

Fostering the Exploitation of Open Educational Resources

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Abstract

The central concept behind Open Educational Resources (OER) is opening up the access to educational resources for stakeholders who are not the usual target user group. This concept must be perceived as innovative because it describes a general economic and social paradigm shift: Education, which formerly was limited to a specific group of learners, now, is promoted as a public good. However, despite very good intentions, internationally agreed quality standards, and the availability of the required technological infrastructure, the critical threshold is not yet met. Due to several reasons, the usefulness of OER is often limited to the originally targeted context. Questions arise if the existing quality standards for Technology Enhanced Learning (TEL) actually meet the specific requirements within the OER value chain, if the existing quality standards are applicable to OER in a meaningful way, and under which conditions related standards generally could support the exploitation of OER.

We analyze quality standards for TEL and contrast the life cycle model of commercial learning resources against the life cycle model of OER. We investigate special demands on quality from the context of OER and, taking the former results into account, derive emergent quality criteria for OER. The paper concludes with recommendations for the design of OER and a future standard development.

Keywords: Life Cycle Model; Open Educational Resources; Prosumer Model; Quality; Quality Concept; Technology Enhanced Learning

Introduction

In recent years, the concept of openness in education has attracted substantial attention (Downes, 2005) with support from national and international institutions and organizations, e.g. the William and Flora Hewlett Foundation, UNESCO, MIT and the Open University UK; “Openness” in this context is related to sharing educational resources as well as experiences and knowledge between all stakeholders in the educational sector. Peter and Deimann (2013) introduce the long history and role of the concept of openness in education and Atkins, Brown and Hammond (2007) comprehensively describe the development of the OER movement and discuss some key-achievements. The Commonwealth of Learning (COL, n. d.) describes Open Educational Resources (OER) as “*materials offered freely and openly to use and adapt for teaching, learning, development and research.*” In contrast to this very wide definition, which includes printed material as well as applications that support the production, management, and use/reuse of learning contents, the definition of Conole and McAndrew (2009) limits OER to digital learning materials that are freely available for use and repurposing. For this paper, the latter definition was adopted.

For the context of India, Kumar (2009) claims that the current way in which traditional education is being organized will not meet the growing demands to develop a society of knowledge. D’Antoni (2007) promotes OER as a possible solution, recognizing the potential to play a central role in achieving educational justice in the world. The study from Benavot (2011) implies that even if shared educational standards were internationally implemented, these would revolve around routines and basic skills but diverge when it comes to more cognitively demanding tasks. We argue that the sheer availability of OER could already prove a definitive solution.

During the past decade, the European Commission has funded several projects, which dealt with the production, collection, presentation, quality, and management of OER. Just to name some related projects “[Ariadne](#)¹” (on-going), “[OrganicEdunet](#)²” (ended 2010), and “[Open Science Resources](#)³” (ended 2011) focused on metadata and building repositories of already existing OER; “[Concede](#)⁴” (ended 2010) investigated approaches for the production and development of a quality concept for User Generated Content; “[QMPP](#)⁵” (ended 2007) dealt with Quality Management for Peer Production of E-Learning; “[OERTest](#)⁶” (ended 2012) analysed the assessment of learning achieved through OER; “[OpenDOAR](#)⁷” (ended 2011) collected and described international OER repositories; “[OPAL](#)⁸” (ended 2012) fostered Open Educational Practices and developed guidelines for stakeholders involved in education; “[ROLE](#)⁹” (started 2014) supports teachers in developing the open personal learning environments for self regulated learning; “[Open Discovery Space](#)¹⁰” (started 2012) focuses on school education: providing a community platform for open knowledge-exchange amongst teachers, indexing approximately 1,5 million Europe-wide distributed learning resources and practically supporting teachers with tools and guidelines.

The Open Educational Quality Initiative (OPAL) investigated barriers to the use of OER in the context of Higher Education. This investigation was driven by the insight that a critical extent of using OER was not met (Cantoni, Cellario & Porta, 2004); despite the successful promotion of the idea that knowledge is a public good (Smith & Casserly, 2006) and the availability of great amounts of highest quality resources. OPAL revealed three issues as the major barriers to using OER, two were related to policy makers as these were a “missing reward system” (strongly supported through the study of Koppi, Bogle & Lavitt, 2004 and Schellenbach-Zell & Gräsel, 2010) and the “not-invented-here syndrome,” which actually reflects the lecturers’ fear of loosing the reason to hold ones own position (Andrade et al., 2010). Solving the latter issue is more than just related to policies, as it requires a fundamental paradigm-shift of the understanding of the role of a lecturer (Keyser & Broadbear, 2010). We promote the idea that a lecturer should hold ones position due to unique experiences and the particular ability to share these with the learners. The third major barrier that OPAL revealed was a lack of trust on the appropriateness of OER (Andrade et al., 2010); the significance of this has been confirmed by Alevizou (2012).

This paper focuses on the usability of OER as a source for special quality demands. It will be shown that the concept of “knowledge as a common good” induces different and additional criteria to those that hitherto are addressed within the existing quality standards. Eventually, some easy to follow recommendations will be provided on how the use and particularly the repurposing of OER can be fostered.

Quality Standards for Technology Enhanced Learning

When thinking about the quality of learning resources, quality standards come to mind. The International Organization for Standardization (ISO) defines quality as the “*degree to which a set of inherent characteristics fulfils requirement*” (van Nederpelt, 2013) and “standard,” as “*a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose*” (ISO n. d.). Montandon (2004) understands standards as sets of criteria, which at least need to be met by products, methods, or processes. Adelsberger and Pawlowski (2001) highlight the necessity for implementing standards in the field of TEL because the underlying constitutive consensus between the various stakeholders facilitates accessibility, adaptability, exchangeability, compatibility, system- and platform independence, reusability, findability, sustainability, expandability, usability, and economic efficiency.

In the context of TEL, various quality standards are related to the design, creation, provision, and management of educational resources. Further standards deal with technology-related issues, such as, implementation guidelines for Learning Management Systems (e.g. SCORM; Jesukiewicz, 2009). In the following, selected standards are being introduced that focus on the quality of learning contents and scenarios.

- “Dublin Core” (DCMI, 2012) is an initiative that fosters the unified description of learning contents through metadata, i. e. the Dublin Core Metadata Terms.
- The international standard “Learning Objects Metadata” (IEEE, 2002) particularly deals with the description of course content and course requirements.
- “IMS Learning Design” (IMS LD, 2003) supports producers to systematically define didactical aspects of learning contents and related scenarios.
- The “IMS Content Packaging Information Model” (IMS CPIM, 2004) defines criteria on how learning contents should be structured to ensure their exchangeability.
- The “ISO/IEC 10796-1:2005” (ISO, 2005) defines a structured process-model on how TEL systematically can be developed and designed through all production steps, starting with the needs analysis and ending with the analysis of feedback regarding implemented resources. The concept of quality behind this approach is to ensure that all related design decisions are fully transparent.
- The “IMS Learner Information Package” (IMS LIP, 2005) specifies particular characteristics of learners. The IMS LIP provides a facility to add content to individual learner profiles, e.g. certificates awarded within the OER, and thus enhances the communication between different learning environments. These characteristics can be stored and managed either within target group profiles or individual learner profiles.
- The international standard “ISO-IEC 19788-2:2005” (ISO, 2011) focuses on the description of educational resources through metadata.

Learning resources usually are being produced for a very particular context, such as a Project Management course for university students of Information Systems in the third semester in Germany. For commercial educational resources, the above briefly introduced standards are perfectly suitable to comprehensively describe related scenarios (context & content): a user in a very similar scenario who searches the Internet for such an educational resource, will be able to find it by using the corresponding key words in a search engine. This user will also be able to reuse it if the required technological conditions are met; given that the resource is accessible through the Internet and the corresponding metadata were properly and comprehensively defined and attached by the original authors or the hosting service providers.

Production, Use and Repurposing OER

A key success factor for OER is that such educational resources can be found and used by anyone, anywhere in the world in whatever educational context. However, the producer originally designed the educational resource with a certain purpose and targeted a specific user-context. A stakeholder looking for already existing OER that are to be reused in his particular context (in the following referred to as “re-purposer”) is very unlikely to find one, which exactly matches all context-specific requirements. Customizing of OER appears to be obligatory in such a scenario (Dichev & Dicheva, 2012); at least if the resources are to be reused for teaching purposes. This process of re-purposing changes the “traditional” life cycle model of learning resources (Fulantelli, Gentile, Taibi & Allegra, 2008). The formerly single-source production scenario for traditional learning resources

becomes, over time, a peer-production scenario. Open learning resources do not reach their peak of maturity at a particular point of time, which is when a traditional learning resource is not changed anymore in terms of e.g., new book releases. Instead, they are continuously being further developed, i. e., improved, repurposed, and eventually re-published in new versions.

In contrast to professional educators who would apply changes to a fund resource in order to make it best possible fitting for their educational purposes and context, an individual learner will probably just select the closest fitting OER found and accept the deviation from what he/she is used to and/or familiar with. Thus, we exclude this particular case from the following discussions.

Processes and motivators for the production and reuse of educational resources in commercial and open scenarios

In order to determine individual requirements that arise when already existing OER are to be repurposed and which demands for quality are realistic, processes and motivations around the production and repurposing of OER need to be investigated. In the following, the contexts of commercial production and the use of commercially produced learning resources are contrasted against the contexts of OER-production and the repurposing of OER.

In the commercial production of learning resources (usually commissioned work), a list of requirements is provided including a description of the expected content, the targeted context, the design, and demanded quality criteria; the resource is being produced accordingly. Commercially produced learning resources, if not exclusively produced for a single customer, usually must be generic enough to meet the requirements of a particular scenario and/or a group of learners, so that they can repeatedly be sold. The producer, usually a professional author, is a domain expert, experienced in the use of authoring tools and media, is familiar with related standards, legal issues, and licenses, and eventually gets paid for the completed result.

In contrast to this scenario, the usual producer of OER is not a fully professional author but a practitioner and user himself e.g., a teacher or a professor. Such a practitioner, first of all, produces the educational resource in preparation for their own lecture; because of a current need: The required educational resource is not yet or not easily available for purchasing. Even though this person is professional in terms of educational issues (didactics, pedagogy) and highly familiar with the topic and the targeted context, the media- and technology-related competences might be less developed than those of a professional author, as well as the knowledge about legal issues and quality standards (Hylén, 2009b). Moreover, the final result just needs to be good enough for their own purpose; transferability and reusability are no focal goals in this context. Further, the OER-producer might not have the need for a successful exploitation and thus, will probably put less effort into the documentation through metadata.

In order to discuss issues around the quality of OER and the appropriateness of such issues, one needs to take into account a very general issue, which is that OER often are not planned to become OER during the production process; instead, they originally are designed as learning resources for a single situation and context. After the resource production is completed and the resource has successfully been used in the targeted context, the author of a particular learning resource might decide that it also could be helpful for others and thus good enough to be shared: The original author selects and applies an open license and makes the resource available for public access through the Internet. This is the moment for the formerly private resource becomes an OER. Toffler (1990) speaks of a "*Prosumer Model*" when a consumer becomes a producer and/or provider. Related to the Web 2.0 movement and the Open Access movement, Bruns (2008) extends this term by defining the concept of "Produsage," which includes the manipulation and republishing of (changed) resources.

The user who purchases a commercially produced educational resource (“customer”) usually has to pay, among other things, for exclusively produced content. If others have already used such content or if it is designed to be used multiple times in similar scenarios, the retailer will likely reduce the cost. Other cost drivers could be required, e.g. quality requirements for correctness, completeness, and appropriateness of the contents, used didactics, language, and implemented design. It is paid for and thus, the consumers eligibly expect that the learning resource meets the requirements of the local curriculum and that there are no unclear legal issues.

A re-purposer, who looks for an OER on the Internet, has no such direct way to influence the content or quality of the learning resource.

The motivation for a professional author to produce and particularly to publish educational resources is expected to be commercially driven, whereas, if the professional author produces for a publisher, he/she might not even be involved in the publishing process. Personal interest in the topic or another kind of intrinsic motivation might have played a role when the job was accepted, but this can neither be postulated, nor generalized. It is assumed that the motivation of a professional author is driven by economic reasons and the opportunity to increase ones reputation. Hylén (2009a, p. 131) mapped users and producers from OER, distinguishing between individuals (practitioners, namely “*teachers*”) and institutions (such as MIT, Merlot or Open University UK) in order to find out who the users and producers of OER actually were. The very low response rate from the institutions rendered the study useless at this level. However, the study results indicated that at least in the beginning of the movement, the major amount of OER were being produced and provided by public institutions, most in the context of publicly funded projects (*ibid*, p. 128). According to the individuals, the response rate also was quite low but the results indicate what might be expected on a larger scale: Even though the study included 193 respondents from 49 different countries, “*there was a clear bias towards teachers from English-speaking countries*” (*ibid*, p. 131). Hylén (2009b) additionally analysed related motives for institutional and individual engagement in OER. Hylén found six motives for institutional engagement (*ibid*, p. 138–139):

- “*sharing knowledge is [...] in line with academic traditions*”;
- “*leverage taxpayers’ money by allowing free sharing and reuse of resources*”;
- “*costs for content development can be cut*” (better use of available resources);
- “*good for public relations and [...] attracting new students*”;
- “*new ways of making revenue [...] as advertisement for the institution, and as a way of lowering the threshold for new students*”;
- “*speed up development of new learning resources, stimulate internal improvement, innovation and reuse, [...] keep good records of materials.*”

For individual engagement in OER, Hylén found (*ibid*, p. 140):

- “*altruism*”;
- “*the pleasure of being involved in peer production*”;
- “*strategy for enhancing a final, commercial version*” (others help improving);
- “*desire for publicity, [...] enhanced reputation within the open community*”;
- “*what is junk to one may be gold to another*”;
- “*gain access to the best possible resources and to have more flexible materials.*”

It is obvious that the motivations to produce, share, and reuse learning resources differs between the common producers and re-purposers of OER, on the one hand, and the professional authors and customers of commercial learning resources on the other hand. Furthermore, particularly “private” OER producers are in a completely different situation than professional authors. This

different situations and preconditions eventually impact their willingness to create records in order to meet formal quality criteria (Koppi *et al.*, 2004; Albright, 2009).

Formal quality versus appropriateness

In order to reach an agreement between the involved stakeholders, quality standards have to keep to a high enough level of generality (formal quality). Just, the perception of the appropriateness of a particular educational resource is context-specific and can be expected to bias a very subjective understanding of quality. To illustrate the complexity of such a task, the [CanCore¹¹](#) project, for instance, defined the scope of 46 elements from IEEE LOM (IEEE, 2002) on various levels of detail in order to enhance the resource discovery within the Canadian educational context (Friesen, Fisher & Roberts, 2003). This approach, however, focused on the completeness of descriptions but not on the reusability of OER. Various other projects, i. e. the [UK LOM Core¹²](#) project, repeated this approach for their respective context. From the specific perspective(s) of the OER producers and re-purposers, appropriateness includes various layers that are not covered by the existing quality standards for TEL. Another critical issue is the fact that understanding, keeping up to date with, and following the commonly agreed quality standards is time consuming and does not necessarily fit into the particular processes of OER production and publication. It can be assumed that what eventually will drive the decision if an OER actually is being reused (or reusable) in a particular scenario, is the re-purposer's perception of its appropriateness in regard to the targeted context (Mwanza-Simwami, McAndrew & Madiba, 2008). Windle *et al.* (2010, p. 10) recommend "*that quality control is best handled at the point of reuse rather than at the point of delivery.*" We argue that in terms of a comprehensive understanding of quality, appropriateness and formal quality should not be separated.

In contrast to the quality of professional content, which actually can be defined with formal criteria because of its limited context for exploitation, the quality of OER is a rather subjective issue because any context might be chosen as the targeted one.

Types of OER

In our analysis we did not yet distinguish between different types of learning resources. This information, however, is highly relevant for the definition of an OER-related quality concept, insofar, as the necessary effort to meet a certain level of quality needs to stand in an acceptable (for the volunteering authors) relation to the complexity of a learning resource: Quality criteria regarding an elemental resource might be different to such related to highly complex resources; examples of such elemental OER can be found amongst the large amount of openly available and reusable pictures and sounds.

In the context of the ODS project, around 800.000 OER are hitherto embedded (linked from existing repositories). Amongst these, below 100 educational resources actually are fully structured OER, such as complete courses; the rest, following the type classification from Creative Commons (2011), are unstructured OER that focus on a single topic or idea, or OER with more structure, such as materials grouped by a subject area. For a sound and commonly acceptable quality standard for OER these different types and formats of OER would need to be considered. Forcing authors and/or content providers to generally create the same comprehensive context descriptions for any kind of resource type and provide a large amount of metadata just in order to meet so called "basic demands for quality" could reveal to contravene the efforts to foster the open movement: As an example, the 60 thoroughly defined parameters within the very well designed and comprehensive list of Kawachi (2013) stands against the usual working scenario of the voluntary authors and/or

publishers. Enforcing the consideration of these criteria for any type of resource might even thwart the opening progress in general instead of supporting it. Even within a specific context the acceptance of such a comprehensive approach is limited. As an indicator for this assumption, not even very prominent projects like CanCore and UK LOM Core have been updated within the last 5 years. It gets obvious that a strict and homogenous definition of context-specific quality indicators/criteria would provide little support in such an open and diverse context.

The international standard ISO/IEC 19788-1:2011 already provides the opportunity to define any kind of resource-based metadata and thus, would be flexible enough to serve as a solution for OER. However, in order to guide authors through the description process and ensure a commonly used vocabulary this standard would have to provide an exemplary list of metadata that actually are relevant and appropriate for OER. As it is right now, the standard is highly complicated to read and costly to purchase. Thus, it does not fit into the common work processes of the OER producers. For OER producers who give away their work results on chance and without expecting an economical benefit, an openly available, simplified and work-oriented version of the standard document would be required in order to save their time and thus, raise the standard's level of acceptance in the OER community.

Special quality demands in the context of OER

Provided that an educational resource is substantially correct, a commonly understandable language has been used, and the resource has a defined level of quality, e.g. following the suggestions from Philip, Lefoe, O'Reilly and Parrish (2008) regarding a peer-review model for OER, it is still unclear for the re-purposer if it appropriately can be used in the targeted context. In order to discuss special quality demands for OER, respective context-specific aspects were adopted from Richter and McPherson (2012).

Presumed Knowledge

Assumed that an OER that is to be repurposed, is a course module or a full course: does the originally presumed knowledge of learners meet the targeted situation (Kinuthia & Nkonge, 2005)? Even if a certain degree of knowledge is assigned regarding a particular national curriculum (indicated by metadata), how shall a re-purposer of an OER know about the difference between his own and the other national curriculum? In order not to overburden (or under-challenge) the learners, the re-purposer will need to manually check the resource for appropriateness and evaluate emerging adaptation needs.

Didactical Design

Is the didactical design that was chosen for the original context also suitable for the re-purposing context? This issue includes all aspects of didactical design regarding regionally and/or nationally common educational practices, such as preferred learning, self-testing, feedback, and examination styles. Lanham and Zhou (2003) reported in this context that "*it has been documented that students from different cultures have varying levels of compatibility with certain learning styles.*" Ho and Ko (2006) argue that "*the critical questions are what kinds of characteristics do learners need in order to survive in E-Learning.*" Marcova (2004) reports that children in Asia "*memorize the correct answers for the tests and university students memorize lectures read by the professor for the exams.*" Yang, Hung and Ching-Mei (2004) explain that different to the learner centered approaches in the western industrial states, "*in Asia, the student learning style is teacher-centered because of the traditional Asian cultural social history.*"

In a context where, e.g. multiple-choice tests are uncommon or not accepted for examinations, related tests might need to be excluded from a learning resource or substituted through other testing methodologies. Re-purposers need to manually check any resource (indicators might be provided through descriptions according to IMS LD) and if implemented, need to redesign the evaluation methods, so that the OER is in accordance with the local regulations.

Context-specific examples

Are originally used examples actually helpful within the targeted context? Examples are meant to support learners in the development of an understanding of a particular issue. In order to reach the highest possible level of understanding, examples often are contextually biased (McLaughlin, 1999): Learners can best imagine what they already have experienced within their natural environment. As an example, a German course on environmental protection that focuses on the responsible use of water might not reach a high level of understanding when being reused in a Sub-Saharan learning scenario. Even though the course contently is correct and perfectly suitable within its originally targeted German context (as one of the water-richest countries in the world), it might cause major irritations in the Sub-Saharan context, where water is a rare resource and thus, of far more substantial value than in Germany. If the originally targeted context of the OER is properly described through metadata according to the ISO IEC 19788-1:2011 at least an indicator is provided that such regionally specific examples could be included. However, as metadata usually focus on very general issues, the re-purposer will need to manually investigate the learning resource in detail.

Optical design

Does the originally applied design of a course meet the requirements of and is it attractive to the learners within the targeted context? We know that there generally are vast national differences regarding e.g. the choice of colours, symbols, and “playfulness” (Banks, 2001; Löhmus, Lauristin & Salupere, 2006). Because of its high level of playfulness, German learners might perceive a course that has been designed for the Asian context as distracting. McLaughlin and Oliver (2000) claim that *“not enough is known about the ramifications of cultural inclusivity for cognitive design of learning resources.”* According to Dunn and Marinetti (2007), the choice of colours can cause serious conflicts because of their diverse meanings across different cultures. In Western cultures, e.g. the colour “red” usually symbolizes a danger, an error, or a problem while in some Eastern cultures (i. e. in China) it is understood as a symbol for “good luck.” Another example for a serious design-specific conflict is related to the use of symbols: While the swastika has a very positive meaning in some Asian countries (luck, success) and freely could be applied as bullet-points for lists, its use even violates German law (StGB, §86). Also here, the originally targeted context can be assigned with metadata (ISO IEC 19788-1:2011). While serving as an indicator for a culturally biased course design, the lack of detailed information, still forces the re-purposer to manually check the content.

Particular cultural issues

Kearsley (1990) argues that *“one complexity of e-Learning is that it is often inappropriately transferred without sufficient recognition of the recipient’s cultural setting.”* Are the original content and the implemented learning design appropriate to meet the requirements in the targeted context (Lefevre & Cox, 2006)? Culture clashes can massively lower the learner’s level of motivation (Richter & Adelsberger, 2013) and in the worst case, result in higher dropout rates (Nilsen, 2006). Cultural conflicts can occur for many different reasons. However, following Haberman (1995), *“it is not in the responsibility of the learners to adapt the given conditions of their learning context,*

but the educational institutions' duty to ensure that an environment is provided which leads to productive learning for any kind and type of learner."

It is possible to describe selected aspects of culture through metadata and contrast the originally focused context against the own one (Richter, 2011). Such comparisons can support the re-purposer to take decisions on potential adaptation needs. Examples for such comparable culture-specific elements are the learners' relationship to and expectation towards instructors (Richter, 2012), particular group-work specific attitudes and expectations of learners (Ting-Toomey, 1988; Cakir, Bichelmeier & Cagiltay, 2002), strategies for providing feedback and raising motivation (Noelting, Leypold, Roeser & Voight, 2004), time management (Lubega & Williams, 2006), and gender issues (Mac Donald & Hedge, 2006). Because of feasibility, a metadata-based description of the originally targeted context must be generic and thus, its use is limited to serving as an indicator for conflict potential within a particular learning resource. A well-described didactical design might provide additional information on how likely it is that changes need to be applied. However, in the end, the re-purposer has to manually check the resource's content on semantic level. The re-purposer actually is familiar with the context in which the OER is to be reused and the only one to evaluate the chance if the learners might accept related deviations between the originally focused and the own culture, or the risk if these could turn out to be problematic (Pless & Maak, 2004).

Historical and political perspectives and religion

Does a learning resource reflect or contradict the historical and/or political positions in the targeted context or even cause religious conflicts? This is a very general challenge, as it might not "just" cause conflicts in the learning process but additionally violate laws and thus, put the re-purposing instructor into serious danger. McLaughlin (1999) states that "*e-Learning is infused with cultural meaning and nuances given that educators bring their own perspectives into the design process.*" Examples for such conflicts are different perspectives on historical events (particularly military conflicts), different perspectives on the role of personalities (an archetype in the one context can be perceived as an antihero in the other), different ideas regarding the ideal type of societies and the role of economy and leadership, different religious interpretations, or hard restrictions regarding certain practices which are common in other contexts. The major problem with such issues is that they often are unintentionally implemented by the authors and thus, difficult to find. Metadata and Learning Design Descriptions might help to determine if there is a potential of related conflicts, but neither is able to describe the particular wording within a learning resource. As a local specialist, the re-purposer is responsible to determine change requirements and adapt the resource accordingly.

Further context-specific requirements

Our understanding of contextual influence factors (Richter & McPherson, 2012) is still incomplete. We expect to go on finding specific requirements, which we cannot even imagine before getting in touch with the corresponding situations.

As an example, in the context of Visionary Workshops (VWs), which we held in German schools in order to promote the portal of the Open Discovery Space project (ODS), we investigated a school with a focus on inclusive education. In this school, pupils with special needs are jointly taught with mainstream pupils; just that they get differently designed learning materials and are individually supported in the class by an additional teacher. Inclusive classes maybe represent the most "extreme" example for a scenario in which OER are required. In contrast to educational scenarios where all learners are at least considered having similar demands for resource design and content, the

special needs of disadvantaged pupils in inclusive classes differ on individual level. The teachers in this particular VW reported that they mainly use OER for their education because the usually used printed books cannot provide the required flexibility regarding the different needs of their pupils. Perner (1997) found that teachers of inclusive classes generally “*prefer using specific resources based on their own and their students' abilities and needs.*” We think that OER have the potential to fill this gap and thus, to support implementing the UNESCO Salamanca guidelines on inclusive education from 1994 (UNESCO, 2003).

In 2011, we conducted a study on barriers against the use of OER in the context of German schools (Richter & Ehlers, 2011). Additionally to the confirmed results from the previously introduced OPAL investigations, the schoolteachers communicated that OER are only valuable for them, if the contents can be modified. In the aforementioned ODS VW in the German inclusive school, the teachers were fully aware of their particular situation and stated that they do not even hope to find perfectly fitting resources. However, they confirmed our result from the 2011 study, and stressed that being able to apply changes to the resources is crucial for them in order to make them appropriate. They reported that if they discovered that already downloaded OER were not adaptable, it discouraged them from further using OER. In this context, they criticized that such “a simple thing” like the indication of data formats and changeability rarely is provided. The study of Atenas, Havemann and Priego (2014) confirms this specific source for frustration. They found particularly that the time efforts required to find and select suitable OER were generally perceived as a barrier.

Limitations

The preliminary assumption in the beginning of section five (special quality demands in the context of OER) that learning resources are implemented in a commonly understandable language was “optimistic” and if at all, its validity is limited to very particular contexts, such as Western European countries. Kickbusch (2001) reports that “*four out of five websites are in English, while only one in ten people on this planet speaks this language.*” DePalma, Sargent and Beninatto (2006) found that 32.6 % of the Internet-users either never or rarely visit English language websites. Adaptability is highly required in order to translate educational resources to a new context. While full courses might rarely be translated, particular elements within the courses, such as figures, could turn out to be very valuable if a translation to the local language is possible (Richter & Ehlers, 2011).

In the discussion, we widely excluded aspects of didactical design because the implementation of related changes for adaptation is usually complex. If adaptation on such a basic level appears to be required, we recommend rather searching for a better fitting resource. However, if and to which extent adaptation is worth the efforts depends on the availability of alternatives, the complexity of required changes, and the local specialist's evaluation of the efforts-benefit ratio. A general recommendation, thus, cannot be provided and related decisions for both needs and measures need to be “case-sensitively” taken.

Conclusion

For a successful implementation of a common quality standard in the OER community, a sustainable quality concept for OER must consider both the appropriateness and the formal quality. The perceived appropriateness depends significantly on the production scenario, the particular educational context in which an OER is to be repurposed, and the resource type. We have been able to show that there are substantial differences between the common scenarios of professional content creation and OER production as well as between the conditions for usage of commercial content

and of OER. We mentioned but did not further consider the fact that many OER were never designed as such during the production process but subsequently declared to be OER by their original producers. This surely is another aspect that influences the OER-community's level of acceptance regarding the implementation of standards and the definition of standardized metadata and documentations. Even though the declaration of a learning resource to become an OER and its uploading to make it openly available are big decisions, little additional efforts are required. It is unlikely that the common OER authors (who are practitioners) and publishers (which might be educational institutions on all levels) will purchase costly standardization documents and invest the time that is required to study, comprehend, and implement them. Thus, if we wish to achieve commonly accepted quality standards in the context of the OER community, new concepts for their design and exploitation might be required.

The second issue we found can be understood as an alternative concept to a comprehensive context description. Following this minimalist concept, an "appropriate OER" must be understood as a document that at least allows re-purposers to modify contents on both the legal (by license) and the technical (by format) level. This should be supported with a definition of the file format and in particular, a recommendation of an application that allows conducting modifications. The corresponding criteria for the quality of OER are not limited to the resources' changeability but to the proper description if (and by using which software) it actually is adaptable. In terms of quality, these issues define a minimum-quality approach, are easily manageable (and acceptable) for everyone, and thus, should be demanded for OER, at least as a good style recommendation. Within the common standards, e. g., the ISO/IEC 19788-1:2011, this solution could easily be adopted as an OER-related subset of mandatory metadata fields and prove highly supportive for the further exploitation of OER.

Recommendations

As a first recommendation, we suggest that the format of any educational resource and the status "changeable/not changeable" should be mandatory to be declared in the context of metadata-based quality standards, in particular (as widely accepted international standard for metadata definition) within the ISO/IEC 19788-1.

Secondly, we encourage all authors of OER who agree that their resources are being manipulated to provide two versions; one version in an unchangeable format (e.g., PDF) that ensures that an OER exactly is displayed in the way it has been designed and another, in a fully and easily changeable format that allows re-purposers to adopt it in order to meet the requirements of their specific contexts. This suggestion particularly includes figures with text. In case of figures that are fully embedded within a document, it would be reasonable to separately provide them in a changeable format within an attached file.

Thirdly, in order to support the life cycle model of OER, we encourage all re-purposers to republish their adapted resources in terms of opening a particular resource for a larger community. In the same context, repository providers always should provide an opportunity to upload repurposed versions of learning resources and to link these with the original ones. In this context, a rough documentation of implemented changes (particularly regarding the new context and purpose) should be mandatory.

Notes

¹ <http://www.ariadne-eu.org/projects>

² <http://organic-edunet.eu/en>

- 3 <http://www.openscienceresources.eu>
- 4 http://eacea.ec.europa.eu/lip/project_reports/documents/erasmus/multilateral_actions_2009/eras_emhe_503993.pdf
- 5 <http://files.eric.ed.gov/fulltext/ED504368.pdf>
- 6 <http://www.oer-europe.net>
- 7 <http://www.opendoar.org>
- 8 <http://www.oer-quality.org>
- 9 <http://www.role-project.eu>
- 10 <http://www.opendiscoveryspace.eu>
- 11 <http://cancore.athabascau.ca/en/index.html>
- 12 <http://zope.cetis.ac.uk/profiles/uklomcore/>

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