Open educational resources: education for the world?

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Education is widely seen as an important means of addressing both national and international problems, such as political or religious extremism, poverty, and hunger. However, if developing countries are to become societies that can compete properly with Western industrialized countries, not only is a fundamental shift in thinking with regard to the value of education and more/better provision of teaching required, but strong support from other countries is needed as well. This article explores questions such as whether Western policymakers can avoid a repetition of some of the failures of the past few decades in terms of providing foreign aid; how educators and providers of educational scenarios and learning contents can foster and manage the creation of a worldwide knowledge society; and in particular, if the provision of open educational resources (OER) can realistically overcome the educational gap and foster educational justice.

Keywords: OER; educational gap; adaptability; foreign aid; developing countries; illiterates

Introduction

The primary millennium goal set by the United Nations in 2010 is to "eradicate extreme poverty and hunger" by 2015 (UNESCO, 2011, p. 6). Yet a poor education is often seen as an underlying reason for poverty, as well as for a correspondingly low level of human capital, in developing countries (Easterly, 2005, p. 8). Degenys (cited in Ramsbotham, Woodhouse, & Miall, 2011, p. 240) claimed that as "educational systems can sustain conflict within schools, they can also liberate it." Although the situation has improved over the last 50 years, this improvement has not been universal. While "enrollments have expanded rapidly, the quality of education is hampered by missing inputs like textbooks and other school materials" (Easterly, 2005, p. 8). Therefore, providing developing countries with educational resources so they can transform into fully functioning and competitive economic/social communities could be seen as a key issue for realizing the United Nations millennium goals.

Today, a number of high-level organizations and institutions actively promote high-quality open educational resources (OER), such as UNESCO OER Wiki, ICDE, and OLnet. Much of this is readily available and accessible via repositories,

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such as Merlot\textsuperscript{4} and MIT OpenCourseWare.\textsuperscript{5} Furthermore, some argue that OER could resolve the lack of educational materials, with D’Antoni (2008, p. 8) suggesting that they can play a central role in achieving educational justice in the world. However, we would like to posit that the mere provision of OER is an overly optimistic idea and will not serve to resolve educational deficits in developing countries.

In this article, we begin our debate by explaining why we think that the sheer existence and availability of free OER is unlikely to prove a definitive solution. We intend to show that, even if the information included is of the highest quality and the applied didactic and pedagogical design follows the very best possible standards, OER will be of value for learners only if they fit the learners’ own context and are thus genuinely reusable or at least fully adaptable.

Next, we explore some of the most serious barriers and what we believe, as a minimum, needs to be done so that OER can actually play their role of overcoming the educational gap. In this respect, we feel that a much more realistic stance needs to be adopted. It is not our intention to diminish or to generally criticize the achievement and potential of a faithful and valuable movement of sharing, which Moore (2002) characterized as a "historic tenet of academic culture" (p. 46). Nevertheless, we feel it is necessary to draw attention to some critical issues that may prevent us from fully achieving these goals. In particular, our position is that just because we (as education professionals and policymakers in the West) may have found that sharing contextually biased OER can often lead to a win–win situation (Open University, n.d.) within Western environments, it does not necessarily follow that this strategy will work when transferring OER to fundamentally different contexts (i.e., the developing world).

Finally, our stance is that if we want to achieve and/or foster educational justice in the world by producing and providing OER, we will need to do more than merely making such learning materials available. Thus, we discuss the necessity to turn contextually limited usable information into tangible and adaptable educational resources, designed in a way that is easy to implement, which in turn could raise the value of OER enormously.

However, we would like to acknowledge some limitations of our deliberations in this article: we are not able to consider situations where there is a fundamentally deficient infrastructure, where existing political systems prevent the use of OER (e.g., environments where information is censored); nor will we attempt to offer OER as a solution to extreme poverty (e.g., where buying a $100 laptop would deprive a family of a month’s worth of nutrition).

Consequently, this article specifically addresses producers, providers, and users of OER who are charged with fostering the upcoming culture of sharing (and reusing) educational resources, as well as educational policymakers who are also responsible for defining quality criteria to ensure the value of such resources. To begin with, then, we discuss key issues that need to be taken into consideration when discussing the potential of, and possible gaps to, providing educational support with OER.

**Educational support with OER**

Despite the fact that many resources are highly promoted, of high quality, and freely accessible, research by Andrade et al. (2011, p. 11) shows that a critical threshold in OER usage has not yet been reached in Europe. One of the main
barriers identified by professionals, policymakers, and learners for (re)using OER is the uncertainty as to whether higher education and adult education resources are appropriate and match the learners’ own educational contexts (p. 171). Similarly, responses to a school-level survey in Germany (Richter & Ehlers, 2011) indicate that teachers simply have no idea how to evaluate a given OER’s appropriateness and adapt it for their particular situation (pp. 4–6). Given these findings in highly industrialized contexts, we can expect to find even more uncertainty and mistrust in developing countries: uncertainty about contextual appropriateness of OER comes on top of the already existing suspicions regarding the motivation of Western industrial countries to provide development aid (e.g., Wedel, 2001, p. 167). Clearly, it is easy to see that determining appropriateness of learning resources in particular subject areas (e.g., religion) could be very difficult; however, do other subject areas also raise the potential for conflict? When trying to find a context-free language for international communication, Davis (2005) found that “only within the most homogeneous community of speakers, with extremely specialized communication needs and zero tolerance to misunderstandings, such as international commercial airline pilots or military commanders, can we expect a thoroughly uniform interpretation of a limited English vocabulary” (p. 1). She concluded that “no single language can achieve this universal goal of establishing a mutually meaningful communication link in today’s widely diverse global population” (p. 8).

Although some argue that mathematics is mathematics and will easily transfer between different cultures, this is not universally true. A UNESCO study by Benavot (2011) found that while a range of developing countries shared educational standards, these mainly revolved around routine and basic skills in mathematical problem solving and reasoning, but diverged when it came to more cognitively demanding mathematics skills. Moreover, it would seem that teaching methods in this subject are not necessarily common either. For instance, a German course in mathematics normally teaches a number of different methods; then asks learners to choose and adapt one of the learned methods to solve a given problem. In an Asian educational context, it is assumed that certain methods are explicitly related to certain problem classes; so as a task, the learners may be instructed to use a defined method to solve a certain problem. Asking a learner to modify a taught method could cause serious conflict, because this would be tantamount to questioning the educator’s authority, which is considered disrespectful in that region (Richter, 2011a).

Furthermore, most educational courses implicitly require prerequisite knowledge from learners, which might or might not be equal in different contexts, and in addition, they may demand too much or too little from the targeted learners.

All these aspects indicate that without considerable thought to adaptation, OER produced in Western industrialized countries may not necessarily fit the needs of learners in developing countries.

Why the simple availability of OER is unlikely to be a definitive solution

The simple provision of resources (e.g., money, construction material, or agricultural machines) to impoverished countries often leads to greater dependency, rather than to sustainable development (Easterly, 2006, p. 40; Moyo, 2009, p. 74). We argue that this insight can be extrapolated to educational contexts, and that without empowering educators to conduct the adaptation process themselves, purely offering
resources for learning may prove less successful than desired, and any gains may be simply temporary.

Other researchers concur that merely making OER available will not necessarily serve the aim of achieving educational justice throughout the world, because provision does not lead to widespread uptake. As explained by Hunt (2007), HakiElimu (an advocacy-based organization in Tanzania supporting every child’s right to basic education) discontinued the distribution of electronic materials by email in 2005 because the recipients did not value (use) them. Albright (2005) contended that OER could be improved by shifting from a provider–user model to one that employs collaborative development, but acknowledged that creating a collaborative environment staffed by volunteers to adapt OER for language, culture, and relevance is a significant challenge (p. 15). Research by Richter (2010) shows that failure to take the targeted learners’ culture into consideration when implementing education in foreign contexts can lead to significant frustration and greater dropout rates. This phenomenon is particularly apparent in e-learning where, to overcome difficulties that arise in self-regulated learning scenarios, motivation and confidence are understood to be significant success factors (Richter & Adelsberger, 2011). Thus, if OER are reused without appropriate thought and without modification, inequity between the rich and the poor may grow (Reich, 2011), and the gap between industrialized countries and the developing world may widen even further.

In line with the UNESCO subsidiary principle, Bogardi and Hartvelt (2001) recommended that any educational “action should be executed on the lowest possible level” and that education “taking place within a national framework is likely to be more efficient than within an international one” (p. 20). Correspondingly assigning these recommendations to the context of OER, sustainability may be possible only if the offered resources also support lower-level education and can be fully integrated into the local context.

OER adoption barriers and overcoming the educational gap
There are many barriers to OER adoption in developing countries. So, the key question here is: What are the most serious barriers to the adoption of OER and what needs to be done to help overcome the educational gap?

Historical effects of colonialism
According to Ziegler (2008), Western colonialism has not yet been fully abandoned; it is just that the methods have changed (p. 83). Today, developed countries still control the African continent by speculatively manipulating the price for food and other trade goods (pp. 88–89). Furthermore, where developing countries had a negative colonial experience prior to independence, offers of Western help might not be fully accepted or even appreciated as such. In the context of modern African education, Thiong’o (2005) argued that “the very mandate as African producers of knowledge is to connect with the continent” (p. 157). Consequently, there is still potential for a good deal of underlying animosity toward the West, which may in turn lead to suspicion of OER produced by industrialized countries.

Another historical issue that needs to be taken into consideration is that of language gaps. This applies particularly to Africa, where the Western colonialist
countries artificially established borders without taking tribes and/or different languages and cultures into consideration (Robbins, 2005, p. 302).

**Language issues**

As long as educational materials continue to be based on a very few (Western European) languages, not only are the languages of minority groups fading away, but also access to higher education remains limited to people who have had the privilege to learn one of those elite (foreign) languages (Ouane, 2002, p. 12). Kickbusch (2001) wrote that “Four out of five websites are in English, while only one in 10 people on this planet speaks this language” (p. 289). DePalma, Sargent, and Beninatto (2006) found that 32.6% of Internet users never or rarely ever visit English language Web sites (p. 4). We presume that this would apply equally to e-learning, where consumers would be candidates for adult and higher education. Chumbow (2002) claimed that for the African context “the use of national languages will be a greater stimulus to learning and this will lead to a greater and higher level of education” (p. 173).

If we want to successfully support developing aid with OER, the language gap is a significant obstacle that needs to be dealt with. Yet even if OER were to be translated to the local language of the targeted learners, adaptation would still be needed, because if left unchanged, OER would still not necessarily be suitable for the targeted regional context (Leonardi, 2002).

**Contextual gaps**

According to Deyrich and Matas-Runquist (2006), language not only means different words, but also offers a different way to express thoughts and build sentences, and such ideas could be regarded as context specific. Corresponding to this, multilanguage Web sites are often drawn directly from the originator’s view of the world, and simply use the words belonging to other languages, with some culturally related (verbal) pictures thrown in.

In view of this, it seems unlikely that contextual and language gaps could be easily managed and overcome by the (mostly voluntary) producers or providers of OER as envisaged by Albright (2005, pp. 11–12). Addressing these concerns, Richter and Pawlowski (2007) argued that e-learning content providers should at least support translations and improve adaptation by better design and description of learning materials. Andrews (2009) explained that “without a proper understanding of [and thus, provision for] the culture of the people aid seeks to help, no effective impacts should be expected” (p. 8).

**Lack of cultural diversity**

Research by Woolman (2001) indicates that most educational material is not designed to foster the development of national identities and does not support cultural diversity (pp. 30–31). Thus, his stance is that OER are usually produced for a certain context and while they can be reused in another one, they are not explicitly designed for reuse. Woolman went on to state that for “the most part, educational policy decisions and implementation remained highly centralised and reflected the will of ruling elites” (p. 28).
Educational privilege and literacy

In many countries, education is seen as a privilege of the elite. Woolman (2001) pointed out that changing this view would be another significant step toward reaching a higher educational standard and social justice throughout the world (p. 28). Nevertheless, the ability to read and write is still seen as an important individual skill (Wallendorf, 2001, p. 505) and possession of such expertise is related to, or leads to, powerful positions in the society. Williamson (2009) suggested that a key barrier for successful foreign aid is the lack of effort to explain (particularly to those who are part of the ruling elites) why changes in behavior, social structures, and political systems are crucial for development and beneficial for all.

Sachs (2005) claimed that greater literacy is one of the main reasons why developed countries have less corruption and better working political systems. According to Sachs, literacy is a skill that leads to more critically thinking societies and thus to better control and more (direct) feedback by the people (p. 378). The UNESCO Institute for Statistics. (2011) reported that in 2009 adult literacy rates in 11 Sub-Saharan African countries and in some Southwest Asian countries were below 50% (p. 2). In addition, more than 50% of the whole world’s illiterates live in South and West Asia, and 21.4% of all illiterate adults live in Sub-Saharan Africa (p. 3). However, it should be noted that the percentage of illiterate adults in Sub-Saharan Africa varies enormously between countries (e.g., 74% in Mali as opposed to 7% in Equatorial Guinea) (p. 2). Taking these statistics into account, it seems that one of the most pressing issues is to address the high levels of illiteracy.

The need for basic education

Such statistics indicate that in developing countries, basic literacy skills education for the general public is often very limited, if available at all. This view is confirmed by UNESCO’s declaration (1995–2011b):

Education is a fundamental human right and essential for the exercise of all other human rights. It promotes individual freedom and empowerment and yields important development benefits. Yet millions of children and adults remain deprived of educational opportunities, many as a result of poverty. (¶1)

Thus, it seems that the most urgent need is for OER producers to support basic reading, writing, and numeracy skills, and not just to focus on higher education and adult education, as they appear to do now. In a context where disadvantaged learners predominantly need to acquire very fundamental literacy skills, this raises the question as to whether e-learning in general, and not just OER, can actually replace face-to-face teaching for such basic education. What special challenges are related to this scenario? With respect to foreign aid through educational support, literacy is a key issue that needs to be addressed prior to, or at least at the same time as, discussing higher education OER provision. Can existing OER actually help in this regard, and are there approved approaches in place to support people in developing literacy skills?

Added to this, there are other context-related impediments that could cause major conflicts during the learning process, or prevent it completely, that need to be overcome (Richter & Pawlowski, 2007).
In the following, we consider the context of learning; that is, all the factors that influence the design, application, and success of learning scenarios but that cannot readily be manipulated by the learning design.

Even though educators, authors, or distributors of OER cannot directly influence the context of the learners, they could help avoiding related conflicts by improved design and appropriate allocation of the content (e.g., by sufficiently describing the originators' context). In many cases of reusing educational materials in other contexts, contextual adaptation will be necessary. As we indicated before, a simple translation is not a solution to bridge cultural or contextual gaps. In terms of supporting the adaptation of learning resources, initially we present a possible solution and then discuss simple design procedures that would be likely to support any adaptation process.

**E-learning in the context of improving literacy skills and basic education**

The virtual learning platform Time To Know (http://www.timetoknow.com) is implemented in the context of schools with low socioeconomic status (SES) in Israel. In an analysis of outcomes, Rosen and Wolf (2011) found a high potential for success among low-SES students as a result of appropriately implemented educational technology programs. According to Poulová, Sokolová, and Šimonová (2010), “adequate ICT equipment and students’ computer literacy are inevitable preconditions of running the process of instruction” (p. 157). This suggests that for learners to make effective use of OER, they need to learn basic IT skills before being taught via e-learning. On the other hand, Mitra et al. (2005) carried out minimally invasive educational experiments in India and claimed that even with no computer skills (i.e., just from natural curiosity), children between the ages of 6 and 14 were not only able to learn how to use computers by teaching each other or by themselves (p. 409) but also learned basic English language skills. In this Hole in the Wall project in several Indian cities, computers installed and embedded into brick walls close to slums were used by the slum children. However, although the development of IT skills is one of the basic issues to be resolved in education (Mitra et al., 2005, pp. 410–411), this experiment was designed to monitor the development of self-taught computer literacy and did not specifically focus on generating basic literacy skills. Moreover, the computers appeared to be running already, which meant that the participating children did not need to switch them on. Furthermore, the children seemed to be already somewhat literate.

Theoretically, once learners attain basic computer literacy skills, they can go on to learning higher order skills, such as more advanced reading and writing. There are some successful examples where children achieve basic education in all sectors (partly in scenarios of blended learning) via e-learning, for example, the Alice Springs School of the Air, designed for children in rural areas of Australia with very low population density; the school for circus kids in North Rhine-Westphalia, supporting children of permanently traveling parents in Germany; and the K-12 International Academy in the USA, which is designed as an online school to support learners from kindergarten to the end of their school education in a complementary way.

Although there are examples of successful basic education via e-learning, designed as pure online learning and/or blended learning, which also seems suitable
for the achievement of literacy skills, transferring such scenarios to developing countries needs to be put into question due to two reasons.

Firstly, learning to read and write is based on spoken sounds and corresponding letters (Ministerium für Schule und Weiterbildung Nordrhein-Westfalen, 2011, p. 26); this assumes that we can teach literacy skills to people only where their verbal communication has some form of parallel written language. Thus, speakers of non-Semitic Languages, such as Mursi (southwest Ethiopia), may not be able to achieve written literacy skills without learning an alternative language that does support a written form. Furthermore, we need educational resources in related languages and designed for related scenarios. If a native language does not have a written form, or if educational resources are not available for a particular language, a suitable alternative language has to be learned and/or resources need to be adapted to the contexts of the learners (e.g., children in the Sahara region and children from a middle-European context will know and use different words in their daily life). This is particularly relevant to literacy skill development where, for pedagogical reasons, real and concrete scenarios are being used as learning exemplars. Thus, if OER are to serve those requirements, they either need to be produced using relevant scenarios and in understandable languages; or they need to be fully adapted to the new context.

The second problem is of a more technical nature. Basic education does not simply serve the purpose of accumulating information needed for developing literacy skills and going on to participate in further and higher education. According to the UNESCO. (2009) report, "Experts’ Conclusions on the Operational Definition of Basic Education: Conclusions," the purpose of basic education is directed to the full development of the human personality. It develops the capability for comprehension and critical thinking, and it inculcates the respect for human rights and values, notably, human dignity, solidarity, tolerance, democratic citizenship and a sense of justice and equity. (p. 2)

The claim for developing a human personality implies social interaction between people and the development of communication skills (also see pp. 8–9). Thus, if basic education is to be conducted entirely online, as a minimum requirement, Internet access with appropriate stability and speed is essential so that communication can be ensured. This is not yet possible in all regions of the world.

Adapting e-learning resources to other contexts

In this section, we will discuss the processes that we have identified as being necessary to make an OER reusable in a different context to that for which it was originally intended. Tong, Yang, Liu, and Liu (2006) suggested that adaptation is the "process of selection, generation or modification of content (text, image, and animation, etc.) to suit to users’ computing environment and usage context" (p. 322). Considering learners’ needs in the context of e-learning, Rosmalen, Boticario, and Santos (2004) defined adaptation as "creating a learner experience that purposely adjusts to various conditions [...] over a period of time with the intention of increasing pre-defined success criteria" (p. 59). This includes all necessary tasks, for example, translation, visual/technological redesign, and changing teaching strategies and methods. These views concur with findings of a study with teachers from
different school levels in Germany (Richter & Ehlers, 2011), which reveals that several gaps for reusing OER could easily be overcome by a better design of the resources. First of all, German teachers seem to rarely use the OER in a digital format because they do not have the necessary technology in their classrooms. Instead, they print the resources and provide them to the learners in paper form. As a barrier to use, the teachers said that OER are often provided in formats, such as PDF or JPG, which cannot be edited. For instance, if the teachers find a chart that contains text, they are unable to change/translate the text for their learners within the chart, so for this to be of any use, they have to recreate it, and in most cases, this exceeds their abilities. Granted, this study was conducted in the industrial West; however, our own experience of working in the developing world leads us to believe that these problems can be extrapolated to those contexts.

To better explain the learning resources adaptation process model shown in Figure 1, we think it would now be helpful to introduce the adaptation circle, which was developed by Richter (2011b). This adaptation process model is the result of a conjunction and extension of the adaptation process models from Rosmalen et al. (2004, p. 60) and Pawlowski and Zimmermann (2007, p. 269). Both models, in our opinion, were not detailed and/or flexible enough for the purpose of international adaptation.9

(1) Each adaptation process starts with the search for a suitable resource (Step 1).
(2) Once the OER is found, its reusability in the new context needs to be validated (Step 2). The original context then needs to be contrasted against the targeted context, resulting in a list of differences between the two contexts that must be taken into consideration. For the adaptation of educational material, the determination of the usability of a resource is the most crucial step (Richter, 2011b), since not only the adaptability but also the potential adaptation needs have to be decided.

Figure 1. The learning resources adaptation process (Richter, 2011b, p. 166).
(3) If the identified resource is adaptable, the critical aspects determined in Step 2 need to be checked to see whether they apply to the specific resource and context and then the changes have to be conducted (Step 3). (Please note that if the resource is not adaptable, Step 1 will need to be repeated.)

(4) Once the adaptation has been carried out, the contextual matching of the adapted resource needs to be validated. Depending on the resource type, there are several levels of validation possible. Those vary from sight check to long-term studies. Pawlowski and Richter (2010) described such a possible design for an experimental long-term study.

(5) If the validation was successful, the learning resource can be republished in the new context. If not, Step 4 will need to be repeated.

It should be noted that although the adaptation process may be quite different depending on the configuration of contexts, culture, and type of resource that is to be adapted, the basic principle remains the same, and the finally (re)produced OER should end up being of an equivalent quality to the original course context.

The learning context

Since 2007, we have conducted intensive research on contextual factors that influence learning scenarios. The first comprehensive list (Richter & Pawlowski, 2007) was drawn from the literature and derived from an analysis of conflict situations occurring in learning scenarios but was not evaluated in terms of comparability or descriptiveness and did not further take cultural aspects into consideration. We then followed up this initial research by systematically collecting concrete data from several sources, such as national statistical offices, local publications, national Web sites, further data collections, and our standardized questionnaire on learning culture (Richter, 2011a) in a variety of contexts, such as Germany, South Korea, Austria, Switzerland, Great Britain, Ireland, and Bulgaria. The purpose of this follow-up investigation was to verify the descriptiveness and comparability of these influences in various contexts. To date, the datasets themselves have not yet been fully verified (apart from those from Germany and South Korea). However, during this second phase, the list significantly changed due to the fact that some factors proved to be extremely difficult to describe, just specific to a single context, or had missing aspects. Nonetheless, a number of aspects have already been verified. Table 1 presents an excerpt of the number of displayed attributes per influence factors defining the context of learning. For a comprehensive explanation and complete list, see Richter (2012).

Turning to the learning context, we consider that there are entities in any educational system that are responsible for the differences between settings, providing different frameworks for the context-specific learning scenarios. Those entities do not just influence the learning scenario itself, but also each other. In Figure 2, we propose three main stakeholder groups (author/educator, tutor/advisor, and learner) and environmental factors that are responsible for contextual influences on learning scenarios.

Our analysis of the stakeholders indicates that learners, tutors/advisors, and authors/educators are the main contributors of contextual influence factors: all three groups of stakeholders are more or less influenced by environmental entities, such as economic communities and military alliances, countries/regions, and companies/institutions. Furthermore (as shown in Figure 2), the different levels of environmen-
Table 1. Displayed attributes per influence factors (excerpt).

<table>
<thead>
<tr>
<th>Context-block (type)</th>
<th>Name</th>
<th>Description (kind)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>Teacher’s role</td>
<td>Assistant or unfaultable authority? (survey LC)</td>
</tr>
<tr>
<td></td>
<td>Value of errors</td>
<td>What do errors mean: a chance to learn or a disaster? (survey LC)</td>
</tr>
<tr>
<td></td>
<td>Index for avoiding insecurities</td>
<td>Hofstede’s UAI value</td>
</tr>
<tr>
<td></td>
<td>Language</td>
<td>Language name(s)</td>
</tr>
<tr>
<td></td>
<td>Communication style</td>
<td>Direct or unsealed communication style</td>
</tr>
<tr>
<td></td>
<td>Humor</td>
<td>Kind of humor; classification possible?</td>
</tr>
<tr>
<td></td>
<td>Gender differences</td>
<td>Are learners with different genders treated equally?</td>
</tr>
<tr>
<td></td>
<td>Social capital</td>
<td>Key value for social development</td>
</tr>
<tr>
<td></td>
<td>Interaction protocols</td>
<td>How do people communicate?</td>
</tr>
<tr>
<td></td>
<td>Emotional stability</td>
<td>How (and how fast) do learners react to unexpected circumstances (acceptance level)?</td>
</tr>
<tr>
<td></td>
<td>Culture-related knowledge</td>
<td>Locally developed context specific insights</td>
</tr>
<tr>
<td></td>
<td>Pedagogical approach</td>
<td>Are there culture-related special pedagogical approaches?</td>
</tr>
<tr>
<td>Demographic</td>
<td>Birth rate</td>
<td>Absolute, maybe regional differences</td>
</tr>
<tr>
<td>development</td>
<td>Number of inhabitants per age group</td>
<td>Absolute value, maybe regional differences</td>
</tr>
<tr>
<td></td>
<td>Family status</td>
<td>Role of the family</td>
</tr>
<tr>
<td></td>
<td>Educational achievement</td>
<td>National divide of education (absolute/percent)</td>
</tr>
<tr>
<td></td>
<td>Ethnic makeup</td>
<td>Ethnic groups, divisions</td>
</tr>
<tr>
<td></td>
<td>Economic status</td>
<td>Division of riches</td>
</tr>
<tr>
<td>Human actors</td>
<td>Ability to bear criticism</td>
<td>Is critic comparable to learners?</td>
</tr>
<tr>
<td></td>
<td>Learning preferences</td>
<td>Are certain learning styles preferred? (survey LC)</td>
</tr>
<tr>
<td></td>
<td>Self-determination</td>
<td>Do learners want to influence their course management system and content? (survey LC)</td>
</tr>
<tr>
<td></td>
<td>General pedagogical</td>
<td>Are there general pedagogical philosophies?</td>
</tr>
<tr>
<td></td>
<td>philosophies</td>
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</tr>
<tr>
<td></td>
<td>Significant life</td>
<td>Wars, times of extremely fast development, catastrophes, etc.</td>
</tr>
<tr>
<td></td>
<td>experience</td>
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</tr>
</tbody>
</table>

tal entities influence each other from outside to inside, for example, a European law has a higher relevance for the member states of the EU than a national law on the same issue. While the tutors and learners usually belong to the context in which they interact, authors/educators may originally belong to another context. Thus, we show them a little outside of the national context of the learner/advisor. For example, an author from Germany may also be writing learning content for a school, university, or enterprise in Austria, and when checking a resource, may find that two contexts have influence on the design of this particular OER: the original context of the author and the author’s interpretation of the context for which the resource has been designed. All displayed entities (stakeholders and environmental
context) influence the educational scenario (depicted in the lower part of the figure). In terms of definable data (for each type of influence)—which we call influence factors—those entities are responsible for providing/producing influence factors. With regard to learners, their particular cultural background plays a significant role and influences their expectations and behavior. We particularly focused on the cultural context of e-learning, because there appeared to be little insight as to which cultural aspects influence attitudes and expectations of learners (Richter, 2011a). Finally, we have now identified and verified several culture-related influence factors. These influence factors seem to have a considerable impact because they directly influence the satisfaction, and thus the motivation, of the learners, which is a critical success factor in e-learning (Richter & Adelsberger, 2011).

In our analysis, we arranged the concrete influence factors in various groups called “influence factor classes.” We categorized them informally according to their roots/general topics, such as rights, human actors, culture, state of development, politics, religion, companies, and geographical issues. During this process, we realized that there are interdependences between the different influence factors (and thus, also between the influence factor classes), as shown in Figure 3.

On the one hand, Figure 3 displays the defined influence factor classes. On the other hand, it shows that the influence factor classes must not be understood as selective, as some influence factors obviously belong to more than one class. When, for example, taking specific symbols with a positive or negative meaning within a certain society, those can have a cultural background but additionally a historical and/or legal one. One concrete example would be the use of the swastika as symbol. In Germany, the swastika has a historical background related to German fascism in the Second World War. Apart from educational purposes, German law generally forbids displaying this symbol.12 In other countries, the swastika has a positive meaning, such as luck, sun, or life. For instance, when adapting South Korean OER, it would be crucial to check whether a swastika is being used, for example, as bullet points.
The overlaps shown in Figure 3 represent interdependences between the influence-factor classes identified to date. The different sizes of the ellipses do not have a specific meaning but were needed to visualize the overlaps. It is conceivable that the intensity of some influence factors may change the impact or relevance of others by, for example, overloading the capability of people to accept differences. Consequently, it is not yet possible to make definitive statements, such as, a certain conflict may not appear if the deviation between both contexts is below 20% (insofar as the influence factor can be quantitatively measured at all). The problem of identifying and evaluating cross-effects between the influence factors remains. To solve this problem (if it is solvable at all), more research on clashes between concrete educational scenarios in general, and in e-learning in particular, is needed.

Returning to the OER adaptation process, our list of potential influence factors may be understood as an indicative tool to systematically determine differences between the genuine context that a learning resource originally has been designed for and its target context. In our upcoming research, which will be conducted from 2012 to 2015, we plan to define the specific data for the determined contextual aspects for as many countries as possible. In previous investigations, we discovered that it is difficult, if not almost impossible, for a foreigner to collect data in other countries, particularly where the researcher does not possess a profound knowledge of the national structures and the local languages. Thus, we consider that we still need partner institutions supporting the collection and verification of national/regional data, particularly when working beyond the European context.
The aim for our next research phase is to provide an open access database that supports the display of national/regional contextual data. Additionally, we plan to implement a function that allows us to contrast the specific attributes of the influence factors of two countries/regions in order to get an initial idea of potential adaptation needs. However, our contextual model is limited to those influence factors identified in the literature as having led to conflicts and to those we imagine as further potentially critical aspects. Although our model will never be complete, it can help to avoid already known conflict situations in educational processes. We consider it unlikely that an OER author who allows others to reuse his/her learning materials will be able or willing to invest additional time for collecting or defining contextual data. Instead of authors having to put effort into their own context description, our database will offer authors a chance to simply link their OER to the specific contextual datasets in the database. Future users of the OER will then have access to both the information on the context of the OER and a description of their own context and be able to compare one against the other.

As a vision for the future, we would like to change the open database to an open decision-support system. However, before we can do so, and if this is possible at all, we need to collect enough information on occurred conflicts, their sources, and negative consequences, based on differences between specific contexts. We think that with those insights we might be able to give reasonable recommendations for adaptation needs, at least in terms of some influence factors and with regard to specific regional and national contexts needing special attention during the adaptation process.

Conclusion
In this article, we have attempted to show that OER can indeed play a fundamental role in supporting educational development throughout the world. The approach that we have taken in this research is an attempt to resolve an existing dilemma: that is, while a huge effort is being made to provide a great deal of high quality educational resources freely, many potential beneficiaries are unable to make full use of these in the contexts where they are needed. In doing this study, we have identified a number of major OER obstacles that first need to be overcome, such as a failure to take foreign contexts into consideration, producing resources that cannot be altered (Schwertel, Pawlowski, Mikroyannidis, & Pirkkalainen, 2011) and/or not providing sufficient information on contexts/content.

As a consequence of our study, we would like to propose the following recommendations on the design of e-learning resources to support reuse/adaptation:

1. When producing OER, a printable version of the learning resources should be provided.
2. Short abstracts should be provided for resources longer than a single page, particularly those that cannot be understood in a single view, and should if possible be written in English.
3. Where resources include combinations of pictures and text, these should be provided in a changeable format or else their reusability will be very limited.
4. In addition, particularly with regard to repositories, republishing of adapted resources should be encouraged and easily manageable for educators. Most
educators are not sufficiently proficient in using ICTs to make alterations to OER with more than just a few clicks.

(5) When researching for suitable resources, educators need to be able to quickly decide if a resource matches their needs. Such an abstract should roughly describe the content of the resource, for which scenario it originally has been produced and what its purpose was.

(6) In future, a context description should also be linked to the resource. As for repositories, the opportunity to evaluate a resource on its usefulness in specific contexts should be possible. Educators would be encouraged to write such reports, including successes and failures. Such reports would help others to decide if a resource might be reusable in their own context of education.

From these recommendations, it can be seen that with a little more sensitivity with regard to identifying contextual differences, a consequently changeable design, and by incorporating a description of resources, producers, and providers of OER could make a fundamental difference to the usability of their resources. However, we would like to end this article on a positive note and announce that UNESCO is working on developing an OER platform that supports the documentation of adapted versions of learning resources (UNESCO, 1995–2011a). The OPEN Scout project also supports the reporting of success-and-failure stories (Mikroyannidis, Okada, Little, & Connolly, 2011). Other institutions providing repositories are recommended to follow this example. Nevertheless, despite these initiatives, it seems clear that if we really want to make a difference to those in greatest need, we need to try to follow the subsidiarity principle, and to seriously pursue the concept of implementing “aid for self-help” in a more viable fashion.

Notes
2. http://www.icde.org/OER+Mandate.9UFRzG5a.ips
6. For information on the Alice Springs School of the Air, see http://www.assoa.nt.edu.au/_HISTORY/history.html
8. See Online Public Schools at http://www.k12.com/schools-programs/online-public-schools
9. For example, Rosmaler et al.’s model (2004) did not explicitly consider any search and/or rewrite options and both models did not include any refinements to already completed steps (Pawlowski and Zimmermann’s model is linear [2007]).
10. In case of sources from outside the countries, we followed the journalistic principle that the same information had to be provided from two independent sources, like the CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/) and the Fischer Weltalmanach [Fischer World Almanach] (http://www.fischerverlage.de/buch/der_neue_fischer_weltalmanach_2012/9783596720125).
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