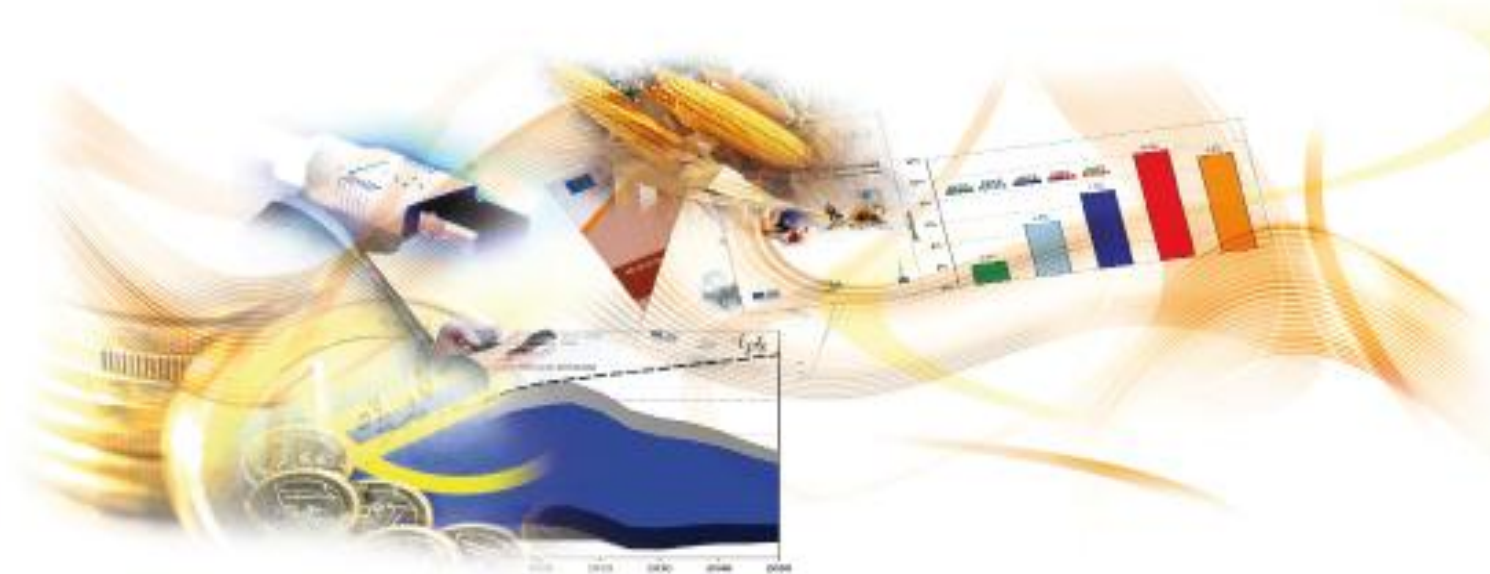# JRC SCIENTIFIC AND POLICY REPORTS

State of the Art Review
of Quality Issues related
to Open Educational Resources (OER)

Anthony F. Camilleri
Ulf Daniel Ehlers
Jan Pawlowski

2014

Europe Direct is a service to help you find answers to your questions about the European Union

Freephone number (*): 00 800 6 7 8 9 10 11

(*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.

It can be accessed through the Europa server http://europa.eu/.

Printed in Spain

TABLE OF CONTENTS

Table of Figures

FOREWORD

On 25 September 2013, the Commission presented a new Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on "Opening up Education: Innovative teaching and learning for all through new technologies and Open Educational Resources". The aim of the initiative is to bring the digital revolution to education with a range of actions in three areas: open learning environments, open educational resources, and connectivity and innovation. The initiative contributes to the Europe 2020 strategy, acknowledging that a fundamental transformation of education and training is needed to address the new skills and competences that will be required if Europe is to remain competitive, overcome the current economic crisis and grasp new opportunities.

Quality assurance for the emerging new ways of learning and teaching enabled by ICT is mentioned in the Communication as a crucial issue that should be tackled to further develop the use of Open Educational Resources (OER) for learning. It is also acknowledged by experts and practitioners as a key challenge.

This report has been prepared by the European Foundation for Quality in e-Learning (EFQUEL) on behalf of IPTS. It presents an overview and analysis of quality issues related to OER and Open Educational Practices (OEP). It is a contribution to the construction of a knowledge base on Opening up Education and is part of a wider scientific agenda on ICT and Learning being developed at IPTS, mainly in collaboration with DG Education and Culture.

Progress on related studies can be followed on the project webpage:
http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html

Yves Punie
Project Leader ICT for Learning and Skills

Open online learning is becoming increasingly popular in Europe and elsewhere, with the rise of Open Educational Resources (OER), Massive Open Online Courses (MOOCs) and other forms of non-formal and informal learning that emerge from opening up educational processes through the use of ICT. Concerns are being raised, however, about the quality of these learning opportunities.

This report provides an overview of definitions of quality for OER, suggests a conceptual mapping and reviews the major issues related to the quality for OER. It also identifies recommendations for policymakers at European and Member State level on quality assurance and OER with a view to supporting the further development and use of OER in Europe. The outcomes of the report can be outlined as follows:

First, when reviewing a set of definitions of OER we find that they all:

- cover both use and reuse, repurposing, and modification of resources,
- include free use of these resources for educational purposes by teachers and learners,
- encompass all types of digital media.

However, definitions differ as to whether OER consists only of digital resources, whether it constitutes resources produced specifically for educational purposes and whether these resources should be in the public domain. Therefore, conceptually we can say that the distinguishing feature of OER when compared to other resources is the freedom with which it may be used, reused and repurposed thanks to its open licence.

Secondly, there are a variety of quality approaches, tools and procedures which may be applied to OER. Due to the above-mentioned freedom, however, the traditional lifecycle of a resource, particularly with respect to the processes of creation, editing, evaluation and use, is significantly disrupted. Whereas before these steps were traditionally distinct, consecutive and managed by various actors, the freedom granted by OER leads to a blurring of these boundaries. The involvement of many more actors in each step therefore means a federation of responsibility for each step, which in turn can lead to cross-over in the functions and timing of processes, as well as sub-cycles (such as several rounds of editing and evaluation).

From a quality perspective this federated responsibility means that quality procedures related to OER cannot be applied to or by the manager of each process. Instead, they need to include the wide spectrum of stakeholders which are involved in an OER lifecycle. This leads to the introduction of federated quality tools such as peer assistance and social ranking systems. However, the involvement of teachers, learners and evaluators in processes of co-production, reuse and repurposing offers significant opportunities to open up the entire learning architecture within formal education systems.

In this report, we postulate that while a grassroots approach can go some way in opening up these learning architectures, appropriate institutional strategies and policies are also necessary to guide their evolution in an efficient and effective manner. To this end, we have proposed a tool for assessing the quality of these strategies and policies, and defined the role of the different actors critical to their success, namely policy-makers, institutional leaders, teachers and students.

Thirdly, opening up of learning architectures is in turn leading to the unbundling of processes of course design, teaching, learning, assessment and recognition within formal education and the emergence of innovative delivery models such as MOOCs. Within formal education, the quality of assessment and the recognition of awards based on these assessments is critical to recognising the quality of the teaching given and the learning achieved. We highlight, however,

that recognition and assessment tools have not yet fully evolved to take into account the new phenomenon which has the potential to bypass existing trust networks that have been built up with formal education.

In this report, we have demonstrated that quality assurance of OER and Open Educational Practices (OEP) requires a complex mix of quality tools. In general, these tools enable many more users to be involved in quality processes, and for a greater variety of learning scenarios to be taken into account. From the perspective of stakeholders, the federation of responsibility described above can also lead to a democratisation of the processes of quality review. Therefore, 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.

In the evolution of quality approaches, the interaction between these trust-networks will be an area of intense interest in coming years. We thus highlight an urgent need to link developments in open education to the existing trust networks, so as not to reduce quality in the field.

1. INTRODUCTION AND SCOPE

The need for quality assurance mechanisms to support the development and sustainable use of Open Educational Resources (OER) is being raised in the literature and in European and national policy documents as a major challenge and opportunity. There is however, little experience and consensus in research and practice on how to define and approach quality for OER, in contrast with quality assurance for eLearning, for instance. The notion of openness is posing additional challenges (Ehlers forthcoming). The aim of this research is therefore to provide an overview of quality approaches and concepts for OER and to some extent, Open Education, with a view to identifying policy options for action at EU and Member State level to further promote the development and use of OER in Europe. This overview focuses on Higher Education in the context of Open Education, as announced in the Commission Communication on "Rethinking education: Investing in skills for better socio-economic outcomes" (EC, 2013).

This report introduces quality concepts and approaches related to OER. It provides an overview of definitions of quality for OER and suggests a conceptual mapping and an overview of major issues related to quality for OER. Where appropriate, it gives examples of relevant existing practices and initiatives to illustrate the conceptual mapping. Furthermore, it gives a detailed overview of quality assurance models for OER, and will provide insights on the role of different actors and institutions involved in quality and OER. Finally, it will identify recommendations for policymakers at European and Member State level on quality assurance and OER with a view to supporting the further development and use of OER in Europe.

2. DEFINITIONS

2.1 Defining OER

The concept of Open Educational Resources (OER) is closely linked to the concept of 'learning objects', a term which was coined by Wayne Hodgins in 1994 (Wiley, 2000), and arose as a result of inspirations from the field of computer design, as applied to the field of instructional design. The key concept of learning objects is that materials used to support learning can be broken down into (or constructed from), a number of elements which can be combined differently and reused in various scenarios.

This led to the creation of repositories of learning content which could be reused in educational settings. Early (and continuing) initiatives in this area include the ARIADNE initiative, started in 1996 by the European Commission and which developed an infrastructure for the production, sharing and reuse of reusable learning content. Repository66.org, an automated collator of statistics on learning object repositories now lists 2,841 repositories globally with a total of over 26 million resources as of April 2013.

The concept of what exactly constitutes a learning object, and what should be excluded is an issue of much debate. McGreal (2004) summarises the different definitions presented in literature of learning objects, by building a matrix of 'all objects' vs. 'objects intended for learning', and of 'digital objects' vs. 'digital and analogue objects'.

The term *Open Educational Resources* (OER) was first used by UNESCO at its 'Forum on the Impact of Open Courseware for Higher Education in Developing Countries' in 2002, where it recommended that they be defined as (UNESCO, 2002):

"The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes."

The Hewlett Foundation defines OER[1] 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 re-purposing by others.'

Whilst the OECD defines them as (Ischinger, 2007):

'Digitised materials offered freely and openly for educators, students and self- learners to use and reuse for teaching, learning and research.'

The Cape Town Open Education Declaration[2] argues that the OER movement is based on 'the belief that everyone should have the freedom to use, customize, improve and redistribute educational resources without constraint'. It focuses on three suggested strategies to removing current barriers to the use of OER: i) teacher and learner engagement with OER, ii) general policy to publish openly and iii) commitment to open approaches at institutional and government levels. Particularly, it specifies that open access means that resources should be *"freely shared through open licences which facilitate use, revision, translation, improvement and sharing by anyone. Resources should be published in formats that facilitate both use and editing, and that accommodate a diversity of technical platforms".* OER is intended to make *"high-quality educational material freely available worldwide in many languages".* (Keller and Mossink, 2008).

McAndrew, Santos et al. (2009) argue that despite some terminological differences (Hylén, 2006) Open Educational Resources are largely digital assets (music, images, words, animations) put together in a logical structure by a course developer who has attached an open license to it. In other words, the content is openly available (it can readily be found or discovered), is openly accessible (it is in a form which others can take it away) and openly reusable (the user can easily modify it and is allowed under the license to do certain things with it without having to ask the creator's permission first).

---

[1]   Definition on the Hewlett website, http://www.hewlett.org/Programs/Education/OER/
[2]   http://www.capetowndeclaration.org/

However, the scope of OER definitions differ: Pirkkalainen & Pawlowski (2010) define OER as "*Any digital resource, which can be freely accessed and used for educational purposes*". This broad definition includes a lot of different objects, such as digital learning resources, software tools like wikis or authoring systems, simulations or animations, electronic textbooks, and also lesson plans or records of shared experiences. They identify parallels to other "openness initiatives" such as 1) learning resources, 2) articles, textbooks and digital equivalents (Open Access), 3) software tools (Open Source), Instructional / didactical designs and experiences (Open Educational Practices) and 4) web assets.

Conole and McAndrew (2010) provide the following definitions to clarify the distinctions between the various terms used:

- A learning object can range from a simple digital asset (such as a piece of text or an audio file) through to a more complex learning resource incorporating a range of media and designed to support a particular learning activity.
- Open Educational Resources (OER) are teaching and learning materials made freely available for use and repurposing by teachers and learners. The term is potentially synergistic with learning objects; the emphasis is on the open licence allowing the use and reuse of the resources.
- A learning activity consists of a set of tasks a learner undertakes, either individually or in a group, using a specific set of resources (which may include tools) to achieve a set of intended learning outcomes.
- Learning design is a research area that develops methods, tools and resources to support teachers in making better pedagogically-informed use of technologies. It is also worth noting that related to this is the term 'Open Courseware' (OCW), which means free and open digital publication of high quality educational materials, organized as courses.

The above definitions expose some of the tensions that exist with OER:

- **Nature of the resource:** Several of the definitions above limit the definition of OER to digital resources, while others consider that any educational resource can be included in the definition.

- **Source of the resource:** While some of the definitions require a resource to be produced with an explicit educational aim in mind, others broaden this to include any resource which may potentially be used for learning

- **Level of openness:** Most definitions require that a resource be placed in the public domain. Others require for use to be granted merely for educational purposes, or exclude commercial uses.

At the same time, these definitions also share some universal commonalities, namely they all:

- cover both use and reuse, repurposing, and modification of the resources;
- include free use for educational purposes by teachers and learners;
- encompass all types of digital media.

It should be noted that the term "open access" (OA) is now widely used in at least two senses. For some, "OA" literature is digital, online, and free of charge. It removes price barriers but not permission barriers. This nature of open access if often referred to as *gratis*. For others, "OA" literature is digital, online, free of charge, and free of unnecessary copyright and licensing restrictions. It removes both price barriers and permission barriers. It allows reuse rights which exceed fair use. This nature is referred to as *libre* (Vollmer, 2012).

The extent of *libre* can be expressed in terms of a Creative Commons license, which grants the licensor "a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the work as stated below[3]:

1. to reproduce the work, to incorporate the work into one or more collections, and to reproduce the work as incorporated in the collections;

---

[3]   From http://creativecommons.org/licenses/. Accessed 01 Nov 2013.

2. to create and reproduce adaptations, provided that any such adaptation, including any translation in any medium, takes reasonable steps to clearly label, demarcate or otherwise identify that changes were made to the original work. For example, a translation could be marked "The original work was translated from English to Spanish," or a modification could indicate "The original work has been modified";
3. to distribute and publicly perform the work, including those incorporated in collections; and,
4. to distribute and publicly perform adaptations.
5. the above rights may be exercised in all media and formats, whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats."

Within the context of the definitions presented above, we suggest that a resource must be both *gratis* and *libre* to be considered an OER.

2.2   Types of resources
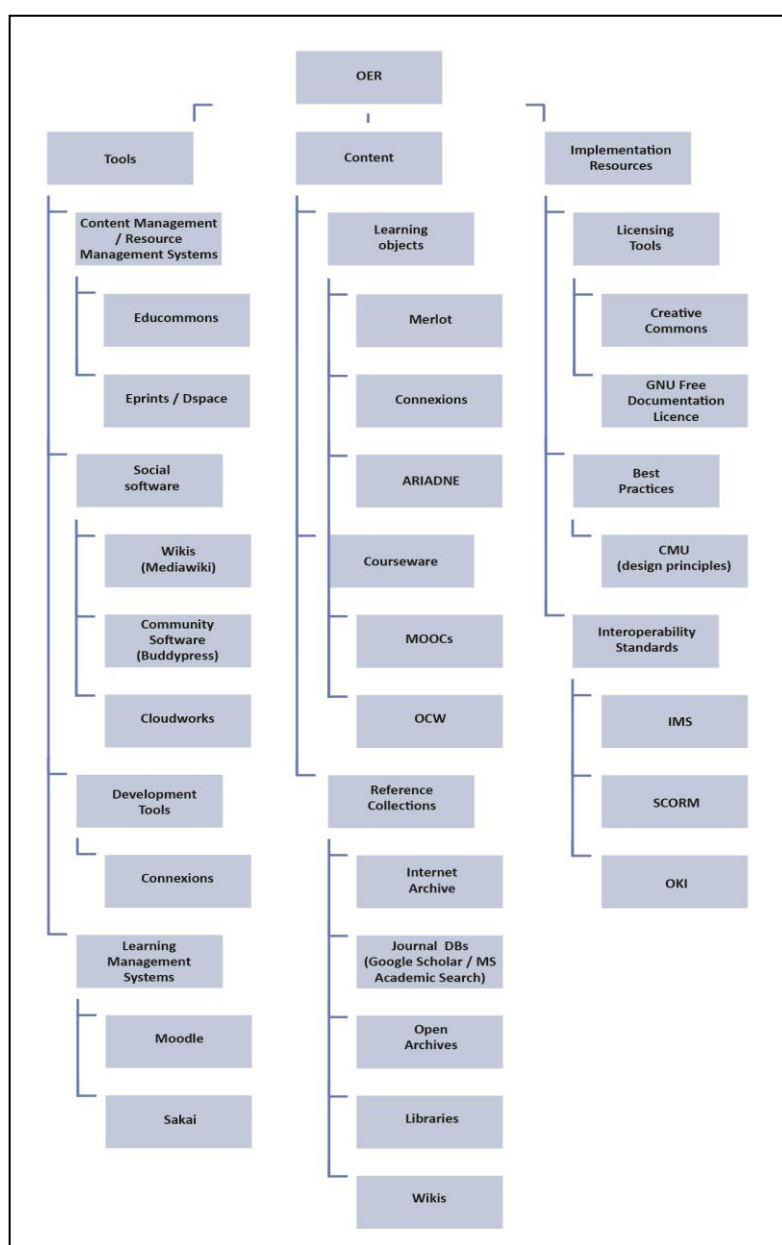
Figure 1: Classification of OER types (adapted from Marguiles, 2005)

From the perspective of what can be considered a resource, OER is said to include (Ischinger, 2007):

- Learning content: full courses, courseware, content modules, learning objects, collections and journals;
- Tools: software to support the development, use, reuse and delivery of learning content, including searching and organisation of content, content and learning management systems, content development tools and learning communities;
- Implementation resources: intellectual property licenses to promote open publishing of materials, design principles of best practice and localise content.

Figure 1 presents a classification of these different kinds of OER, together with some examples of specific resources which can be presented under those categories. By this classification, any open resource can be theoretically used for educational purposes, particularly in informal settings. Thus, 'open' resources can cover open science resources such as journal and conference publications and open cultural resources including museum collections and literature.

However, to be able to consider the topic of OER and quality coherently, we need to make a fine distinction between these sorts of resources and OER. Therefore, for the purposes of this report we consider a resource to be educational if it fits one of the following three criteria:

- it has been produced / released specifically for use in formal or non-formal education;
- it is used as course-material in an educational course or programme;
- it is included in a repository of materials intended to support formal/non-formal education.

2.2.1 User-generated vs. organisationally-produced resources

Amongst the different ways to classify OER, Hoyle proposed using the terms 'big' and 'little' OER in the comments of a blog post in 2009. Since then, they have been described as follows (Weller, 2010):

Organisationally-produced ('big') OERs are ones that arise from projects such as OpenLearn. These are usually of high quality, contain explicit teaching aims, are presented in a uniform style and form part of a time-limited, focused project with a portal and associated research and data.

User-generated ('little') OERs are usually low cost resources. They are produced by anyone, not just educators, may not have explicit educational aims, have inconsistent production quality and could be shared through a range of third party sites and services. Collections of little OERs abound all over the internet. Slideshare, a repository of PowerPoint presentations on all nature of topics, is one of the better known.

2.2.2 Peer-produced vs. individually-authored resources

Section 2.2.1 described the distinction between organisationally-produced and user-generated OER. So far, we have referred to these as instances of 'individually-authored' OER, i.e. they have been prepared over a distinct period of time by a set author or group of authors, and, on completion of the document, have been released to the community/public.

On the other hand, crowd-sourced or peer-produced OER is very different. It describes resources which are authored by a community, such as a wiki, or a community-forum. As such, the resource itself is constantly in flux, has a multitude of authors and a multitude of versions. Thus, for example, the Wikipedia entry on Philosophy[4] was updated over 60 times in the first 6 months of 2013, with more than 20 different authors contributing to the updates.

Since different specific editions of 'authored' OER are spaced months or even years apart, the latest edition is easily identified in terms of content and can be attributed to a specific author(s). Crowd-sourced OER can sometimes be updated many times, even in the same day. While it is true that the content of each version/edition is also identifiable, and attributable to an author(s), since the latest edition is constantly updated, any attempt to work with the 'latest' edition is instantly outdated.

2.2.3 Single and packaged OER

Any classification of learning objects, or attempt to apply a unitary quality scheme to them, is further complicated by the fact that the concept encompasses several levels of granularity (McGreal, 2004).

Figure 2 presents the diversity of different objects which can be considered as learning objects, many of which can be incorporated into each other. The figure gives the example of a case where several information objects may constitute a single learning object. In turn, several learning objects may then make up a topical unit, which forms part of a simulation, which can be part of a course module. We define open education course modules as collections of learning objects organised into course units, suitable for self-study and not necessarily tutor supported (Camilleri et al., 2012).

---

[4]   We choose this example since it is a 'mature' topic, whose scope is widely agreed, and which is not subject to rapid evolution, unlike current affairs or technology topics.

Massive Open Online Courses (MOOCs) are a recent phenomenon, where a "course […] is scaled to enable an essentially unlimited number of students to take the course […] and leverages the natural scaling power of online tools" (Hill, 2012, p.92). MOOCs differ from Open Courseware in that they are not only collections of course materials, but constitute entire courses which are delivered over a set period of time, moderated by a tutor(s), and offer possibilities for assessment and recognition of the knowledge obtained during the course. Hill (2012) introduced a distinction between xMOOCs and cMOOCs. The former come close to 'traditional' courses with pre-defined learning outcomes for learners, syllabi and structured OERs, some proprietary material, homework and assessment. cMOOCs, on the other hand, emerged in the context of Connectivism where learning is distributed, social and explorative. This concept of Connectivism recognises that learning can exist outside of ourselves, in repositories such as organisations or databases, and suggests that the connections that allow us to learn are more important than our current state of knowing (Siemens, 2005). This concept's strength lies in explaining web-activity as an example of learning (Kop & Hill, 2008). Conole (2013) further proposes classifying MOOCs based on 12 criteria, namely: open, massive, use of multimedia, degree of communication, degree of collaboration, learning pathway, quality assurance, amount of reflection, certification, formal learning, autonomy and diversity.
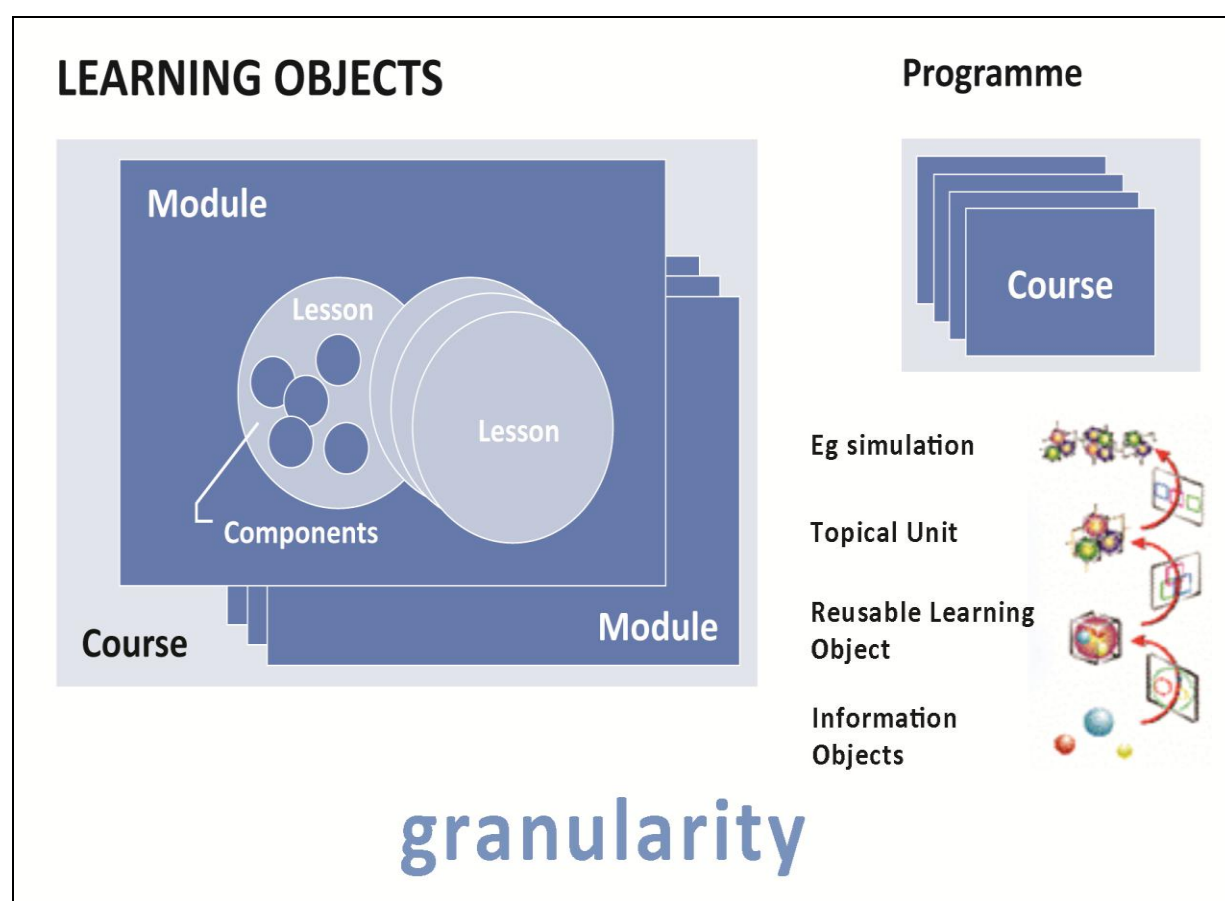
FIGURE 2: Granularity of learning objects (McGreal, 2004)

MOOCs are increasingly seen as synonymous with Open Education due to their 'open' moniker. However, a large proportion of MOOCs are not, strictly speaking, *gratis* in that they charge for certification and/or for certain course materials, and furthermore in many cases are not *libre*, as they can still be protected by copyright restrictions. On the one hand, all the most-current definitions of OER recognize that resources must respect the twin principles of *gratis* and *libre*. On the other hand, MOOCs are undoubtedly a significant leap forward in openness, even when they cannot be formally considered OER. A cursory review of the currently available MOOCs finds that, generally speaking, cMOOCs use and create OER, and are based on Creative Commons licence, while the majority of xMOOCs are copyrighted, and have little relevance to the OER discussion. (Camilleri & Tannhauser, 2013).

For this reason, though we do not consider MOOCs and OER to be synonymous, we do nonetheless comment specifically on MOOCs in several areas, as MOOCs are possibly the most influential by-product of the open courseware movement. As a result, they cannot be wholly separated from any discussion of quality in open education

2.3   Utilising OER to enhance practice

The OER movement has been successful in promoting the idea that knowledge is a public good, expanding the aspirations of organisations and individuals to publish OER. However, the potential of OER to transform practice has not been realised as yet. There is a need for innovative forms of support for the creation and evaluation of OER, and also an evolving empirical evidence-base about the effectiveness of OER. Although no comprehensive statistics are available, there is a rapid expansion in the number of OER projects and the number of people involved and the number of resources available are also increasing. At the time of writing, the OCW Consortium listed over 8,000 courses in its database, while there are over 3,800 learning object repositories, collectively listing more than 26 million items. Although the dominant language so far is English, translation of resources combined with a growing number of non-English OER projects cater for greater language diversity and increased global use.

The first phase of "building OER" can be characterized through funding mechanisms that are financed through public, private and philanthrophic funding schemes (Stacey 2010). Many well-known OER initiatives such as MIT's Open Course Ware (OCW), Stanford's iTunes or Rice University's Connexions are now coming into their sustainability phase. Until now OER have been in development and use, often pioneering, since 2002. Roger's technology adoption lifecycle would suggest that OER have come through the innovation phase, are striving for adoption, and aspiring to cross into early majority (Rogers, 1983). In his recent analysis of OER initiatives worldwide, Stacey (2010) shows that the focus of current well-known OER initiatives is largely on creation and publication of OERs. Use and reuse – especially for those that aim to improve learning and innovate educational scenarios – are still somewhat underrepresented (ibid.). Open provision of course materials has become more extended, particularly thanks to the introduction of MOOCs, and many universities have adopted this approach. However, not much research attention has been paid to the diverse OER projects in order to establish how best to move from existing provision to better structures for open education. We thus define the first phase of OER development and diffusion as focusing on the access to and availability of OER. This is also reflected in the various available definitions, described in Section 2.1, which by and large argue that OER are digital assets put together into a logical structure by a course developer who has attached an open license to it (Hylén, 2006). We can deduce that, up to now, the main focus has been on building access to OER, and building infrastructure, tools and repositories. We therefore conclude that OER is currently in an intermediate phase which we will call Phase 1, focusing on creation and open access.

Phase 2 is currently emerging in the debate, literature and policy discourse. This phase is about using OER in a way that improves learning experiences and innovates educational scenarios. This next phase in OER development will see a shift from a focus on resources to a focus on Open Educational Practices (Figure 3).
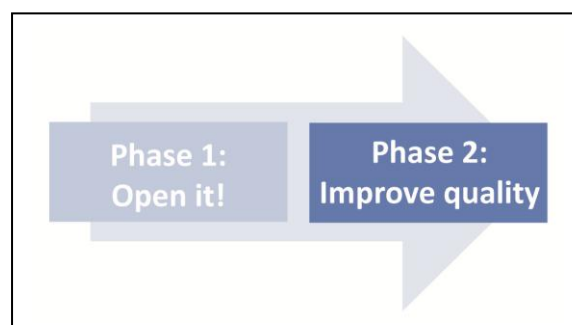
Figure 3: Shift from OER to OEP (Ehlers, 2011)

These comprise a combination of open resources use and open learning architectures to transform learning into 21st century learning environments in which students in universities, adult learners and citizens are provided with opportunities to shape their lifelong learning pathways in an autonomous and self-guided way. We contextualise Phase 2 as the emergence of Open Educational Practices (OEP) defined as practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers of their lifelong learning paths (Ehlers, 2011). Open Educational Practices have the following characteristics:

- They build on OER and move on to the development of concepts of how OER can be used, reused, shared and adapted.

- They go beyond access into open learning architectures and seek ways to use OERs for transforming learning.

- They focus on learning as a construction of knowledge assets which they share with others and receive feedback and reviews.

- They follow the notion of improving quality through external validation because of the importance of sharing of resources.

- They are about changing the educational paradigm of many un-knowledgeable and a few knowledgeable to a paradigm in which knowledge is co-created and facilitated through mutual reflection.

- They emphasise the fact that OER contribute to the value chain of educational institutions.

2.4   Notions of quality

Quality is an amorphous concept, and not an objective entity. Therefore, before presenting a conceptual map of issues affecting OER Quality, we present a conceptual map for the notion of quality itself, on which our discussion on OER can be based.

In this discussion, we consider quality to be a confluence of the following concepts:

- **Efficacy** – by this we mean the fitness for purpose of the object / concept being assessed. Within the context of OER, this might include concepts such as ease-of-reuse or educational value.

- **Impact** – impact is a measure of the *extent* to which an object or concept proves effective. Impact is dependent on the nature of the object / concept itself, the context in which it is applied and the use to which it is put by the user.

- **Availability** – the concept of availability is a pre-condition for efficacy and impact to be achieved, and thus also forms part of the element of quality. In this sense, availability includes concepts such as transparency and ease-of-access.

- **Accuracy** – accuracy is a measure of (a) precision and (b) absence of errors, of a particular processes or object.

- **Excellence** – excellence compares the quality of an object or concept to (a) its peers, and (b) to its quality-potential, i.e. the maximum theoretical quality potential it can reach.

It is useful to consider the three levels of quality approaches which can be applied to the domain of Technology-enhanced Learning (Clements & Pawlowski, 2012). Of the approaches described in Figure 4 (below), this report focuses on specific quality instruments, applicable to OER. In this vein, Pawlowski et al (2013) discuss different levels and aspects of quality which are relevant to managing quality in OER:

- **Quality of Organizations:** Quality management approaches are still in place and widely recognized, targeting a holistic quality culture. These approaches are equivalent to accreditation:, certified organizations have processes in place to develop high-quality programmes, courses and modules and thus OER.

- **Quality of Courses:** There are many quality approaches to course and programme certifications which take into account the quality notions mentioned above. With regards to content, key features are assessed automatically such as metadata quality, language and grammar, tag quality as well as essential elements (learning activities, media usage, and technical correctness). However, when content changes rapidly and dynamically, it is essential to plan incremental quality checks.

- **Quality of Metadata:** Metadata are assessed for spam and inappropriate content and validated against given taxonomies (contents, curricula, didactics, and context). This allows simple automated feasibility checks.

- **Individual Quality:** Do OER fit the learner's context? Mechanisms allow for the representation of user-context. As quality is not a generic concept, users only receive OER fitting their context. Based on user behaviour and comments, users receive high-quality objects for their context.

- **Transferability and Adaptability:** How can OER be contextualized? This is a key quality attribute regarding adaptation of language, culture, design, didactics etc.

Quality Approach	Purpose	Examples
Generic Quality Approaches	Concepts for quality management or quality assurance, independent of the domain of usage	ISO 9001:2008 (ISO, 2009) EFQM Excellence Model (EFQM, 2009)
Specific Quality Approaches	Quality management or quality assurance concepts for the field of learning, education, and training	Standards and Guidelines for Quality Assurance in the European Higher Education Area (ENQA, 2009) Success Factors for Virtual Schools (Bacsich et al., 2012) UNIQUe Criteria for Excellence in TEL (EFQUEL, 2011) e-xcellence (Williams, Kear, & Rosewell, 2012)
Specific Quality Instruments	Manage or assure specific aspects of quality	Ratings (Nesbit, Belfer, & Vargo, 2002) Recommender Systems (Manouselis & Sampson, 2004) Peer Reviews (Neven & Duval, 2002) Trust (Pawlowski & Clements, 2010)

Figure 4: Classification of quality approaches, (adapted from Clements & Pawlowski, 2012)

When implementing quality instruments which can be applied at these levels, the following aspects of the quality of the instruments themselves must also be ensured:

- **Transparency** of procedures used to assess quality,

- **Independence** of bodies assessing quality from the producers of quality,

- **Reproducibility** of quality assurance procedures,

- **Auditability** of quality assurance processes,

- **Comprehensiveness** of quality audits.

As a conclusion, we can state that the broad concept of quality needs to be defined so that the scope and levels of quality are clearly understood. While OER quality mechanisms obviously need to be built on previous experience, it is also essential to assess how they can be applied to new situations, i.e., to the rapidly changing, dynamic environment.

3.   CONCEPTUAL FRAMEWORK FOR OER AND OEP QUALITY

Adapting the classification provided by Clements & Pawlowski (2012), as described in Section 2.4, we propose a conceptual framework based around three 'sets' of quality approaches, and two sets of quality instruments. These consist of:

Quality Approaches:

- **Quality Assurance of Resources** – here we present a lifecycle model to understanding the quality factors affecting individual resources, including their creation, use and evaluation (Section 3.1)

- **Quality Assurance of Strategies / Policies** – using a maturity model, we consider the institutional development of policies which govern and promote the creation of OER (Section 3.2)

- **Quality Assurance of Learning** – this focuses on course-specific quality assurance, including processes of teaching, assessment and recognition (Section 3.4)

Quality Instruments:

- **Tools and Tool Practices** are the methodological and technical tools which allow for quality assurance to be performed (Section 3.3)

- **Collaborative and Partnership Models** describe the human element, in the form of trust networks that underpin the quality assurance models. (Section 3.2.2)

The following sections describe each of these approaches (the number in brackets refers to the number of the relevant sub-section), while considering applicable examples of quality instruments within the sections as appropriate.

3.1   Quality assurance of resources

The lifecycle of a learning resource (visualised in Figure 5) can be considered as a set of 11 steps, namely:

1. Creation of the resource by an author/creator
2. Description of the resource by means of metadata
3. Approval by the commissioning body of the resource
4. Publication of the resource, making it available to the wider public
5. Discovery, the process by which a user finds the published resource
6. Evaluation, or checking of the fitness for purpose of the discovered resource
7. Resolution, where a handle is used as a precursor to obtaining it
8. Obtaining the resource usually by downloading it or streaming
9. Re-purpose and re-use: the resource may be edited and/or changed by the tutor using the resource
10. Integration, which describes the process of including it into it a larger learning experience (such as a course), or as part of a technical tool such as a virtual learning environment
11. Use, which describes the actual utilisation of the resource to enable a learning experience by the end user / student.
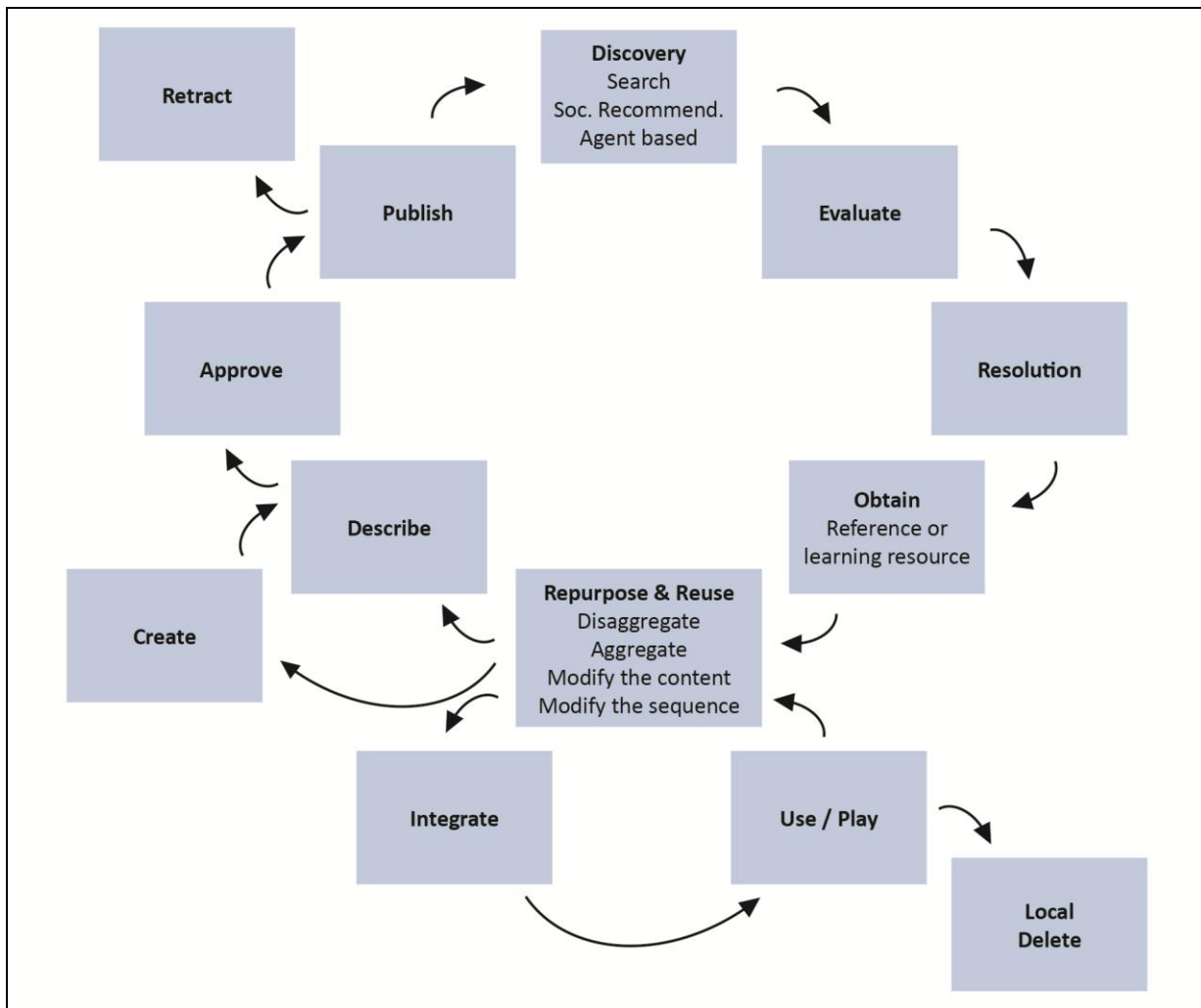
Figure 5: A typical usage scenario for learning resources (van Assche & Vuorikari, 2006)

The model in Figure 5 can be applied to any learning resource. However, the essential difference between open resources and traditional resources, i.e. the open licence, significantly complicates or distorts several steps in the model. Thus, the act of open licencing a resource can lead to situations where:

- Authoring, editing and evaluation are not discrete consecutive processes, but take place in continuous-improvement cycles, where the distinction between editing and reviewing is blurred (see Section 3.1.5).
- These steps are the shared responsibility of several people, acting independently or semi-independently, and not necessarily under the coordination or control of a single person or organisation.
- Publishing has a different meaning, since multiple versions of the same resource, in various stages of preparation, may be available publicly at the same time, and may be in use by different stakeholders.
- Once a resource is released, copies can be made freely, and there is no legal obligation for owners of the copies to delete/retract these copies, should the original be deleted/retracted.

An evolved lifecycle model[5] is presented in Figure 6 below, taking these phenomena into account. In the following, we explain each step in detail highlighting the requirements of the open licence.

---

[5]   For simplicity, in this model we have left out the resolution and obtain steps.

Figure 6: A typical usage scenario for Open Educational Resources

3.1.1 Initiate

The initiation involves the creation of the 'idea' of the learning resource – the process whereby the initial author decides on a set of learning objectives the resource should be designed to address. Where the resource in question is being repurposed for learning, it is this process of applying learning objectives to it which effectively turns it into a learning object.

The European Consortium for Accreditation suggests a number of quality criteria which should be taken into account when designing such learning objectives (ECA, 2013):

- Internal and external stakeholders should be involved in the process of designing and revising learning objectives, for example by participating in meetings, pedagogical boards, satisfaction surveys, evaluation procedures, etc.
- Learning objectives should be described in a comprehensible way. In particular, they should:
  o Be defined in clear and concrete terms (short and simple sentences),
  o Focus on what students are expected to be able to demonstrate and describe observable abilities which can be assessed.

Bloom's Digital Taxonomy
  └ **Key Terms**
      └ **Creating**
        Designing, Constructing, Planning, Producing Inventing, Devising, Making, Programming, Filming, Animating, Blogging, Videoblogging, Mixing, Re-mixing, Wiki-ing, Publishing, Videocasting, Podcasting, Directing, Broadcasting
      └ **Evaluating**
        Checking, Hypothesising, Critiquing, Experimenting, Judging, Testing, Detecting, Monitoring, Blog commenting, Reviewing, Posting, Moderating, Collaborating, Networking, Refactoring, Testing
      └ **Analysing**
        Comparing, Organising, Deconstructing, Attributing, Outlining, Finding, Structuring, Integrating, Mashing, Linking, Validating, Reverse engineering, Cracking, Media clipping
      └ **Applying**
        Implementing, Carrying out, Using, Executing, Running, Loading, Playing, Operating, Hacking, Uploading, Sharing, Editing
      └ **Understanding**
        Interpreting, Summarising, Inferring, Paraphrising, Classifying, Comparing, Explaining, Exemplifying, Advanced searches, Boolean searches, Blog journaling, Twittering, Categorising, Tagging, Commenting, Annotating, Subscribing
      └ **Remembering**
        Recognising, Listing, Describing, Identifying, Retrieving, Naming, Locating, Finding, Bullet pointing, Highlighting, Bookmarking, Social networking, Social bookmarking, Favouriting / local bookmarking, Searching, Googling

HOTS
higher order thinkinhg skill

Communication Spectrum
Collaborating
Moderating
Negotiating
Debating
Commenting
Net meeting
Skyping video conferencing
Reviewing
Questioning
Replying
Posting & Blogging
Networking
Contributing
Chatting
E-mailing
Twittering / Microblogging
Instant
Messaging
Texting

LOTS
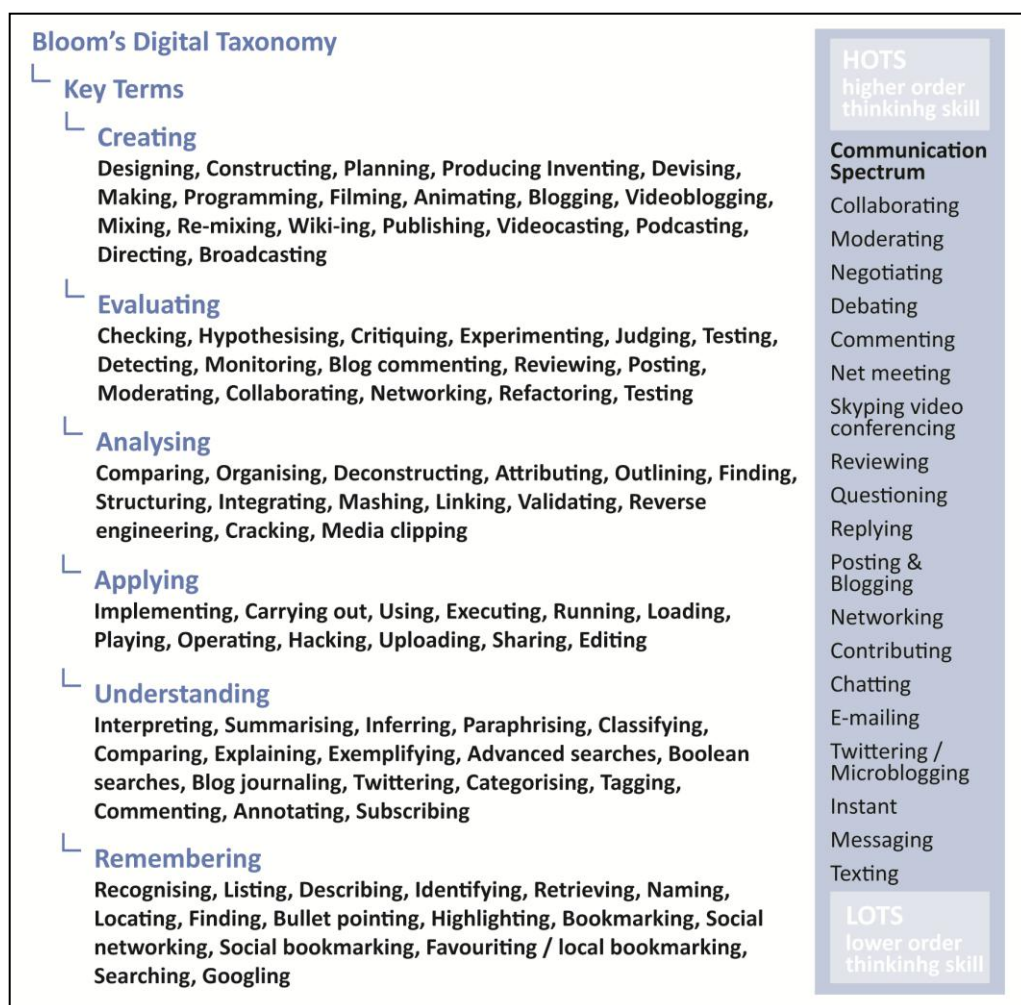lower order thinkinhg skill

Figure 7: Bloom's Digital Taxonomy (Churches, 2009)

An invaluable tool for defining learning objectives appropriately is the classification of Learning Objectives into those that deal with the cognitive domain – or 'knowledge objectives' (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956), the psychomotor domain (Dave, 1967) – or 'skills objectives' and the affective domain (Krathwohl, Bloom, & Masia, 1964) – or 'attitude objectives'. Each domain is supported by a taxonomy of verbs, which help the specification of quality learning objectives; e.g. the outlined elements under the cognitive domain are remembering, understanding, applying, analysing, evaluating and creating. The taxonomy then presents a set of verbs which can be used in relation to these elements. For example, the verbs which show understanding may include locate, match, memorize, name, recall, spell, state, tell and underline.

When applied to digital learning resources and technology-enhanced learning, Churches (2009) proposes a 'Digital Taxonomy' presented in Figure 7. In an OER lifecycle, many of the steps in the above taxonomy, such as creating and evaluating, not only describe demonstrable learning outcomes from engaging with the learning object, but may actually describe activities which can be performed on the learning object itself, since in certain educational scenarios, such as cMOOCs, the learning objective is achieved through the actual modification and improvement of the original learning object.

3.1.2 Author

Authoring describes the initial creation of the learning resource by an author or group of authors, before initial release to the public. Depending on the context, it may involve as little as the creation of an initial draft of a wiki article, or as much as the creation of a whole course, involving multiple iterations, actors and stages.

18

Lane (2009) considers the design principles that teachers can use to create effective educational content and goes on to discuss what constitutes quality in terms of Open Educational Content. He argues there are three main features of quality that need to be addressed: and poses the questions:

1.   Is the material academically sound in that it appropriately covers the body of knowledge and meaning for the topic?
2.   Is it pedagogically robust in that the way the material has been structured matches a stated pedagogical model and sets out appropriate learning outcomes and ways of assessing those outcomes?
3.   Is the way the material is presented through the chosen media helpful in enabling learners to meet the learning outcomes?

From a quality perspective, the "big" vs "little" classification of OER (see 2.2.1) is useful in considering what kind of quality systems can be applied to this process of creation.

In traditional education, course resources generated within an institution, i.e. "big resources", are not typically quality assured directly. Instead, institutions have quality assurance systems which apply processes in order to ensure that the production of high-quality materials and/or that the producers of the materials are of sufficient academic standing that the materials they produce may be considered authoritative.

Similarly, the quality systems applied by institutions, particularly in Higher Education, may be considered to be sufficient guarantors of quality for "big OERs", on the assumption that their production is subject to the same quality processes and procedures as the production of 'traditional' materials.

Since by definition "little OERs" are not produced within an institutional context, and are produced independently of any systematised process, the process of production cannot be quality assured, as with "big OERs". This therefore forces us to consider measures for assuring and assessing the quality of the resources themselves. In these cases, quality assurance will often be performed by the repository managers, repository community and/or users in later stages of the cycle.

Ways to ensure the quality of an institution's overall strategy is discussed in Section 3.2.

3.1.3 Describe

Learning objects are described using metadata, which is defined as structured data about an object that supports functions associated with the designated object. The first part of this definition, emphasising structure, implies that different users must agree to use the same metadata schema, according to a standardised profile. The second part of the definition implies the ability of the meta-data to support activities and behaviours of the object. For example, 'title' might enhance discoverability, 'cost' might inform purchasing decisions. (Greenberg, 2004). From an educational perspective 'Number of ECTS', 'Assessment Method' etc. might inform recognition decisions.

Three standards dominate the field of resources for learning, and e-learning resources:

- **Dublin Core** – are a set of vocabulary terms which can be used to describe resources for the purposes of discovery. The terms can be used to describe a full range of web resources (video, images, web pages, etc.), physical resources such as books and objects like artworks. It was made machine-readable for the purposes of distribution and harvesting by means of the Open Archives Initiative Protocol for Meta-Data Harvesting (OAI-PMH), which in turn has been integrated into the most common open-source repository software. As such, Dublin core is the *de-facto* current standard for library-style online archives.
- **SCORM** – The Sharable Content Object Reference Model defines standards for a Content Aggregation Model, Run-Time Environment and for Sequencing and Navigation. SCORM is primarily used for packaging entire courses and allowing them to be read/used by different learning management systems and/or course design packages.

- **LOM** – The IEEE Standard for Learning Object Metadata specifies the syntax and semantics of Learning Object Metadata, defined as the attributes required to fully describe a learning object (which is defined as any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning). It is more detailed, and hence more specific than Dublin Core, and has spawned a significant number of nationally-specific application profiles. OAI-PMH can also be used to transport LOM metadata, however the LOM terms are optional for implementation of OAI-PMH.
- Further standards, not yet widely accepted but very relevant for OER – for example, the curriculum exchange format (CEF) allows us to relate OER to curricula. Another example is INLOC (integration learning outcomes and competences) which allows us to describe which competences can be achieved using OER. These standards might be used to assess an OER for future use.

From the perspective of OER-quality, the current standards landscape presents little clarity. In most cases, individual resources are indexed through the Dublin Core / SCORM / LOM trifecta. The problem of meta-data standardisation for entire course modules is best exemplified by MIT's Open Courseware. While MIT recommends that course implementers adopt the IEEE LOM metadata standard, at the same time in its own implementation, it has stored further rights metadata as part of a Filemaker Pro database, and additional operational and administrative metadata are captured in the content management system used to create and publish the MIT OCW website (Sotiriou et al., 2010). In short, more than one metadata standard has been used to capture the entirety the Open Courseware data needs, since none of the existing ones were sufficient.

We conclude that current meta-data schema need to be extended so as to encompass the concept of *reusability*, which is inherent in Learning Objects, and especially in OER. A descriptor of this kind would provide adequate ways to measure the progression of a resource through multiple re-uses by different authors for different purposes (Abdul, Chaudhy, & Khoo, 2007). In addition, the ISO Quality Standard for Learning, Education and Training, ISO/IEC 19796-1, provides a detailed framework for the description of quality processes (Pawlowski, 2007). Integration of this with the current e-learning standards would allow reference to be made to quality standards by which the object has been judged. With respect to courseware, there is a pressing need to differentiate between course modules which offer certifications and those which do not, or offer granular information as to what type of certifications are linked to the resources (Montes, de Cordoba, Bailón, Blanco, & Camilleri, 2012)

Educational credits in Higher Education Institutions in Europe are all described in terms of ECTS, and the ECTS manual and the Diploma Supplement Model specify what information needs to be associated with a published credit (EC, 2009). However, the vast majority of open courseware, including MOOCs, is not actually quantified in terms of ECTS.

A revision of standards to address these concerns would significantly improve the transparency and accessibility of OER, while further facilitating the collection and re-sharing of open education courses.

3.1.4 Release

Release is the process of 'making available' of the resource to the wider community. While the release is often made available to the general public, a number of measures are often (but not always) applied to maintain the integrity / expertise of the community in the first instance. These might include:

- limiting discoverability of the resource: thus, while open to all, only a small cohort of people who may contribute significantly to its development are made aware of its existence.
- requiring membership of a community for access to the resource: the most typical mechanism for this is through the use of a registration procedure.
- limiting contextual information around the resource: thus, the resource itself is released, but without information which would allow its simple integration into a larger educational context. This information is held by members of the community until its publication.

Critically, the release of a resource implies that work done has been made available, but does not necessarily imply that the work has been subject to significant quality improvement/assurance procedures at this stage.

3.1.5 Check / edit / approve

Once released to the general public, a resource is available for further development and use, and will go through multiple iterations, with each iteration involving a process of checking and of improving the resource in question. At this point, we are not concerned with edits whose purpose is to *change the intended use of the resource,* i.e. repurpose.

Where the release occurs within a process-controlled institutional setting, such as those described by "big" OER, the same process controls that ensure quality for traditional resources, should also be a sufficient guarantor of quality for open resources. We call this this the check → approve method:

Check → Approve

Checking and approval in this sense implies the verification that a specific version of the resource complies with a set of formal quality standards which have been promulgated either by or on behalf of the body commissioning the resource. This step is one of quality assurance, rather than of quality improvement, and will often involve peer-review or inspection. Quality systems using the check-approve method are thus often built upon a three consecutive steps, namely (Van Vught & Westerheijden, 1994):

- **Self-Reflection (internal check)** – where the author/subject of the quality review checks their own work, and consequently improves it, in line with a set of quality standards.
- **Peer-Review (external check)** – where external experts judge the work in question, make suggestions for improvement, and the author/subject consequently takes these into consideration.
- **External Review (approval)** – either of the quality procedures used in the self-assessment and peer-review phases to ensure methodological rigour and consistency, or of the resource itself (a re-review) with the intention of clearing for publication.

The quality systems described so far are typically:

- **Centralised** in that a single body manages the process of peer-review, and the award of any certification of quality/compliance.
- **Free of Conflict of Interest –** in that people conducting the peer-review and/or external review have no direct connection with the subject of the review.
- **Based on determinate criteria** – which have been published beforehand, and form the subject of the review.
- **Informed by users –** end-users of the subject of the review are typically either surveyed as part of the review or are represented by a nominated reviewer on their behalf. Alternatively, user-expectations are outlined in a document which is measured by reviewers.

Where the release is wider, QA systems begin to come up against significant barriers and a "Check ⇄ Edit" procedure is more commonly employed.

Check ⇄ Edit

It has been argued that crowd-sourcing of products will actually produce a system in which a continual cycle of perpetual peer-creation and peer-validation leads to a virtuous cycle of quality improvement (Auvinen & Ehlers, 2009), as explained in Figure 8.
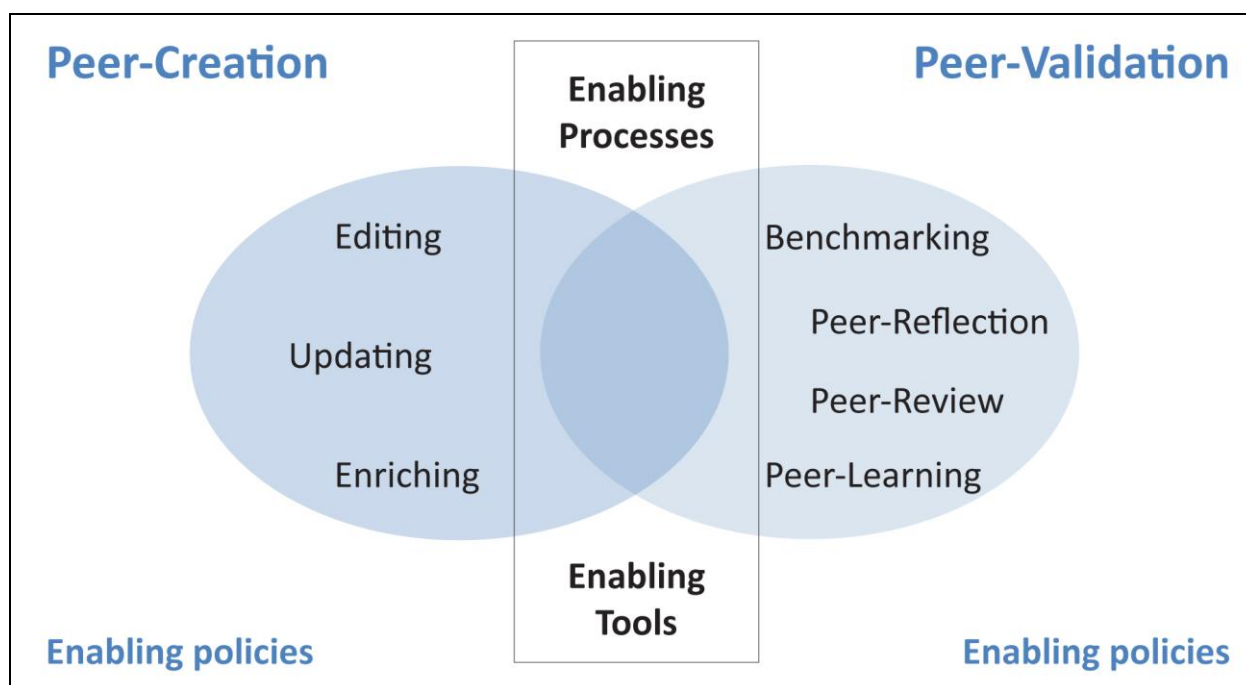
Figure 8: Conceptual map of peer production in e-Learning (Auvinen & Ehlers, 2009)

Enabling processes may include, for example active "communities of practice" within the organization to exchange learning experiences and good practices or support for intra-organizational and inter-organizational work in the area of peer production. Enabling tools may include wikis, blogs, collaborative working spaces, etc.

Due to the sheer number of authors, as well as the increased number of versions/editions in a check ⇄ edit process, peer-review, as described in the Check→ Approve process, does not really apply. It can therefore be substituted by the idea of peer-assistance, which has the features listed in Figure 9 (ibid, adapted).

	Traditional review	Peer assistance
Aim	Evaluation	Learning, improvement of knowledge
Process-type	Collaborative but hierarchical	Collaborative and communal
Task	Criticise a Paper	Learn with and through a team
Reviewer-selection	chosen by independent body	Members themselves choose the assistants
Reviewer-identity	Some actors are always reviewers	Actors can change role between reviewer and producer depending on the context
Guidelines	Based on rigid guidelines/instructions	Review conducted against broad criteria
Report	Mainly for the use of management	Process is for the aim of those who called for it (usually producers)

Figure 9: Traditional review vs peer assistance (adapted from Auvinen & Ehlers, 2009)

A number of new quality approaches therefore try to measure the scope, quantity and quality of the peer-validation processes, in an attempt to verify the quality of the resources themselves. For example, a study of high quality articles on Wikipedia has found that there is a positive correlation between quality and the number of edits, the number of editors and the intensity of cooperative behaviour respectively (Wilkinson & Huberman, 2007).

3.1.6 Publish

Publication involves the selection of an approved version, and the making available of this specific version online in a permanent, or semi-permanent fashion. One of the ways to do this is through the use of a digital object identifier, which in simple terms, is permanently assigned to an object to provide a resolvable persistent network link to current information about that object, including where the object, or information about it, can be found on the Internet. While information about an object can change over time, its Digital Object Identifier (DOI) will not change. A DOI can be resolved within the DOI system to values of one or more types of data relating to the object identified by that DOI, such as a URL, an e-mail address, other identifiers and descriptive metadata. (ISO, 2012)

The main difference between release and publishing is that a publication has been through a defined verification/approval process to ensure quality, and is intended for use by the end-target group.

3.1.7 Discover

Discovery refers to the identification of relevant learning resources and their evaluation in terms of fitness for purpose for their intended use. Resources may be discovered through:

- search tools, such as those built into common repositories and search-engines,
- community recommendations, such as suggestions given in forums, learning-resource guides etc.,
- automated recommendations, such as tools which scan a user's browsing history, and recommend similar resources,
- references, such as bibliographies or lists of used resources.

The discoverability of a resource usually hinges upon a combination of a human- and a machine-dependent element. The quality of the meta-data is the main determinant as to whether automated tools can utilise the data and expose it to search. Amongst the meta-data, the licence conditions are particularly important in determining whether the resources are OER and whether they are made available for reuse. Factors such as the number of references and the profile of the referees are often used in determining the importance or ranking of a resource from a discoverability perspective.

Discoverability also implies the selection of resources based on a set of criteria proposed by the user. Within this context, the search for a resource can be described as the establishment of a set of specific individualised quality criteria, for a specified use – and the consequent evaluation, ranking and selection of resources based on that set of criteria.

3.1.8 Use / integrate / repurpose

The quality of use of a learning resource can be measured as a factor of:
- its value as part of the learning process (use),
- its value as part of a learning process, when combined with other learning resources (integrate),
- its value as an object for reuse as part of other learning processes (repurpose).

Quality use as part of the learning process is, in turn, a function of the quality of the object itself (as has already been verified in previous steps), and of the quality of the pedagogic process in which it is embedded (the latter falls outside the scope of this report). Factors determining the usability of learning objects may include (Nash, 2005):

- relevance to the pedagogic aims of the course,
- usability within the platform or delivery system,
- cultural appropriateness, communicating correctly within the cultural context it is applied,
- infrastructure support in terms of ability to technically stream/download the object (this in turn depends on factors such as the size of the object, and the redundancy of access),

- relation to the infrastructure / delivery – a simple object such as a document may be easier to integrate with, e.g. a learning management system, then a game, which might have to run beside it.

3.1.9 Evaluation and rating

A common tool for the evaluation of the learning object from this perspective is that of social ranking, which can be described as a form of crowd-sourced peer-review. Social rating is compared with traditional review and peer assistance, in Figure 10 (Auvinen & Ehlers, 2009, adapted).

With a traditional resource, evaluation takes place as a distinct step. The results of evaluation condition whether or not a resource will be used. After an initial evaluation as part of the discovery phase, the evaluation of an OER takes place in concurrence with its use, and the rating is often given at the end of this use.

Scarcity could be a concern with crowd-based evaluation mechanisms: in many cases, OER are not (yet) used by a large-enough user base. This affects, for example, the reliability of ratings. Thus, different quality mechanisms have to be applied at the initial provision of an OER (when only a few users rate it) to those applied when the OER is widely used (when simple ratings might be good enough to judge quality).

Assessment of the quality of the learning process can be done using student assessment systems, which test how well a resource's learning objectives were achieved.

Integration of a learning object into a learning process is usually done according to criteria determined by a teacher, a tutor or by an instructional designer. On the other hand, peer-review and/or editorial selection according to a pre-selected standard is usually the norm for putting together a learning object repository. Vuorikari, Maouselis & Duval (2008) suggest that such editorial criteria and the associated ratings could be the subject of a standardised data model, enhancing discoverability and use.

Repurposing involves the creation of a new set of learning objectives, and thus directs us back to the beginning of the lifecycle.

	Traditional Review	Social Rating
Aim	Evaluation	Evaluation
Process-type	Collaborative but hierarchical	Individual and distanced from authors
Task	Criticise a Paper	Rate a OER
Reviewer-selection	chosen by independent body	All learners are potentially reviewers
Reviewer-identity	Some actors are always reviewers	Actors can change role between reviewer and producer depending on the context. Several actors have no experience beyond having used the resource
Guidelines	*Based on rigid guidelines/instructions*	*No guiding criteria for rating, aside from name of ranking*
Report	Mainly for the use of management	Report (rating) is for use of other users of the resource

Figure 10: Traditional review vs social ranking (adapted from Auvinen & Ehlers, 2009)

3.1.10 Summary on quality assurance of resources

The distinguishing feature of OER when compared to other resources is the freedom with which they can be used, reused and repurposed thanks to their open licence. We described each step of the lifecycle of an OER, and highlighted how several of the steps, such as editing, evaluation and use/repurposing, differ from the same steps in a non-open resource. In OER, these steps do not happen consecutively, but instead, they can happen simultaneously in the processes of 'checking and editing',

or 'checking and approving'. In addition, multiple stakeholders with differing aims may be involved during each step.

We described quality approaches which can be applied to these steps, in particular highlighting how socially-based quality tools such as peer-assistance, social-ranking and others can help to evaluate the quality of the resources at each stage in their lifecycle. At the same time, we pointed out the limitations of existing approaches where appropriate, and the roles of different stakeholders in each step. We highlighted examples of tools and tool practices in use at institutions to support these Quality Assurance procedures.

3.2 Quality of strategies and policies

The report "Beyond OER" (Ehlers et al. 2011) came to the conclusion that Open Educational Resources (OER) in higher education institutions are in in principal available but are not frequently used. The study reveals that there are five main barriers with which individuals are faced when they want to use OER: 1) lack of institutional support, 2) lack of technological tools for sharing and adapting resources, 3) lack of skills and time of users, 4) lack of quality or fitness of OER, 5) personal issues like lack of trust and time (Ehlers et al. 2011). With OER, an old question seems to gain new relevance: if we build it, will they come? (Masie, 2001). Four of five issues are related to lack of supporting components like organisational support, a lack of sharing culture within organisations, lack of skills, quality, trust or time and skills for adaption. Only one element is related to the availability of technical tools for sharing and adapting resources. Not a single barrier relates to the question of accessibility and availability.

The results of the 'Beyond OER' study are in line with a more general debate in recent literature on the gap between the concept of "giving away knowledge for free" (Ischinger, 2007) and the actual use of free and open resources for teaching and learning. A literature screening of the last 6 years of OER research reveals that the challenges associated with OER no longer lie in the availability or accessibility of resources but beyond.[6] Thus, Pirkkalainen and Pawlowski (2013) provide a map of 31 barriers to OER use by teachers, which also seems to indicate that the limiting factors for OER-use lie outside the realm of availability and accessibility. In fact, these barriers can be categorised as being due to lack of time, lack of training, lack of policy, lack of support, lack of awareness, lack of quality content, language issues and incompatibility of resources with the educational scenario.

The current situation can be characterised as follows: although OER are high on the agenda of social and inclusion policies and supported by many stakeholders in education, their use has not yet reached a critical threshold.[7] This has to do with the fact that the past and to some extent the current focus on OER is mainly on building more access to digital content. There is too little consideration of whether this will support educational practices, or promote quality and innovation in teaching and learning. We consider that OER are moving from a first phase in which the emphasis was on 'opening up access and availability' to a second phase where the focus will be on 'improving learning quality' through OER. We therefore suggest that the focus should be extended beyond 'resource access' to 'innovative Open Educational Practices' (OEP).

In order to facilitate the shift from OER to OEP, it is important to outline all the factors which influence the actual creation, use, sharing and reuse of OER for learners, educational professionals and organizational leaders in one common framework. A framework of this kind would have to be capable

---

[6] In addition, for quality assurance and OER: Windle et al 2010, Philip et al 2008, for skill demand for OER usage: Beggan 2009, Conole & Weller 2008, for teaching culture and OER: Beggan 2009, for lack of transparency culture: McGill et al. 2008, for conflicting agenda between research and teaching excellence related to OER usage: Browne 2010, for shift from supply to demand side with OER: Browne 2010, Beggan 2009, McGill, Beetham, Falconer, Littlejohn, 2010, for learning design as pedagogical underpinning of OER: Kahle 2008, Boyle and Cook 2004.

[7] There is a separate but connected debate ongoing about whether this holds true for developing countries as well. However, apart from infrastructure challenges – which are a necessary condition and not to be neglected – the issue of OER usage meets the same challenges there and could be facilitated through creating a culture of openness within institutions through a complementary focus on educational practices in addition to resources.

of directing stakeholders towards innovative, open education in which OER play the role of improving the quality of learning experiences.

3.2.1 Characterising Open Educational Practices

Open Educational Practices (OEP) address the whole OER governance community: policy makers, managers/ administrators of organisations, educational professionals and learners. The matrix displayed below (Figure 11) captures this link between resources and practices. It suggests different degrees of openness in the usage and creation of Open Educational Resources. The span ranges from "no usage" or "OER usage" to "OER (re-) usage and creation" and covers different realities within organisations and/or individual learning behaviour. This dimension of openness in resource usage and creation is related to a dimension of pedagogical practice.

Pedagogical practice is subdivided into three degrees of openness which represent different stages in teaching and learning frameworks. While there is currently no agreement on the classification of "openness" of pedagogical models available, research suggests different aspects of openness in teaching and learning frameworks. Ehlers' (2011) approach to classifying pedagogical models/ learning activities according to their openness largely follows Baumgartner's (2007) approach of "teacher – tutor – coach". Other approaches to classifying learning activities which come to similar conclusions have been taken into account, like that of Pavola, Lipponen and Hakkarainen (2004) who suggest learning metaphors such as acquisition – participation – knowledge creation, or the classifications of Laurillard (1993) and the comprehensive analysis of Mayes and de Freitas (2004) for JISC. Following this analysis, pedagogical levels of "freedom" or "openness" are conceptualized:

- Levels are "Low" if objectives and methods of learning and/ or teaching are rooted in "closed" one way, transmissive and reproductive approaches to teaching and learning. In these contexts, the underlying belief is that teachers know what learners have to learn and mainly focus on knowledge-transfer.
- "Medium" levels are achieved where objectives are still pre-determined and given, but methods of teaching and learning are represented as open pedagogical models. They encourage dialogue-oriented forms of learning or problem-based learning (PBL), focusing on dealing with developing "Know how".
- "High" degrees of freedom and openness in pedagogical models arise when learning objectives and methods (e.g. learning pathways) are highly determined and governed by learners. Questions or problems around which learning takes place are determined by the learners (SRL – self regulated learners). Teachers facilitate learning through open and experience-oriented methods which accommodate different learning pathways, either through scaffolding and tutorial interactions (ZPD Vygotskian-inspired approaches) or through contingency tutoring (Woods & Woods, 2011).

		OER Usage		
		Low No OER (re) usage	**Medium** OER (re) usage or creation	**High** OER (re) usage and creation
Learning Architecture	**High** Social practices, Collaboration, Sharing (Reflection in action) - "open" objectives - "open" methods	A	B	C
	Medium Dialog, Procedures, Rules (know-how) - "closed" objectives - "open" methods	D	E	F
	Low Knowledge transmission (know that) - "closed" objectives - "closed" methods	G	H	I

Increasing OEP (arrow from G to C)

Figure 11: Constitutive elements of OEP (Ehlers, 2011)

Open Educational Practices are defined as being within the trajectory, which is delimited by both dimensions: openness in resource usage and creation vs. openness in pedagogical models. Both dimensions can help individuals and organisations to self-assess and position their respective contexts. Using the matrix in Figure 11, we can analyse three examples:

1. **Autonomous Learning without OER** (grid ref. A): A high degree of pedagogical openness (project-based learning, etc.) and a low degree of OER usages and creation would result in interactive, autonomous learning contexts but without extensive use Open Educational Resources.

2. **Lectures with OER** (grid ref. H): using OER (e.g. a slide set) to give a lecture to students in a directive, knowledge transfer.

3. **Open Learning Architectures** (grid ref. C): Where a high degree of openness in pedagogical models in combination with a high degree of OER usage and creation result in a high degree of OEP in which OERs are used in open learning architectures (e.g. creation of learner-generated content in exploratory, autonomous learning scenarios).

Open Educational Practices (OEP) constitute the range of practices around the creation, use and management of Open Educational Resources which aim to improve quality and foster innovation in education. For example, a database or repository of Open Educational Resources is not an open educational practice. Using these Open Educational Resources in a traditional closed and top-down, instructive, exam-focussed learning environment is the most restrictive and limited form open educational practice. However, if OER are used to create resources which are more learner-centred than the previous ones, if learners are involved in the creation of content which is taken seriously by the teachers/facilitators, if teachers move away from content-centred teaching to "human resource"-based teaching, if learning processes are seen as productive processes and learning outcomes are seen as artefacts which are worth sharing and debating, improving and reusing, then OER might improve the learning process and we can then talk about Open Educational Practices.

OEP essentially represent a collaborative practice in which resources are shared by making them openly available. Pedagogical practices are employed which rely on social interaction, knowledge creation, peer-learning and shared learning practices. Once an individual or an organization has understood the constitutive elements and principles of OEP which were addressed in the first matrix, they can move on and analyse the diffusion of OEPs within their specific context using the second matrix, presented below in Figure 12. We believe that educational practices are never entirely closed or

open and that within educational organisations patterns and configurations of educational practices have developed which taken together constitute a diverse landscape. This has to do with the diverse beliefs and attitudes towards OER and towards open pedagogies.
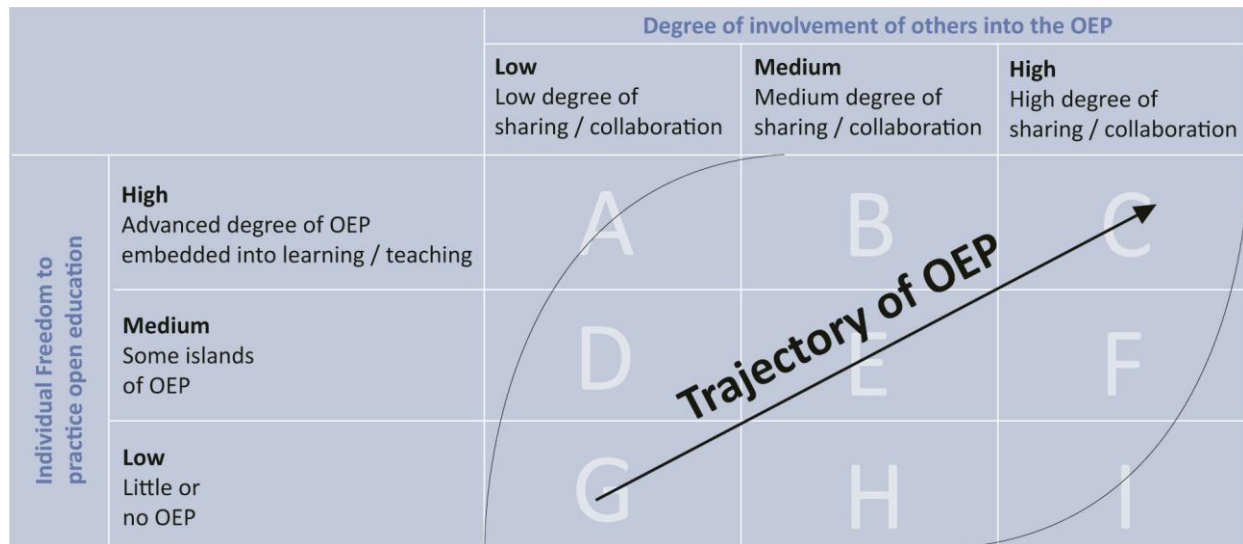
		Degree of involvement of others into the OEP		
		Low Low degree of sharing / collaboration	**Medium** Medium degree of sharing / collaboration	**High** High degree of sharing / collaboration
Individual Freedom to practice open education	**High** Advanced degree of OEP embedded into learning / teaching	A	B	C
	Medium Some islands of OEP	D	E	F
	Low Little or no OEP	G	H	I

Trajectory of OEP

Figure 12: Diffusion of Open Educational Practices (Ehlers 2011)

In order to be able to categorize, assess and position the existing landscape of Open Educational Practices within a given context (e.g. a learner or a teacher in his/her context) they can be mapped against two dimensions: the freedom of an *individual* to practice open education on the one hand and the involvement of others in OEP, which is expressed in different degrees of shared practices and collaboration. Both dimensions delimit the trajectory of diffusion of OEP for any given context. The matrix in Figure 12 shows the different dimensions in combination. The dimension of *individual freedom to practice open education* is divided into the three stages:

- "Low" – means that within a given learning/teaching context, no Open Educational Practices are encouraged.
- "Medium" – means that within a given learning/teaching context, islands of Open Educational Practices exist, but are not a shared and common reality.
- "High" – means that within a given learning/teaching context, Open Educational Practices are embedded into the reality of all learning and teaching activities.

In terms of stakeholders:

- *Organisations* will be able to use the first matrix to analyse which elements of OEP they already have in place and which elements of OEP could further be developed. They can use the second matrix to analyse their own OEP landscape, and understand the extent of OEP diffusion within an organization as a whole or individual units, or to members.
- *Individuals (learners, professionals)* likewise can use the matrix presented in Figure 11 to better understand OEP and assess themselves in order to see to what extent OEP constitutes part of their own learning/ teaching abilities. They can use the second matrix (Figure 12) to analyse the OEP landscape in which they operate. How much freedom do they have to practice open education and to what extent is it embedded in an open social sharing and collaborative environment?
- *Policy makers* will find that both matrixes promote their understanding of OEP. These matrixes will help them to analyse whether their policies support OEP and will inform their decisions.

3.2.2 Stakeholders in Open Education Quality

The stakeholders of Open Educational Practices are the 'open educational governance' community, i.e. those actors who are involved in open education from all perspectives.

	Schools	Higher education	Adult learning
Policy maker level	European, national, regional, local (communal)	European, national, regional, local (communal)	European, national, regional, local (communal)
Management and administration level	School Heads, Managers at Department of Education, Managers of Charter Schools, Leadership of Educational NGOs	Rectors/ VCs of HE Institutions, Heads of administration, leaders of technical departments, institutional policy makers, IP experts	Directors of Adult Learning Centres (ALCs) or initiatives, leaders of administrative units within adult learning centres, leaders of technical departments within ALCs, institutional policy makers, IP experts
Educational level (teachers, professors, curriculum designers, etc.)	Teachers, tutors, class assistants, parents / home-tutors, curriculum / text-book designers, Technical editors converting materials into online format, class-animators, quality assurance professionals, etc.	Teachers, professors, curriculum designers, learning material designers, assessors and validators of learning, teacher trainers, pedagogical advisors and consultants, support staff related to educational processes, Technical editors converting materials into online format, , quality assurance professionals, etc.	Teachers, facilitators (also learners can become teachers in adult learning), material, and curriculum designers, validators/ assessors, teacher trainers, pedagogical support staff, advisors, Technical editors converting materials into online format, quality assurance professionals, etc.
Teaching and learning level (learners, students, tutors, teachers)	Pupils	Students in formal learning contexts, lifelong learners, informal learners	Students in formal learning contexts, lifelong learners, informal learners

Figure 13: Open Education stakeholders

In Figure 13, we focus on schools, higher education and adult learning. These include:

- the policy making component of education in which national, regional or local (communal) policies are shaped and implemented to stimulate the use of Open Educational Practices.
- production and distribution of learning materials, and the management or administration of educational organisations.
- teaching or providing learning environments,
- learning in learning environments in which Open Educational Resources are used to improve quality and access of learning.

Mapping the role of stakeholders in quality approaches

For all stakeholders, our aim was to enquire how Open Educational Resources are used (authored, described, released, checked, approved, used and repurposed) to improve quality and innovation in the learning environment. All the stakeholder categories presented in Figure 13 can either be involved as individuals, as part of communities (online or face-to-face) or as members of institutions leading initiatives in the field of OEP. In the 21 case studies collected by the Open Educational Quality Initiative,[8] a more specific list of stakeholders was collected with respect to the implementation of

---

[8] Open Educational Quality Initiative (OPAL), LLP Project 504893-LLP-1-2009-1-DE-KA3-KA3MP. http://www.oer-quality.org

Open Educational Practices within an institution. The following stakeholders were cited in the case studies as being involved with different aspects of OEP:

- Teachers – finding, creating, using or repurposing OER
- Formal learners – finding, creating, using or repurposing OER
- Informal learners – finding, creating, using or repurposing OER
- Non-formal learners – finding, creating, using or repurposing OER
- Managers – decide strategy and implementation plan and resources related to OER
- Policy makers – implement policy around OER
- Technical editors – converting materials into online format
- Instructional designers – helping ensure the design of OER adheres to good ID principles
- Educational developers – helping staff gain the skills to understand and use OER
- Quality assurers – putting in place QA models and ensuring the quality of OER both in terms of content and processes
- Translators – converting OER into other languages
- International relations staff – dealing with cross-cultural issues
- OER mentors – providing support for collaborators in creating and using OER
- Wider community – for example, family members of learners
- E-learning and OER researchers – with an interest in exploring specific questions around the use and effectiveness of OER.

We have mapped this list to the steps of our lifecycle model for OER, which mapping is presented in Figure 14.

	Initiate	Author	Describe	Release	Check/ Edit	Approve & Publish	Use	Re-purpose
Teachers	XX	XX	X		XXX	XX	XXX	XX
Formal Learners	X	X			XX		XXX	X
Informal Learners	X	X			XX		XXX	X
Non-Formal Learners	X	X			XX		XXX	X
Managers	X			X	X	XX		X
Technical Editors		XX	XXX	XXX	XXX	XX		
Instructional Designers	XXX	XXX	XXX	XXX	XXX	XX		XXX
Educational developers	XX	XX		X	XXX	XX		XX
Quality assurers				X	XX	XXX		
Translators		XX	X		XX	X		
International relations staff					X		X	
OER mentors					X		XX	
Wider community	X	X	X		X		X	

x = occasional / marginal involvement, xx = strong involvement, xxx = extensive involvement

Figure 14: Stakeholders' role in the lifecycle of an OER

This section focused on the role of various stakeholders in the implementation of quality processes at resource and/or strategy level. In addition to these stakeholders, there are a set of actors, who through

their ability to influence quality schemes, have a particular ability to contribute towards the improvement of quality of OER. These stakeholders include:

- Supranational bodies in policymaking, particularly the European Commission: through their ability to deploy EU-wide indicators, set standards in certain areas, and deploy collective improvement methodologies such as the Open Method of Coordination. They have the ability to encourage the development of quality measures in nation states, and provide support to OE quality professionals.
- National and Regional policymakers have the ability to pass laws such as Open Access mandates which greatly increase the number of high quality materials entering the field. They can also, in coordination with European authorities, legislate standards for resources and/or create transparency instruments in various areas (such as MOOCs), which may then be beneficial for the enhancement of quality.
- QA Bodies / Agencies have the ability to propose and deploy specific quality standards for Open Educational Resources and Practices, and, in conjunction with national governments, enforce or promote such standards amongst the wider community.
- Technology Providers have the ability to develop technical tools which can help in the measurement of quality, the discoverability of quality resources, and in the achievement of better-quality outcomes. For example, a Learning Management System developed to be in line with quality standards, or ways of auditing the lifecycle of resources can enhance quality.
- Institutional actors have the ability to influence OER quality mainly through the adoption of Open Educational Practices as already described in the previous section.
- Lifelong learners, teachers and the general public have the ability to influence quality much more through enhanced participation in quality procedures as described in the previous section. Users still suffer from a lack of trust and lack of motivation to participate in these processes (Pirkkalainen & Pawlowski, 2013). Thus, any activities which increase users' trust, motivation and ability to interact with the lifecycle of resources, will in turn lead to improved quality of the resources.

3.2.3 A framework for supporting Open Educational Practices

Quality concepts for OEP often depend on the type of institution and their learning and teaching culture, the balance of importance of the 'value' of teaching (in comparison to research activities in the institution), the degree to which OEP activities are seen as activities in their own right, the level of digital maturity of the institution and the extent to which they had engaged with OEP work previously. QA models range from lightweight, user-defined models to strictly controlled hierarchical models.

A three step approach has been developed by the Open Educational Quality Initiative. It can be used by individuals in institutions to help them focus on the quality of their own practices and learn how to strengthen Open Educational Practices (OEP) within their own specific context. Each of the following steps consists of a set of specific questions to help self-assessment (see Annex 1 for more details):

1. Positioning the user's own personal experiences with and exposure to OER in the OEP trajectory;
2. Creating a vision of openness and a strategy for OEP in the user's educational context;
3. Implementing and promoting OEP to transform learning in the user's educational context.

The approach is intended to be used by policy makers, organisational leaders, professionals and/or learners.. It is expounded by means of a 'maturity framework' which consists of a set of questions/criteria under each of the steps shown above, according to which individuals can assess the maturity of their own practice in their own organisation. The following levels can be observed: Not yet started; Early stages/awareness; Developing/Commitment; Established; Embedded/Advanced

Figure 15 shows an example of the questions related to Step 2: Creating a Vision of Openness. It also shows examples of possible answers which allow individuals to gauge their organisation's level of OEP Maturity.

1. Do you have vision for how to use OER in your teaching?				
Not yet started	Early stages/ awareness	Developing/ Commitment	Established	Embedded/ Advanced
No vision	An emerging vision of how to use OER in teaching.	A good understanding of how to use OER in teaching.	A well-developed vision for use of OER in teaching	An innovative and applied vision for use of OER in teaching.

Figure 15: Example of question/criterion in OEP maturity framework

It is worth noting that not all the questions/criteria of the OEP maturity framework are applicable to all the target groups. Therefore, different paths can be envisaged for different target audiences. Figure 16 illustrates alternative paths for policy makers, organisational leaders, professionals and learners on the questions under steps 2 and 3. In the illustration, all the above stakeholders start with the same question of vision, as exemplified in Figure 15. Policy makers, however, are not concerned with all the same issues as the organisational leaders are and therefore they can skip some of the questions on strategy and policy; business models and partnership, and advance directly to the question on relevance (see Annex 1 for details where the full quality approach and maturity framework is presented). .Note that the order of stakeholders in Figure 16 is random and does not illustrate any hierarchy.
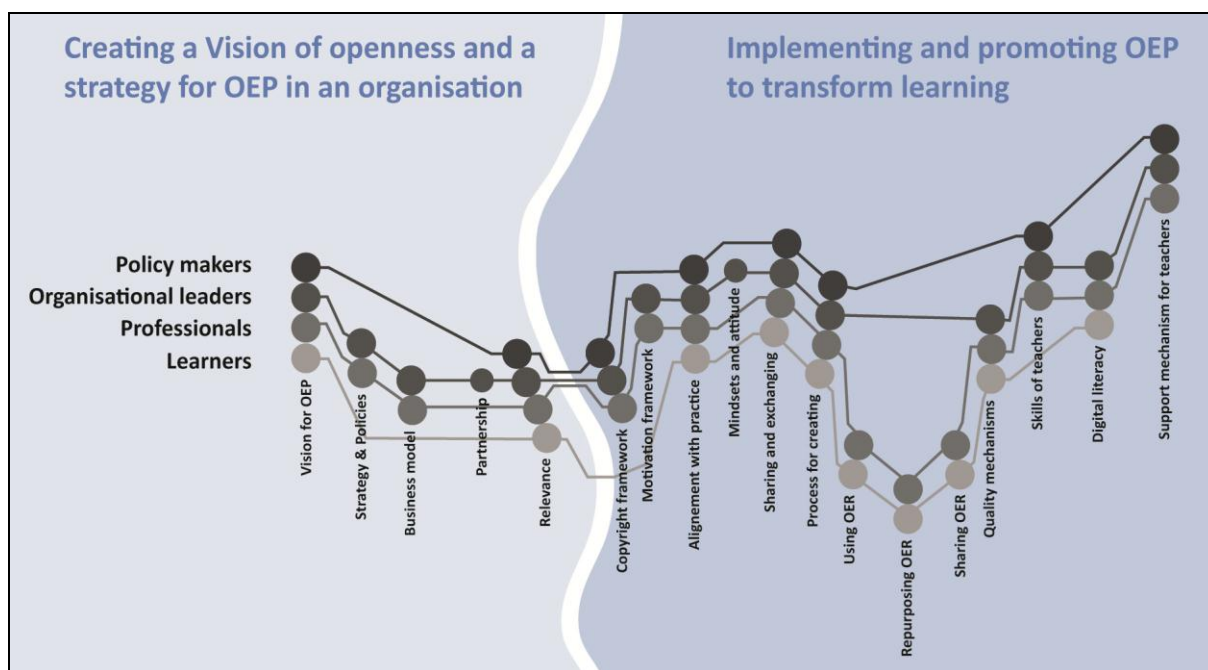

Figure 16: Map of OEP criteria for various stakeholder groups (http://www.oer-quality.org/publications/guide/roadmap/)

The vision for open educational practice is to move from resource-based learning to a learning process in which social processes, validation and reflection are at the heart of education, while keeping the standards high. In this process, learners become experts in judging, reflecting, and innovating within a domain and navigating through domain knowledge.

To avoid misunderstanding, it is important to stress that Open Educational Practices do not neglect the importance of the availability of good resources, but that they aim to achieve higher levels on the ladder of reproduction/ understanding – connecting information – application of knowledge – competence action – responsible behaviour (North, Reinhardt, & Sieber-Suter, 2012).

Achieving quality OEP through the adoption of best appropriate educational practices can be argued to promote the creation and delivery of OERs that are not only fit for purpose but also may incorporate

the opportunity to increase new innovative methods of delivery to and sharing with a wider global audience. How this is accomplished often depends upon local circumstances, access to suitable technological solutions and personal attitudes. It is informed by knowledge of current research in the area of OER production and also draws from existing OEP.

3.3   Examples from practice

The OPAL project led to the collection of over 80 case studies from Open Education Initiatives around Europe. The operation mechanisms and quality standards in place were studied in each case study. The following sections present examples of quality assurance strategies, models and tools found in these case studies (Conole et al., 2010). Names, URLs and further information about the cases can be found in Annex 2. In the following text, we refer to each case study as [CSnumber] the number points to a specific case study reference in Annex 2.

3.3.1   Strategies and policies

We found that three main aspects emerged at the organisational environment level:

1.   The extent to which initiatives are bottom up, versus top down.

2.   Lightweight/user driven strategies versus institutional structured workflow.

3.   The degree to which students are actively involved.

Amongst others policies must:

1.   Include certain characteristics in order to join (e.g. CampusContent [CS1]).

2.   Adhere to open source principles and approaches (e.g. NDLR [CS12].

3.   Adhere to existing policy practices and standards. For example the CCCOER [CS2] project points to the wikieducator[9] exemplary collections of institutions with OER policies, and also to the DLISE review of collections best practices.

4.   Link to national or broader policy agendas. For example the OpenER [CS3] project links to the Lisbon agenda, feeding through Dutch government objectives in this area.

5.   Mainstream OER work into institutional business provision. This was a core object of the OpenLearn [CS4] initiative in the UK and is now being instantiated. Many other initiatives are seeing the importance's of building in sustainability and embedding into core processes as an essential part of their overall strategy.

3.3.2   Examples of quality assurance models

A range of Quality Assurance (QA) models was evident across the case studies. These depended on a number of factors:

•   The type of institution and their learning and teaching culture.

•   The balance of importance of the 'value' of teaching (in comparison to research activities in the institution).

•   The degree to which OER activities were seen as research activities in their own right.

•   The level of e-learning maturity of the institution.

•   The extent to which they had engaged with OER work previously.

QA models range from lightweight, user-defined models to strictly controlled hierarchical models. An example of a lightweight and user-driven model came from the Southampton University case study

---

[9]   http://wikieducator.org/Exemplary_Collection_of_institutions_with_OER_policy

and their EdShare project [CS5]. They provided the option of either open-web sharing or institution-only sharing, according to academics' wishes. The OER are made available as simple assets (such as PowerPoint, Word, or PDF files), i.e. standard formats that academics are used to producing in their everyday practice. In terms of quality assurance and adherence to standards, this is very much a lightweight approach, as no adherence to IMS CP or LOM is required. OpenExeter [CS6] is another example of quality control driven by academics, although it does adhere to IMS standards and is SCORM compliant. Southampton and Exeter would both view themselves as 'research-focused' institutions, hence such lightweight, academic-driven approaches are to be expected. In fact, this does appear to be quite a common approach in many of the case studies; and certainly in a number of the more recent, smaller initiatives.

In contrast to these lightweight models, the OpenLearn [CS4] initiative is a good example of a top-down controlled QA model, with clearly articulated quality processes and identified roles (authors, editors, technical support, quality assurers, etc.). This can be seen as both a consequence of the inititiative's unique position in the UK as a large-scale distance educational institution (with a well-established, Fordish production model for course production and presentation). Also, due to the fact that the project received considerable funding from the Hewlett Foundation, it was in a better position to set up more rigorous and complex roles and processes.

A number of examples of QA practices are evident from across the case studies. These practices include the use of peer-reviewing as a means of ensuring quality (for example in the GITTA [CS7] project) and defining criteria for peer-production and open content (the AVO/SOMETU [CS8] project). Some others include more organic and community peer-review based quality assurance models that are relatively linear. There are also multi-level reviews, or reviews against a set of pre-defined criteria. In other cases, quality assurance checks and processes are embedded in the workflow for production of OER, which also include annotations by experts which help the users through the learning materials.

An example of a relatively linear quality assurance model is the OpenER [CS3] project, where authors are required to produce and submit content, which is then checked, converted and rechecked. EducaNext [CS9] is an example of a more organic community-based model, where members are able to comment on published content or run a complete course evaluation. KELDAmed [CS10] is another example, which includes annotation by experts, who then are also available to help the users through the learning materials.

CampusContent [CS1] have multi-level reviews: experts review the material and then learners can further improve shared understanding of the OER through their own annotations. Podcampus [CS11] is an interesting example of a lightweight QA model, where contributions are provided by experts. Another community-based model can be seen in the CCCOER/CCOT initiative [CS2] which enables educators to share reviews of materials, and also to look at and comment on the reviews of others. The CCOT reviews are done against a set of pre-defined criteria. These include sub-dimensions around accuracy, importance or significance, pedagogical effectiveness, completeness of documentation, ease of use for teachers and learners, inspirational/motivational for learners, and robustness as a digital resource.

3.3.3 Tools and tool practices

A wide range of tools and tool practices emerged from the case studies, which exploited the full potential of new technologies to support the sharing and critiquing of resources. In some cases, institutional Learning Management Systems (LMS) have been adopted, in other cases a more specialised digital repository has been created. More generally web 2.0 tools (such as wikis, blogs, social networking sites, etc.) are being used in a variety of ways to foster and promote the community of practice around the OER. Not surprisingly, there is strong support in general for adopting open practices. Most projects subscribe to some form of creative commons licensing, in particular the use attribution, non-commercial, share-alike basis.

Connexions is mentioned across a number of the case studies as a valuable system for sharing and editing OER. Similarly, the EduCommons content management system has been used as an OER platform by a number of projects (for example OpenER [CS3]). OpenLearn [CS4] used the open source learner management system Moodle for hosting its OER, whereas others used commercially available

LMS (for example NDLR [CS12] used Blackboard). Rather than create a separate platform, UnisulVirtual [CS13], chose to use the specially adapted platform that OpenLearn [CS4] created. OpenExeter [CS6] chose to use its existing Information Technology Infrastructure Library system, whereas U-NOW [CS14] developed a conventional website. Some used relatively lightweight packaging and distribution of OER (using Word files in ZIP and PDF formats), whereas others adopted an XML-based framework. GITTA [CS7], for example, used eLML (eLesson Markup Language). A number of the sites incorporated or developed specialised repository tools to enable different types of search (for example AKLEON) or KELDA (an annotated database).

Web 2.0 tools were used in a variety of ways. ZUM-Unity [CS15] used forums and blogs as a means of exchanging ideas. In contrast, a number of projects chose wiki-based systems – sometimes for storage and sometimes to promote discussion and community building (for example Wikiwijs [CS16], and Skriptenforum [CS17]). MatheVital [CS18] used a repository plus a wiki for annotation. More specialised OER such as podcasts have either been distributed via specialised podcasting platforms (as in the case of Podcampus [CS11]) or via iTunes (for example at the Open University UK and the OpenSpires project [CS19] at Oxford University). Other standard available web tools such as Twitter and YouTube have also been used as a means of distributing information at the various OER initiatives. CCOT [CS2] used the social networking site Ning to promote community engagement. The AVO project [CS8] includes SOMETU, which is also Ning-based and provides a forum for people who are interested in the potential that social media offer for learning. It is described as a tool that 'not only helps expand one's knowledge but promotes business, eDemocracy, citizen activism and leisure activities in the digital age'. More recently a number of projects have been using the Cloudworks site as a means of sharing and discussing OER issues and practices (for example OpenExeter [CS6], Olnet [CS19], the Hewlett grantees and NROC [CS20]). AVO/SOMETU [CS8] is also exploring the use of Virtual Worlds (along with mobile devices, blogs, wikis, and other social media tools). Finally a number of tools have emerged to support visualising OER, both in terms of making their inherent designs explicit (CompendiumLD) and to support visualisation of argumentation about OER issues (CompendiumLD and Cohere).

At the educational environment level, in addition to the above, a number of other factors emerged. There were some good examples of the use of voting and 'recommendation' tools to enhance community engagement and shared consensus, and syndication formats like RSS and RSS aggregators to distribute metadata and provide access to content. Blogs, wikis and discussion forums have all been used as spaces to discuss OER/OEP and to co-create a shared understanding and there are examples of the use of social networking sites and file sharing services (such as Flickr, Slideshare and YouTube). Collectively there is evidence that these tools enable peer critiquing and commenting, which is leading to an improved shared collective understanding. Community-based tagging, the use of folksonomies to create metadata and tagging has become more important as users have shifted away from pre-defined metadata categories.

Adopting open practices is, perhaps not surprisingly, fairly common. The emergence of the Creative Commons license four or five years ago was a major break-through in terms of providing a means for project to label the level of attribution and the degree of sharing they wanted on the resources. Most of the case studies reviewed from the UK, for example, use attribution, non-commercial, share-alike. However some projects were not comfortable with the share-alike option, which meant that the repurposing of the OER was not possible. More generally in terms of adopting open practices there are a range of approaches, for example some projects have deliberately chosen to use open source tools (such as Moodle), whereas others have opted for bespoke systems or commercially available products. Likewise projects differed in their attitudes to adherence to open standards, ranging from full to no compliance. In the BCcampus project [CS21], OER developers have a choice of two licensing options: Creative Commons Share Alike-Attribution Canada Licence or the BC Commons licence (90% have chosen the latter).

3.3.4 Summary on quality assurance of strategies and policies

We suggested the concept of Open Educational Practices (OEP) as a way to build on OER and move on to the development of concepts of how OER can be used, reused, shared and adapted. OEP support the

(re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path.

In particular, we described a quality assurance approach for OEP based on determining the OEP-maturity of strategies and policies from the viewpoint of policymakers, institutional leaders, teachers and/or learners. We illustrated our description with examples of strategies and policies in place at various institutions.

3.4 Quality of learning

A variety of quality marks and certifications have been developed to ensure quality on a course level. In particular, the ECBCheck certification produced by the European Foundation for Quality in e-Learning and the E-xcellence mark produced by the European Association for Distance Teaching Universities, are specifically targeted at comprehensively measuring e-learning course quality (Devedžič, Šćepanović, & Kraljevski, 2011).

The ECBCheck certification analyses the organisation of the programme, target audience orientation, quality of content, programme/course design, media design, technology and evaluation and review. E-xcellence measures strategic management, curriculum design, course design, course delivery, staff support and student support (Williams, Kear, & Rosewell, 2012).

The UNIQUe scheme for e-learning quality specifies institutional-level criteria for mainstreaming e-learning strategy and practice across Higher Education Institutions. By demanding proof of continuous iterative innovation in all aspects of institutional management, pedagogical design and course provision, it ensures a holistic and well-structured approach to the design, supply and evaluation of e-learning within institutions (EFQUEL, 2011). Figure 17 describes the areas covered by the certification.

These quality standards apply universally for traditional distance courses, however applying them to OER requires a more nuanced approach.
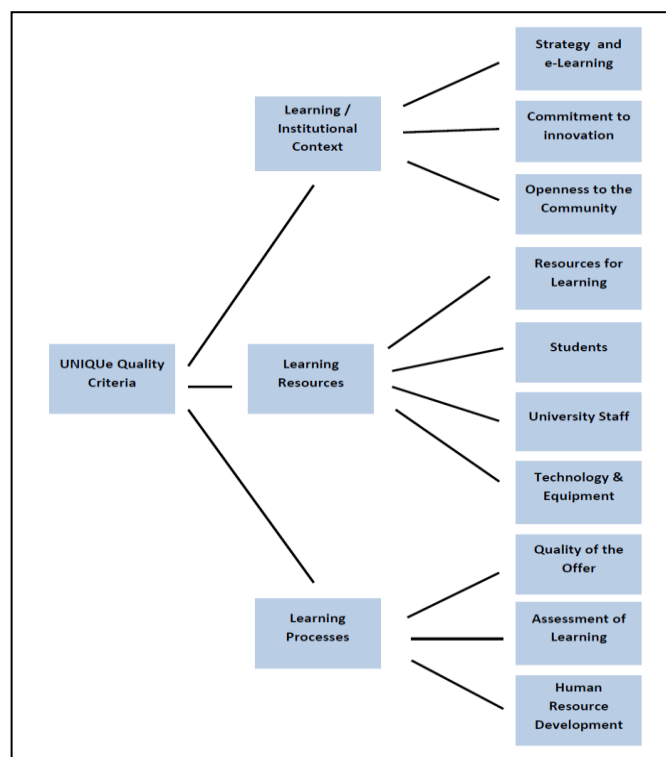

Figure 17: Overview of UNIQUe quality criteria (EFQUEL, 2011)

Open courseware, defined as publicly-available materials that are either a part of, or a complete course from an educational institution such as a university or college ("Commonwealth of Learning – Open CourseWare and OERs," n.d.), implies no tutor support beyond the creation of the materials, no assessment/certification processes for students, and no course delivery. As such, only a fraction of the criteria of e-learning course standards apply. In fact, it is likely that both content-creation guidelines and course-quality criteria could be used as sources for a quality approach towards open courseware.

Open-course modules and/or MOOCs imply heavy automation of teaching processes, limited tutor support, and provision of a course leading to assessment and award of a certificate. As such, they are much closer to classic/traditional e-learning courses. This said, MOOCs, and in particular cMOOCs, are introducing new modalities of teacher supervision, assessment and teaching, which are not fully

covered by the standards outlined above. Open Education courses, are simply any traditional course with a high degree of openness. In these cases, current course-quality approaches are fully fit-for-purpose.

3.4.1 Degrees of openness

In an institution with strongly embedded OEP, a quality indicator for the effectiveness of these practices is the degree of openness of the courses produced and released by the institution. Hodgkinson-Williams and Gray (2009) propose a framework to analyse the degree of openness of OER policies at the University of Cape Town.

Social Openness	Lecturer-centred		Student-centred			Student, lecturer & broader community		
	USE					CONTRIBUTE		SHARE
	Traditional	Sharing	Collaborating	Organising	Managing	Participating	Contributing	Sharing
	← Most didactic		Most participative →					

Technical Openness	Proprietary	Proprietary / Open	Ope
	← Most restrictive	Most accommodating →	

License Openness	Copyright	Limited-Public						Publ
	All rights reserved	Attribution non-Commercial No derivatives	Attribution non-commercial share alike	Attribution non-commercial	Attribution no derivatives	Attribution share alike	Attribution	
	← Most restrictive	Most accommodating →						

Financial Openness	Charged		Low Cost		Opportunity Cost		Free
	Market-based pricing		Small charge	Subscription fee	Contribution in kind	User registration	No cost (gratis)
	← Least affordable		Most affordable →				

Figure 18: Measuring Openness of OER (modified from Hodgkinson-Williams and Gray, 2009)

- **Social openness**: the degree to which pedagogy is didactic or participative, through the use of sharing, collaboration, participation and contribution.

Examples: Here, lectures delivered in a theatre-like classroom would be considered most closed, while cMOOCs would be an example of most open.

- **Technical openness**: the degree to which software / platforms on which OER are based are themselves open- or closed-source.
  Examples: Taking examples of Learning Management Systems, a proprietary LMS such as Blackboard would be considered most closed, while the adaptation of an open-source wiki platform such as mediawiki for the production of MOOCs currently might be considered the ultimate example of technical openness.
- **Licence (or legal) openness**: the degree to which the licence grants the user rights over the material, ranging from copyrighted (no rights to user), including the full spectrum of creative-commons licenses, up to no rights reserved (all rights to user).
  Examples: the majority of publications from traditional publishers such as Pearson, McGraw Hill etc., which include standard copyright declarations are examples of the most closed licenses. Wikipedia is an example of a fully openly licensed set of materials.
- **Financial openness:** this measures the charge for the education provided, ranging from full commercial pricing, including several options for low-cost pricing and ending with *gratis* pricing.
  Examples: Courses offered by the Open University are examples of the most closed kind of financial openness in this case. Free education offered by public universities is an example of the most open model.

3.4.2 Measuring educational outcomes

Within formal learning, the recognition of learning outcomes via assessment is a critical part of the quality assurance infrastructure. It directly ensures the quality of the learning undergone by individual students for the purposes of recognition by the broader community. Indirectly, it also provides important metrics as to the effectiveness and efficiency of the teaching provided to those same students.

Existing OER modules have not necessarily been subject to the same rigorous quality assurance that is required for creating curricula and awarding credit for self-learners in formal learning. In discussing quality issues around entire course modules, academics stress the need to guarantee *equivalence* between OCW/MOOC style content and the same modules offered in bricks and mortar institutions. (Tannhäuser, 2012)

Currently, three types of credit can be offered to open learning (Camilleri & Tannhäuser, 2013):

- **Recognition of prior learning (RPL)** – where the institution providing the module does not certify it, certification of learning outcomes and competences can be done through a RPL procedure, conducted by a dedicated recognition agency or by an educational institution with the authority to do so.
- **Non-standard certificate** – Non-standard certificates include any kind of award which is not mapped in the European Qualifications Framework. These might include certificates of accomplishment, attainment, attendance, etc. The certification offered by the large majority of MOOCs falls into this category
- **Recognised certification** – In Europe, this would involve the award of ECTS[10] credit for successful completion (including assessment) of a course. This credit is recognised in any institution in Europe, in line with the requirements of the Lisbon Recognition Convention and subsequent legislation codifying the Bologna communiques.

Across Europe, RPL systems based on CEDEFOP's guidelines for the Recognition of Non-Formal and Informal Learning are increasingly being codified into law, as per the 2012 EU Council Recommendation on the Validation of Non-Formal and Informal Learning. As such, there is no

---

[10] European Credit Transfer System.

appreciable difference between RPL conducted in open learning modules, and in other learning, since RPL does not validate the process of teaching/learning or the quality of the resources used, it only validates competences achieved.

Since non-standard certificates are not referenced to any standard or legislation, they essentially exist outside the quality infrastructure formalised through the European Standards and Guidelines for Quality Assurance. As a result, each individual course may or may not have been subject to an institutions' standard quality procedures.

Since recognised certifications are offered within the framework of ECTS, and are linked up to national/European qualification frameworks, institutions providing the certifications must subject them to their standard institutional quality procedures. This said, there are significant doubts as to whether the current quality procedures are adequate for assessing open education modules. Amongst the concerns are:

- open courses occasionally use radically innovative forms of pedagogy and assessment such as virtual laboratories and peer-assessment, to mention two, which are too new to have been clearly proven to be effective. Thus, any quality assessment of courses including these elements cannot make a fully-informed pronouncement as to their quality.
- the majority of open courses (a) do not form part of programmes from the institutions offering them, and (b) often mirror the content of a 'traditional' course offered as part of the programme. At present, quality assurance systems do not require equivalency for the same courses offered through different modalities.

The concept of assessment awarded for open education, as embodied by MOOCs is extremely recent, and hence, the quality models underpinning them are in constant flux.

3.4.3 Summary on quality assurance of learning

We examined the use of the criterion of 'Degree of Openness' as a way to quality assure open learning (as opposed to other learning). We also considered current limitations in the verification of learning outcomes from open learning, and recognition of learning achieved through open learning processes within formal education. We briefly considered the implications of new recognition and transparency instruments for quality of learning.

3.5   Conclusions

This chapter endeavours to give an overview of quality approaches, tools and procedures which may be applied to OER. Conceptually, the distinguishing feature of OER when compared to other resources is the freedom with which they may be used, reused and repurposed thanks to their open licence.

This freedom significantly disrupts a resource's lifecycle, particularly with respect to the processes of creation, editing, evaluation and use. Where before these were traditionally distinct, consecutive and managed by discrete actors, the freedom granted by OER leads to an evolution of concepts. The involvement of many more actors in each step means a federation of responsibility for the steps, which in turn can lead to cross-over in the functions and timing of processes, as well as sub-cycles (such as several rounds of editing and evaluation). From a quality perspective, federated responsibility has meant that quality procedures cannot limit themselves to the manager of each process, but instead they must include the wide spectrum of stakeholders who are involved in an OER's lifecycle, leading to the introduction of federated quality tools such as peer assistance and social ranking systems.

The shaking-up of the resource-production lifecycle, in particular the involvement of teachers, learners and evaluators in processes of co-production, reuse and repurposing offers significant opportunities to open up the entire learning architecture within formal education systems. We postulate that while a grassroots approach can go some way to opening up these learning architectures, appropriate

institutional strategies and policies are necessary to guide this evolution forward efficiently and effectively. To this end, we have proposed a tool for assessing the quality of these strategies and policies, and defined the role of the different actors critical to their success, namely policy-makers, institutional leaders, teachers and students.

The opening up of learning architectures is, in turn, leading to the unbundling of processes of course design, teaching, learning, assessment and recognition in formal education and the emergence of new modes of education such as MOOCs. In formal education, the quality of assessment and the recognition of awards based on these assessments is critical to recognising the quality of the teaching given and the learning achieved. We highlight that recognition and assessment tools have not yet fully evolved to take into account the new phenomena outlined above. Furthermore, developments in the field have the potential to bypass existing trust networks built up with formal education. There is therefore an urgent need to link developments in open education to the existing trust networks, so as not to reduce quality in the field.

We have argued that quality assurance of OER and OEP requires a complex mix of quality tools. In general, these tools enable many more users to be involved in the quality processes, and for a greater variety of learning scenarios to be taken into account. From the perspective of actors, the federation of responsibility described above has also led to a democratisation of the processes of quality review. In effect, this has led to the creation 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 made up of the existing trust-networks in publishing and formal education. In the evolution of quality approaches, the interaction between these standards and criteria applied by both networks will be an area of interest in coming years.

When we consider the role and use of open resources and practices (compared to other approaches) across education as a whole, the quality question is the same as it is for any educational approach – Does the use of OER/OEP improve the learning experience overall?

While we do not hazard to answer this question ourselves, we believe that the use of the tools which have been described in this chapter could allow all stakeholders in open education to answer this question in their own particular context.

4. RECOMMENDATIONS

The following recommendations have been derived by the authors from the analysis described in this report:

R1: Apply research into quality of OER and OEP

Challenge: Significant research has been done into aspects of quality for OER and OEP, as detailed in this report. As yet, this has not resulted in the creation of common standards of use and quality, except in the area of metadata.

Addressed to: Education and Training (quality) stakeholders, policy-makers

Recommendation: Research into quality aspects of OER should be translated into operative quality tools, such as quality standards / marks. The development and operation of such quality standards should be entrusted to stakeholder organisations in the field, and be promulgated jointly by governments, national standards bodies and stakeholder organisations.

R2: Address the fragmentation of high quality learning resources

Challenge: There is currently no single way or place to distinguish high quality learning resources from the rest of the open education resources available. Aside from the difficulties this creates for learners, teachers and course-designers to discover and use high quality resources, it also makes it impossible to assess the outcomes of policies intended to promote the creation of more resources.

Addressed to: Policy-makers, quality stakeholders

Recommendation: We recommend that European-level policy makers support the creation of 'learning exchanges' – specialised directories linking to only high-quality repositories, and using commonly agreed standards for classification and sharing. Since there is currently no agreed standard or quality mark for a 'high-quality' learning-object repository, we also suggest the implementation of a project to agree quality standards for such repositories to be included in the learning exchanges.

Special treatment should be given to (ECTS-equivalent) whole-course modules, in the form of MOOCs or other open education modules. These should be collected in a special learning exchange of their own.

R3: Help institutions nurture Open Educational Practices

Challenge: The current level of knowledge on institutions support strategies is insufficient to foster and ensure the mainstreaming of Open Educational Practices.

Addressed to: institutional leadership, policy-makers, researchers

Recommendation: Research into implementation of Open Educational Practices should be commissioned, in particular into the most effective strategies for deploying OEP in institutions. Best practice exchange around this topic should also be supported.

R4: Support quality recognition of Open Learning

Challenge: Unless it takes place as part of an existing course in a formal educational institution, learning using OER goes largely unrecognised. MOOCs provide 'credit' for their learning, but the large majority of them do not offer this credit in a currency that is widely recognised such as ECTS. While recognition of prior learning goes some-way to addressing these issues, it is overly complex, expensive and too unevenly implemented to be effective.

Addressed to: Legislators / policy makers, educational researches

Recommendation: In the first instance, institutions should be strongly encouraged to map any and all qualifications offered, whether by open learning or otherwise, to the European Qualifications Framework, and, within Higher Education, to make them ECTS-compliant.

Secondly, initiatives to share resources in the recognition of prior learning, should be piloted and deployed, so that the equivalency learning based on the same resources does not need to be checked on multiple occasions.

Thirdly, regulatory frameworks should allow for the unbundling of course design, provision and certification, so as to allow OER assessment to happen on a credit-equivalence basis by independent providers.

R5: Create methods to track reuse and repurposing

Challenge: There is currently no way to track the quantity or quality of reuse or repurposing of learning objects. This makes measurement of quality from this perspective impossible.

Addressed to: Standardisation bodies, technology developers

Recommendation: In the first instance, create a methodology for the structure of a European (or global) citation database applied to learning objects. The structure should include a number of indices to show successful authors / institutions / publishers / resources. Once a structure is developed, technological methods of automatically generating citation lists and counts, in line with current metadata standards, should be examined.

In the second instance, technological methods of determining the *extent* of reuse/repurposing of learning objects should be examined, (on the same principles as the GIT system used in software engineering), and integrated into the citation system mentioned above.

The creation of methods to track reuse and repurposing will provide a valuable indicator of quality of any learning object, using the same trust infrastructure as is used for scientific publication.

R6: Strengthen processes of peer-assistance and social ranking

Challenge: Processes of peer-assistance and social-ranking depend on the participation of the largest number possible of knowledgeable people to achieve the optimum result. Since reuse/repurposing of resources is still low, as is participation in editing solely for quality improvement processes, the ratio of consumers/editors needs to be shifted more strongly towards the editors.

Addressed to: Stakeholders, Education Managers, Teachers

Recommendation: Potential editors need to be familiarised with the principles and advantages of peer-assistance, use and reuse of resources. This should include collection of data on the perceived barriers to their use and reuse, and the addressing of those barriers through training courses, information campaigns, etc.

BIBLIOGRAPHY

Abdul Karim, A.H., Chaudhry, A.S., & Khoo, C. (2007). *Learning objects application profile for granularity and reusability: Integrating Dublin Core with IEEE-LOM*. In Proceedings of the International Conference on Dublin Core and Metadata Applications 2007 (DC 2007) (pp. 116-122)..

Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). *A review of the Open Educational Resources (OER) movement: Achievements, challenges, and new opportunities*. Creative common. Retrieved from http://www.hewlett.org/uploads/files/ReviewoftheOERMovement.pdf

Auvinen, A., & Ehlers, U. (2009). Handbook for Quality Management of Peer Production.

Bacsich, P., Pepler, G., Phillips, B., Camilleri, A. F., Op de Beeck, I., & Bristow, S. F. (2012). *Virtual Schools and Colleges: Providing Alternatives for Successful Learning*. (G. Pepler & P. Andries, Eds.) (Vol. 2). Roosbeek, Belgium: ATiT bvba. Retrieved from: http://www.virtualschoolsandcolleges.info/sites/default/files/VISCED_Handbook-Volume-2.pdf

Baumgartner, P. (2004). The Zen Art of Teaching-Communication and Interactions in Education. In *Proceedings of the International Workshop ICL2004, Villach/Austria* (Vol. 29, p. 2004). Retrieved from http://www.ro.feri.uni-mb.si/razno/icl2004/pdf/baumgartner.pdf

Beggan, A. (2010). Opening up: Staff attitudes to open learning. *Educational Policy and OpenCourseWare, Ocwc Global conference, Hanoi, Vietnam*. Retrieved from: http://webapps.nottingham.ac.uk/elgg/cczajb/files/-1/833/Opening%20up--staff%20attitudes%20to%20open%20learning.pdf

Bianco, A. M., De Marsico, M., & Temperini, M. (2005). *Standards for e-Learning*. Trondheim, Norway: TISIP Foundation.

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: Handbook I: Cognitive domain*. New York, USA: David McKay. Retrieved from: http://www.professorevans.net/uploads/EvansAppliedReadingGuide.pdf

Boyle, T., & Cook, J. (2003). Learning objects, pedagogy and reuse. Learning technology in transition. From individual enthusiasm to institutional implementation, 31–44.

Browne, T., Holding, R., Howell, A., & Rodway-Dyer, S. (2010). The challenges of OER to Academic Practice. *Journal of Interactive Media in Education*, *2010*(01). Retrieved from: http://www-jime.open.ac.uk/jime/article/viewArticle/2010-3/html

Camilleri, A. F., Ferrari, L., Haywood, J., Maina, M., Pérez-Mateo, M., Montes, R., Tannhäuser, A. (2012). *Open Learning Recognition: Taking Open Educational Resources a Step Further*. (A. F. Camilleri & A. Tannhäuser, Eds.). Belgium: EFQUEL – European Foundation for Quality in e-Learning. Retrieved from http://openaccess.uoc.edu/webapps/o2/handle/10609/21341

Camilleri, A. F., & Tannhäuser, A.-C. (2013). Assessment and Recognition of Open Learning. In *Openness and Education* (Vol. 1). Emerald Group.

Carneiro, R., Lefrere, P., & Steffens, K. (2011). *Self-regulated learning in technology enhanced learning environments: A European perspective* (Vol. 5). Springer. Retrieved from: http://www.google.com/books?hl=en&lr=&id=OoP9M3ZOcLIC&oi=fnd&pg=PR5&dq=Self-regulated+Learning+in+Technology+Enhanced+Learning+Environments:+A+European+Perspective&ots=VmSTIPoi1S&sig=iVkWKkPWqaV2n35AtNU0jZ9MJew

Churches, A. (2009). *Bloom's digital taxonomy*. Retrieved from: http://montgomeryschoolsmd.org/uploadedFiles/departments/techtraining/homepage/BloomDigitalTaxonomy2001.pdf

Clements, K. I., & Pawlowski, J. M. (2012). User-oriented quality for OER: understanding teachers' views on re-use, quality, and trust. *Journal of Computer Assisted Learning*, *28*(1), 4–14.

Clow, D. (2013). MOOCs and the funnel of participation. Presented at the Third Conference on Learning Analytics and Knowledge, Leuven, Belgium. Retrieved from: http://oro.open.ac.uk/36657/

Commonwealth of Learning – Open CourseWare and OERs. (n.d.). *Commonweatlh of Learning.* Retrieved June 15, 2013, from: http://www.col.org/resources/crsMaterials/Pages/OCW-OER.aspx

Conole, G., & Weller, M. (2008). Using learning design as a framework for supporting the design and reuse of OER. *Journal of Interactive Media in Education, 2008*(1). Retrieved from:
 http://www-jime.open.ac.uk/jime/article/viewArticle/2008-5/335

Conole, G., Ehlers, U., Connely, T., Santos, A. I., Mundin, P., Veith, P., & Richter, T. (2010). *Scope of Desk Research and Case Study Identification* (No. D3.1). Milton Keynes, UK: Open University. Retrieved from:
http://www.oer-quality.org/wp-content/uploads/2012/02/D3.1_Desk_Research_and_Case_study_identification_FinalPrint_Public.pdf

Conole, G., & McAndrew, P. (2010). A new approach to supporting the design and use of OER: Harnessing the power of web 2.0, M. In M. Edner & M. Schiefner (Eds.), *Looking toward the future of technology enhanced education: ubiquitous learning and the digital nature.* Retrieved from http://www.e4innovation.com/share/conole_mcandrew_shum_chapter_edner_book_v3.doc

Conole, G., Ehlers, U., Connely, T., Santos, A. I., Mundin, P., Veith, P., & Richter, T. (2010). *Scope of Desk Research and Case Study Identification* (No. D3.1). Milton Keynes, UK: Open University. Retrieved from:
http://www.oer-quality.org/wp-content/uploads/2012/02/D3.1_Desk_Research_and_Case_study_identification_FinalPrint_Public.pdf

Conole, G. (2013, June). A new classification for MOOCs. *MOOC Quality Project.* Retrieved from:
http://mooc.efquel.org/a-new-classification-for-moocs-grainne-conole/

Dave, R. (1967). Psychomotor domain. In Berlin: International Conference of Educational Testing

Devedžič, V., Šćepanović, S., & Kraljevski, I. (2011). *E-Learning benchmarking methodology and tools review* (Project Deliverable No. 1.3). Serbia: University of Kragujevič. Retrieved from:
http://www.dlweb.kg.ac.rs/files/DEV1.3%20EN.pdf

EC. (2009). *ECTS Users' Guide.* Luxembourg: Office for Official Publications of the European Communities. Retrieved from:
http://ec.europa.eu/education/lifelong-learning-policy/doc/ects/guide_en.pdf

EC. (2012). *Rethinking Education: Investing in skills for better socio-economic outcomes* (Communication from the Commission No. COM2012(669)). Strasbourg, France.

ECA. (2013). *Learning Outcomes in Quality Assurance and Accreditation: Principles, Recommendations & Practice* (Project Report). European Consortium for Accreditation in Higher Education. Retrieved from http://www.ecaconsortium.net/admin/files/assets/subsites/1/news/1372260000_eca-wg4-document-on-lo-final.pdf

EFQM. (2009). EFQM Model 2010: Achieving Excellence. European Foundation for Quality Management. Retrieved from: http://www.efqm.org/sites/default/files/triptych.pdf

EFQUEL – European Foundation for Quality in e-Learning (2011). *UNIQUe Information Package.* (Quality Manual). Belgium: European Foundation for Quality in e-Learning. Retrieved from:
http://cdn.efquel.org/wp-content/blogs.dir/5/files/2012/09/UNIQUe_guidelines_2011.pdf

Ehlers, U.-D. (2011). From Open Educational Resources to Open Educational Practices. *E-learning papers, 23*, 1–8.

Ehlers et al. (2011): Beyond OER: Shifting Focus from Resources to Practices. Lisbon, Essen

Ehlers, U.D., (2013): *Quality and Assessment for Open Learning Cultures*, Springer, heidelberg, New York

ENQA. (2009). *Standards and guidelines for quality assurance in the European Higher Education Area* (3rd ed.). Helsinki, Finland: European Association for Quality Assurance in Higher Education. Retrieved from http://www.enqa.eu/files/ESG_3edition%20(2).pdf

Hill, P. (2012). *Online Educational Delivery Models: A Descriptive View.* EduCause Review, 47(6), 84–97. Retrieved from: http://net.educause.edu/ir/library/pdf/ERM1263.pdf

Hodgkinson-Williams, C., & Gray, E. (2009). Degrees of openness: The emergence of Open Educational Resources at the University of Cape Town. *International Journal of Education and* Development *using ICT*, *5*(5). Retrieved from http://www.editlib.org/p/42198/

Iiyoshi, T., & Kumar, M. V. (2008). Opening up education: The collective advancement of education through open technology, open content, and open knowledge. MIT Press.

Ischinger, B. (2007). Giving Knowledge for Free: The Emergence of Open Educational Resources. OECD.

ISO. (2009). *Selection and Use of the ISO 9000 family of standards*. Geneva, Switzerland: ISO Central Secretariat. Retrieved from: http://www.iso.org/iso/iso_9000_selection_and_use-2009.pdf

ISO. (2012). *ISO 26324:2012 Information and documentation -- Digital object identifier system* (Standard). Geneva, Switzerland: International Standardization Organisation.

Kahle, D. (2008). Designing open educational technology. In *Opening up education: The collective advancement of education through open technology, open content, and open knowledge* (pp. 27–45). Retrieved from:
http://www.google.com/books?hl=en&lr=&id=gWrHFmAYX5EC&oi=fnd&pg=PA27&dq=Designing+Open+Educational+Technology&ots=AKDiuX_oeW&sig=BRg1maTDY_LngJ3_ZRn0-LhvxxA

Keller, P., and Mossink, W. (2008), Reuse of material in the context of education and research.

Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *The International Review of Research in Open and Distance Learning*, *9*(3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/523

Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). *Taxonomy of Educational Objectives, Handbook II: Affective Domain*. New York, USA: David McKay Company.

Lane, A. (2010). Who puts the Education into Open Educational Content? In *The tower and the cloud: Higher education in the age of cloud computing*. Educause. Retrieved from:
http://net.educause.edu/ir/library/pdf/PUB7202.pdf

Laurillard, D. (2002). Rethinking university teaching: A conversational framework for the effective use of learning technologies. Psychology Press.

Manouselis, N., & Sampson, D. (2004). Recommendation of quality approaches for the European Quality Observatory. In *Advanced Learning Technologies, 2004. Proceedings. IEEE International Conference on* (pp. 1082–1083). Retrieved from:
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=1357761

Margulies, A. (2005). MIT Opencourseware–A New Model for Open Sharing. In *Presentation at the OpenEd Conference at Utah State University, September*.

Masie, E. (2001). *E-learning:"If we build it, Will they come?"* Alexandria, Virginia: The Masie Centre and ASTD Report.

Mayes, T., & de Freitas, S. (2004). e-Learning Models desk study, Stage 2: Review of e-learning theories, frameworks and models.

McAndrew, P., Santos, A., Lane, A., Godwin, S., Okada, A., Wilson, T., Connoly, T., Ferreira, G., Buckingham Shum, S., Bretts, J. (2009). OpenLearn [CS4] research report 2006-2008. Retrieved from:
http://oro.open.ac.uk/17513/

McGill, L., Currier, S., Duncan, C., & Douglas, P. (2008). *Good intentions: improving the evidence base in support of sharing learning materials* (Project Report). JISC. Retrieved from:
https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/goodintentionspublic.pdf

McGill, L., Beetham, H., Falconer, I., & Littlejohn, A. (2010). *UKOER Pilot Programme Synthesis And Evaluation Report*. Retrieved from:
http://www.caledonianacademy.net/spaces/oer/index.php?n=Main.PilotProgrammeSynthesisAndEvaluationReport

McGreal, R. (2004). Learning objects: A practical definition. *International Journal of Instructional Technology and Distance Learning (IJITDL)*, *9*(1). Retrieved from: http://auspace.athabascau.ca/handle/2149/227

Montes, R., de Cordoba, J. M., Bailón, A., Blanco, I. J., & Camilleri, A.F. (2012). The OERtest Clearinghouse. In *Proceedings of Cambridge 2012: Innovation and Im-pact-Openly Collaborating to Enhance Education* (p. 534). Retrieved from: http://www.academia.edu/download/30867247/Conference_Proceedings_Cambridge_2012.pdf#page=542

Mikušová, M., & Janečková, V. (2010). Developing and Implementing Successful Key Performance Indicators. *Proceedings World Academy of Science, Engineering and Technology. Paris*, (66), 1231–1243.

Nash, S. (2005). Learning objects, learning object repositories, and learning theory: Preliminary best practices for online courses. *Interdisciplinary Journal of E-Learning and Learning Objects*, *1*(1), 217–228.

Nesbit, J., Belfer, K., & Vargo, J. (2002). A convergent participation model for evaluation of learning objects. *Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie*, *28*(3). Retrieved from: http://cjlt.csj.ualberta.ca/index.php/cjlt/article/viewArticle/110

Neven, F., & Duval, E. (2002). Reusable learning objects: a survey of LOM-based repositories. In *Proceedings of the tenth ACM international conference on Multimedia* (pp. 291–294). Retrieved from: http://dl.acm.org/citation.cfm?id=641067

North, K., Reinhardt, K., & Sieber-Suter, B. (2012). Kompetenzmanagement in Der Praxis: Mitarbeiterkompetenzen Systematisch Identifizieren, Nutzen Und Entwickeln Mit Vielen Fallbeispielen. Gabler. Retrieved from: http://books.google.com/books?hl=en&lr=&id=t1yLSycfQboC&oi=fnd&pg=PA5&dq=north+kompetenzmanagment&ots=38TU-Me86f&sig=l-tduvQRa4qc0Ktkm8_INQI9gAI

OECD. (2012). *Education at a Glance 2012: OECD Indicators*. OECD Publishing. Retrieved from http://dx.doi.org/10.1787/eag-2012-en

Pavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of educational research*, *74*(4), 557–576.

Pawlowski, J. M. (2007). The quality adaptation model: Adaptation and adoption of the quality standard ISO/IEC 19796-1 for learning, education, and training. *JOURNAL OF EDUCATIONAL TECHNOLOGYAND SOCIETY*, *10*(2), 3.

Pawlowski, J. M., & Clements, K. I. (2010). Implementing quality standards for knowledge-intensive organizations. *Journal of Technology, Instruction, Cognition and Learning (TICL)*, *7*, 295–314.

Pawlowski, J.M., Camilleri, A.F., Conole, G., Creelman, A., Ehlers, U._D. (2013). OER Quality 2030. In: Open Education 2030. Part III: HIGHER Education, IPTS, Sevilla, 2013.

Philip, R., Lefoe, G., O'Reilly, M., & Parrish, D. (2008). A peer review model for the ALTC Exchange: contributing to the landscape of shared learning and teaching resources. Retrieved from: http://epubs.scu.edu.au/tlc_pubs/175/

Pirkkalainen, H., Pawlowski, J.M. (2010). Open Educational Resources and Social Software in Global E-Learning Settings. In: Yli-Luoma, P. (ed.), Sosiaalinen Verkko-oppiminen, pp. 23-40, IMDL, Naantali, 2010.

Pirkkalainen, H., & Pawlowski, J. (2013). Global Social Knowledge Management: From Barriers to the Selection of Social Tools. *Electronic Journal of Knowledge Management*, *11*(1). Retrieved from http://www.ejkm.com/issue/download.html?idArticle=379

Saisana, M. & Tarantola, S., (2002), State-of-the-art report on current methodologies and practices for composite indicator development, EUR 20408 EN, European Commission-JRC: Italy.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3–10.

Sotiriou, S., Koulouris, P., Kouris, F., Zygouritsas, N., Borotis, S., Kastis, N., Kalamatianos, A. (2010). Towards the Development of a Common Digital Repository for Formal and Informal Science Education. Retrieved from: http://www.ea.gr/ep/osr/material/D-%202.1%20OSR%20Educational%20Design.pdf

Tannhäuser, A. (2012). General Reflection on Open Learning Recognition. In A. F. Camilleri & A. Tannhäuser (Eds.), *Open Learning Recognition: Taking Open Educational Resources a Step Further* (pp. 59–62). Brussels, Belgium: EFQUEL – European Foundation for Quality in e-Learning. Retrieved from http://lippe.ehs.unu.edu/file/get/10922.pdf

UNESCO (2002),'Forum on the Impact of Open Courseware for Higher Education in Developing Countries' in 2002, report available online at http://portal.unesco.org/ci/en/ev.php-URL_ID=5303&URL_DO=DO_TOPIC&URL_SECTION=201.html, last accessed 21/04/10.

Vollmer, T. (2012, November 1). Keeping MOOCs Open – Creative Commons. Retrieved May 30, 2013, from https://creativecommons.org/weblog/entry/34852

Van Assche, F., & Vuorikari, R. (2006). A framework for quality of learning resources. In *Handbook on quality and standardisation in E-learning* (pp. 443–456). Springer. Retrieved from http://link.springer.com/content/pdf/10.1007/3-540-32788-6_29.pdf

Van Vught, F. A., & Westerheijden, D. F. (1994). Towards a general model of quality assessment in higher education. *Higher Education*, *28*(3), 355–371.

Vuorikari, R., Manouselis, N., & Duval, E. (2008). Using metadata for storing, sharing and reusing evaluations for social recommendations: the case of learning resources. *Social information retrieval systems: Emerging technologies and applications for searching the web effectively*, 87–107.

Weller, M. (2010). Big and little OER. Presented at the OpenEd, Barcelona. doi:http://hdl. handle. net/10609/4851

Wiley, D. A. (2000). Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In *The instructional use of learning objects.* Bloomington: Association for Educational Communications and Technology. Retrieved from http://www.reusability.org/read/chapters/wiley.doc

Wilkinson, D. M., & Huberman, B. A. (2007). Assessing the value of coooperation in wikipedia. *arXiv preprint cs/0702140*. Retrieved from: http://arxiv.org/abs/cs/0702140

Williams, K., Kear, K., & Rosewell, J. (2012). *Quality Assessment for E-learning: a Benchmarking Approach* (2nd ed.). Herleen, The Netherlands: European Association of Distance Teaching Universities. Retrieved from http://oro.open.ac.uk/34632/

Windle, R. J., Wharrad, H., McCormick, D., Laverty, H., & Taylor, M. G. (2010). Sharing and reuse in OER: experiences gained from open reusable learning objects in health. *Journal of Interactive Media in Education*, *2010*(01). Retrieved from http://jime.open.ac.uk/jime/article/viewArticle/2010-4/html

Wood, D., & Wood, H. (1996). Vygotsky, tutoring and learning. *Oxford review of Education*, *22*(1), 5–16.

Step 1: Positioning your personal experiences with and exposure to OER in the OEP Trajectory

OEP consists essentially of the use of open educational resources in open learning environments/ architectures. The maturity matrix enables you to position yourself in terms of your level of OEP maturity.

STEP 1: Positioning	Not yet started	Early stages/ awareness	Developing/ Commitment	Established	Embedded/ Advanced
1. What is your level of expertise in terms of OER?	No knowledge or experience	Some awareness	Knowledge of OER existing initiatives	Good understanding	Expert knowledge
2. To what extent are you using OER?	No use	A little use	Use regularly to support my teaching	Not only use but repurposing of OER	Significant use and repurposing
3. To what extent are you sharing OER and practices?	Not sharing at all	Small amount of sharing	Significant sharing	Regular sharing of both OER and associated practices	Sharing of innovative practices on the creation and use of OER
4. To what extent are you using technologies for the creation and repurposing of OER?	No use of technologies	A little use	Significant use	Regular and innovative use of technologies to create and share OER	Cutting edge development and use of technologies

Step 2: Creating a Vision of Openness and a Strategy for OEP in your Educational Context

We believe that OEP that can be supported through strategic planning. This second part of the OEP guideline helps you to better understand the strategy within your own educational context. This section is designed to analyse your strategic environment in relation to relevant dimensions of an open educational practice strategy for your practice

STEP 2: Vision and Strategy	Not yet started	Early stages/ awareness	Developing/ Commitment	Established	Embedded/ Advanced
1. Do you have vision for how to use OER in your teaching?	No vision	An emerging vision of how to use OER in teaching.	A good understanding of how to use OER in teaching.	A well-developed vision for use of OER in teaching	An innovative and applied vision for use of OER in teaching.
2. Are OEP embedded in your practice?	No use of OER	Some use of OER	Regular use of OER in teaching.	Significant use of OER in teaching	Sustained and innovative use of OER in teaching.
3. What types of pedagogical approaches are you using with your OER?	No use of OER	Some use of OER, to supported mainly didactic pedagogical approaches.	Range of different pedagogical approaches in the use of OER to support different forms of learning.	Advanced pedagogical approaches in the use of OER including constructivist and socially situated approaches	Innovative and varied pedagogical approaches to the use of OER.
4. Are you involved in any partnerships and/or networks to exchange with other educational professionals about OEP?	No partnerships within the organization or with other colleagues exist with regard to OEP.	Informal links between colleagues and/or teams in relation to OEP exist within my organization.	I have established links between colleagues within our organization to exchange about OEP. We even begin to develop a small number of OEP partnership-projects.	Within my professional context we have now several ongoing and successful partnerships and/or alliances with colleagues to exchange and support the use of OEP.	There are social networks and partnerships to share, co-create and exchange experience and practices on OEP with colleagues.
5. Do you perceive OEP as relevant across the organization?	I do not view OEPs as relevant to my professional context.	I view OEP as relevant to some extent.	Apart from me we have some teams and groups within the organization which start to view OEP as relevant to their own learning/ teaching context.	Me and my colleagues across the entire organization perceive OEP as relevant and desired practices.	OEPs are perceived as a relevant part of the organizations professional work and are communicated as such to professionals, learners, outside partners and clients.

Step 3: Implementing and Promoting OEP to transform learning in your educational context

The following section contains dimensions, which are important to create a favourable environment for OEP within your educational context.

STEP 3: Implementation and Promotion	Not yet started	Early stages/awareness	Developing/Commitment	Established	Embedded/Advanced
1. How aware are you of IPR, DRM and copyright regulations for the use of OER?	No knowledge or experience	Some awareness	Basic understanding	Good understanding	Expert knowledge
2. Is there a motivational framework for OEP in existence (e.g. incentives)?	There are no incentives for OEP.	Individuals are motivated to develop and (re-)use OER and use open learning architectures.	Motivation to develop and (re-)use OER and Open Educational Practices on a department or team level is simulated through incentives	Incentives to stimulate the transformation of educational scenarios and resources into OEP exist on an organizational level.	OEP is supported through an organization-wide motivation framework.
3. Do you have tools to support sharing and exchanging information about Open Educational Practices?	No tools for supporting the sharing of Open Educational Practices (e.g. social networks, blogs, etc.) exist.	I am starting to use tools for sharing Open Educational Practices (e.g. social networks, blogs, etc.).	Together with colleagues we are adopting tools for sharing and exchange of information about educational practices (e.g. social networks, blogs, etc.).	Use of digital tools to support sharing and exchange about OEP are a widespread reality amongst me and my colleagues.	The use of digital tools which support sharing and exchange of information about OEP are embedded into my everyday work as an educational professional.
4. Do you have quality processes in place for your OER?	No quality processes in place	Limited amount of quality control	Good level of quality control	Robust quality processes in place	Quality processes are shared and validated with peers
5. What level of knowledge and skills do you have in relation to open learning architectures and OEP?	I have little or no understanding of open learning architectures.	Some of my colleagues and me have sufficient knowledge to apply OEP.	Knowledge and skills to apply open learning architectures within the organization's educational programs are beginning to diffuse from a handful of to teaching staff more generally.	A significant number of teachers across the whole organization have the skills and confidence to successfully apply open learning architectures.	The vast majority of teaching staff have the knowledge, skills and confidence to successfully and appropriately apply open learning architectures. New open learning architectures are actively developed within the institution.
6. What is your level of digital literacy skills	Basic understanding and use of technologies	Some awareness of social and participatory media	Increasing use of innovative technologies to support teaching	Regular and established use of a range of technologies to support teaching	Innovative and cutting edge use of technologies to support teaching
7. Do you receive any support to develop your OEP?	No support	Some basic training is available	Suite of training opportunities	Advanced support for the creation and use of OEP	Expert knowledge and provide support on the creation and use of OEP to peers

Ref	Name of Initiative	Website of Initiative	Summary Profile of Initiative[11]
CS1	Campus Content	http://www.campuscontent.de	http://www.oer-quality.org/campuscontent/
CS2	CCCOER: The Community College Consortium for Open Educational Resources	http://oerconsortium.org	http://www.oer-quality.org/cccoer-the-community-college-consortium-for-open-educational-resources/
CS3	OpenER, a Dutch initiative in Open Educational Resources	N/A	http://www.oer-quality.org/opener-a-dutch-initiative-in-open-educational-resources/
CS4	OpenLearn	http://www.open.edu/openlearn/	N/A
CS5	EdShare	http://www.edshare.soton.ac.uk/	N/A
CS6	OpenExeter	http://blogs.exeter.ac.uk/oer/	http://www.oer-quality.org/openexeter/
CS7	GITTA – Geographic Information Technology Training Alliance	http://www.gitta.info/website/en/html/index.html	
CS8	AVO/SOMETU - Sosiaalinen Media Oppimisen Tukena	http://sometu.ning.com	http://www.oer-quality.org/avo-and-sometu-open-networks-for-learning/
CS9	EducaNext	http://www.educanext.org	http://www.oer-quality.org/educanext/
CS10	KELDAmed	http://www.umm.uni-heidelberg.de/apps/bibl/KELDAmed/	http://www.oer-quality.org/keldamed-2/
CS11	PodCampus	http://www.podcampus.de	http://www.oer-quality.org/podcampus-3/
CS12	NDLR – National Digital Learning Resources	http://www.ndlr.ie	N/A
CS13	Unisulvirtual	http://labspace.open.ac.uk/course/view.php?id=3194	http://www.oer-quality.org/unisulvirtual/
CS14	U-Now	http://unow.nottingham.ac.uk/	http://www.oer-quality.org/u-now-university-of-nottingham/
CS15	ZUM-Unity	http://unity.zum.de/	
CS16	Wikiwijs	http://www.wikiwijsleermiddelenplein.nl/	http://www.oer-quality.org/wikiwijs/
CS16	Skriptenforum	https://skriptenforum.net/wiki/Hauptseite	N/A
CS17	MatheVital – Virtual Interactive Tools for Advanced Learning	http://www-m10.ma.tum.de/bin/view/MatheVital/	N/A
CS18	OpenSpires	http://openspires.oucs.ox.ac.uk/	http://www.oer-quality.org/openspires-%E2%80%93-oxford-university/
CS19	OLNet	http://olnet.org	http://www.oer-quality.org/olnet/
CS20	NROC – National Repository of Online Courses	http://www.montereyinstitute.org/nroc/	
CS21	BCcampus	http://www.bccampus.ca	http://www.oer-quality.org/bccampus-oer/

---

[11] This column links to case-study fiches collected by the OPAL project which studied many of the initiatives in detail in 2011.

Abstract

The need for quality assurance mechanisms to support the development and sustainable use of Open Educational Resources (OER) are being raised in the literature and in European and national policy documents as a major challenge and opportunity. There is however, only little experience and consensus in research and practice on how to define and approach quality for OER, in contrast with quality assurance related to eLearning for instance. The notion of openness is posing additional challenges. The aim of this report is to provide an overview of Quality approaches and concepts for OER and to some extent, Open Education, with the aim to identify policy options for action at EU and Member State level to further promote the development and use of OER in Europe. The focus for the overview is on Higher Education in the context of Open Education as announced in the Commission Communication on "Rethinking education: Investing in skills for better socio-economic outcomes" (EC, 2013).

This report introduces quality concepts and approaches related to OER. It provides an overview of definitions of quality for OER and suggests a conceptual mapping as well as an overview of major issues related to quality for OER. Where appropriate, it gives examples of relevant existing practices and initiatives to illustrate the conceptual mapping. It also provides insights on the role of different actors and institutions involved in quality and OER. Finally, the report provides recommendations for policymakers at European and Member States level on quality assurance and OER with the aim to support the further development and use of OER in Europe.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.

Publications Office