are meant to be used. This method has been applied to secure usability in the Dutch repository for school materials called Wikiwijs, which are aligned to learning outcome plans (Wikiwijs program plan 2011-2013, 2011). In the United States, the Common Core State Standards refer to the expected outcomes in mathematics and English in all states that have agreed to use them.[8] In practice, this has been used in the Khan Academy's repository for educational resources, which has a section on the alignment of OER to the Common Core.[9]

The organisation Achieve, a non-partisan organisation from the United States and focused inter alia on providing states with technical assistance for developing accountability systems in the educational sector, has developed evaluating criteria for OER based on the issue of alignment to central standards and certain characteristics of individual resources (Achieve, 2011). The standards are designed to evaluate the potential of an OER learning unit to fulfil the following purposes:

- degree of alignment to standards (in this case CCSS standards)
- quality of explanation of the subject matter

- utility of materials designed to support teaching
- quality of assessment materials
- quality of technological interactivity
- quality of instructional and practice exercises
- opportunities for deeper learning
- assurance of accessibility.

Some of these purposes will be more relevant to OER than others, and some will not be relevant at all. The rating scheme differentiates between the grades superior, strong, limited, very weak/none, and not applicable (see Box 6.1 to see how the grade superior is used). They have been used, among other things, to help Washington State evaluate the OER available for secondary schooling.[10]

However, such systems will only work with an active community of producers and users annotating and describing the OER. Experts interviewed for a study on usage and quality (Atenas and Havemann, 2014) argue that "OER repositories should require the barest minimum of metadata [because] every additional field makes it less likely OER will be deposited and released". Another expert stated that "metadata was the death of learning objects" (ibid: 38). The case of OpenTapestry presented above showed that users seldom use the metadata fields provided.

Box 6.1. **Rubric II: Scoring guide for grade "superior"**

"An object is rated superior for explanation of subject matter only if all of the following are true:

- The object provides comprehensive information so effectively that the target audience should be able to understand the subject matter.
- The object connects important associated concepts within the subject matter. For example, a lesson on multi-digit addition makes connections with place value, rather than simply showing how to add multi-digit numbers. Or a lesson designed to analyse how an author develops ideas across extended text makes connections among the various developmental steps and purposes the author has.
- The object does not need to be augmented with additional explanation or materials.
- The main ideas of the subject matter addressed in the object are clearly identified for the learner."

Source: extract from Achieve (2011), *Rubrics for Evaluating Open Education Resource (OER) Objects*, Achieve, http://www.achieve.org/files/AchieveOERRubrics.pdf.

Quality assurance mechanisms

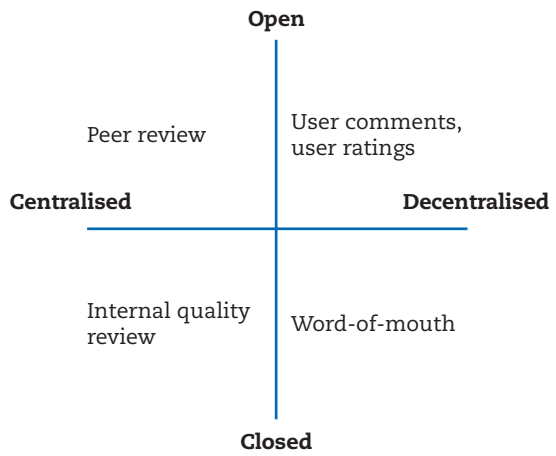
In a recent study from the United Kingdom, a high share of academics expressed concern over quality as a barrier to using OER (Atenas, Havemann and Priego, 2014: 37). A further survey by the European Open Educational Quality Initiative (OPAL) also found that mistrust of the quality of other users' OER was a major barrier to use (Andrade et al., 2011). Although there has been a lot of research on quality procedures for OER, it clearly remains a challenge.

In order to typify quality assurance mechanisms for OER, Hylén (2006) developed a four-field matrix that differentiates between two sets of poles: decentralised versus centralised and open versus closed procedures (see Figure 6.1).

A survey of teachers familiar with OER found that they usually searched for resources based on word-of-mouth from colleagues and the use of organisations (and repositories) with a good reputation, although many also simply found them through browsing the Internet (Clements and Pawlowski, 2012). The respondents favoured qualitative evaluation from other users over rating schemes, which identifies the need for building communities of trust to encourage the sharing of

OER. This leads many analysts to conclude that whilst the most potential for OER quality assurance systems may be in open decentralised procedures (top right-hand corner of Fig. 6.1), trust between members of a community of users is still a major factor and must be built up.

Figure 6.1. **Dimensions of quality assurance regarding OER**



Source: Hylén, J. (2006), *Open Educational Resources: Opportunities and Challenges*, http://www.oecd.org/edu/ceri/37351085.pdf.

A survey of higher education staff in British Columbia came to similar conclusions through qualitative interviews. One respondent expressed the usefulness of such quality filtering as follows: "[…] I guess if people in the field, people that I trust, other institutions that I trust have looked at something. So this is where I guess it might […] be useful to have best practices, groups perhaps that would get together and look at what is out there and what is good and what is absolute rubbish 'cause there's a lot of stuff out there that you really don't want to touch, but it takes time to sift through it. 'This is good. This is not good'." (Porter, 2013: 102).

This is the approach used in the OpenLearn case above, and also, for example, by the Merlot repository.[11] A further example of large-scale practice and the challenges of such open systems for quality control and updates is Wikipedia, where information resources are published even before they have been through an official quality assurance procedure (arguably similar to the Open University's "beta content" approach).

A 2009 study in the United States showed that while college students use Wikipedia as a source, they only rate its credibility as moderate (Lim, 2009). One of the ways in which articles are marked for necessary improvement and updates is through "clean-up tags" that highlight areas of a text requiring attention – the first one having been used in 2004 (Anderka, Stein and Busse, 2012). A longitudinal analysis of the English language Wikipedia shows that 70% of the tags have been fixed and that, on average, the improvement process took five months with one-third of fixes occurring within the first week. Articles of a particularly high quality are classed as "good articles" (GA) or "featured articles" (FA), according to specific Wikipedia criteria that are judged by editors. Currently about 0.1% of all Wikipedia articles have this status. Work is progressing on using algorithms to provide automatic indicative classifications to assist this process (Warncke-Wang, Cosley and Riedl, 2013).

Similar work has been proposed for the Merlot collection of OER by Rodriguez et al. who suggest using the standard statistics available in the repository to calculate a "relevance indicator" (Rodríguez, Dodero and Alonso, 2011). A variation of this was also used in the Dutch Wikiwijs repository, which developed a quality certification system that allows (trusted) third parties to recommend specific

objects to their audiences (Wikiwijs program plan 2011-2013, 2011: 6). As with metadata usage, all of these more open forms of quality assurance require an active commitment of users, and repositories that have the functionality to collect and use usage data.

The OTTER project at the University of Leicester used fixed quality criteria for OER from the outset to ensure that feedback loops were programmed into OER provision to enable improvements and updates (Comrie, 2010). This approach is taken in an even more comprehensive and systematic manner in the context of the new Z-Degrees of Tidewater Community College in Virginia state in the United States. Since 2013, the college has a policy for the use of OER and particularly for the designation of certain courses as "Z-Degrees" (Tidewater Community College, 2015). This policy states that OER-based courses cannot be developed or taught by academic staff, who have not undergone a training course at the college, learning outcomes must be specified and successful delivery reviewed regularly using learning analytics. Any changes to an accredited course of up to 10% of the content leads to the requirement for a renewed quality assurance review.

Recognition

Formal recognition of learning with OER between institutions would be useful for OER (see Chapters 7 and 8), but remains problematic. This is because formal assessment frequently relies on a fixed assessment of grades of performance against set content and an agreement of grades and criteria between learning providers. This is particularly challenging in the context of more open quality assurance mechanisms for OER. The OERTest project and VMPass have been trying to balance some closed elements of assessment with open elements of learning content, but argue that more dialogue and collaboration between learning providers will be necessary to make this successful.

On a more local scale, a pilot initiative based on the Saylor.org repository of OER-based courses in the United States has already achieved some formal recognition for independent learners in collaborating colleges through course alignment on the content-side and independent assessment (Hilton et al., 2014).

In the context of competency- and outcome-based learning, which argues for the separation of content and the assessment of what competencies rather than content have been learnt (or even can be demonstrated), the problem of recognition is likely to be reduced.

Notes

1. www.opentapestry.com
2. The Erasmus Programme is a European Union student exchange programme established in 1987. Students who join the Erasmus Programme study at least 3 months or do an internship for a period of at least 2 months to an academic year in another European country. Formally, the Erasmus Programme guarantees that the period spent abroad is recognised by their higher education institution when they come back, but this recognition remains an issue unless the programmes at the domestic higher education institution and abroad are well aligned (Ferencz, Hauschildt and Garam, 2013).
3. http://vmpass.eu/the-project/overview-of-the-project/
4. www.corestandards.org/standards-in-your-state/
5. http://k12oercollaborative.org/
6. http://lelivrescolaire.fr/
7. http://www.lrmi.net/about

8. For states and timeline for implementation visit: www.corestandards.org/standards-in-your-state/

9. www.khanacademy.org/coach-res/reference-for-coaches/other-reference-materials/a/common-core-map

10. https://digitallearning.k12.wa.us/oer/review/2014/report/rubrics.php#ao

11. www.merlot.org/merlot/index.htm

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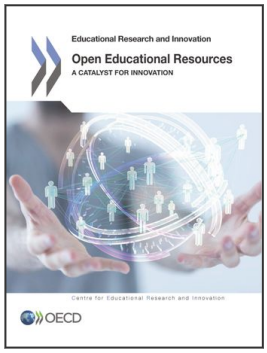

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