

Proceedings of the 1st International Symposium on Open Educational
Resources: Issues for Localization and Globalization

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1st Proceedings of the International Symposium on Open Educational Resources Issues for Globalization and Localization



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Editorial

As populations grow and policies for mandatory public education put greater demand on schools to educate children and adults, how will states manage to provide quality education for all? One can illustrate it with the case of Brazil. Enrollment in basic education has risen steadily over the past decade reaching near universality. Federal policy has now included elementary education as part of what is considered a basic, mandatory education to be provided by the State. According to legislation, teachers must now hold a university degree to teach and are encouraged to pursue degrees in their area of specialty. These and other factors have fueled an increasing demand for education at the graduate and post-graduate levels. On the other hand it is known that the demand for new teachers will not be met by current graduation rates. Universities would need to grow at unprecedented levels in order to quench the demand for new teachers around the country, and curricula increasingly demand new skills of existing teachers and new specialists (African history, Sign language, Spanish, Sociology and Philosophy, Music, among others).

These trends can be seen in many countries around the world, both rich and poor. The movement for Open Education and Open Educational Resources is an attempt to mitigate these concerns. Open Education is by no means a new phenomenon. One could go back many years, but need only turn to Ivan Illich and his proposal for formal communities of learning for some insight. Already in the 70's he envisioned a world where people would "network" in order to teach and learn any topic of interest. To facilitate this free and open education, Illich envisioned the central role of the shared, communal resources and the need for open systems rather than centralized content distribution.

This is an area of great interest for those involved with OER. The movement for Open Educational Resources has grown exponentially over the past.

According to the most recent UNESCO/COL guidelines, OER can be defined as:

"...teaching, learning, and research materials in any medium that reside in the public domain or have been released under an open license that permits their free use and, in some instances, re-purposing by others. The use of open file formats improves access and reuse potential of OERs which are developed and published digitally. Open educational resources can include full courses, course materials, modules, textbooks, research articles, videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge. OER is not synonymous with online learning or eLearning. Rather, many OER – while shareable in a digital format – are also printable. Given the bandwidth and connectivity challenges common in some developing countries, a high percentage of resources will be shared as printable resources, rather than being designed solely for use in online learning."

OER promotes the potential of the exchange, sharing, adaptation, and modification of content licensed openly, using open formats. This has led to exciting new ways to think about how educational content is created and used. At the same time we have come to realize the opening content has reframed by sustained divides between those who traditionally create and those who just consume, and has not led to massive uptake in remixing and adaptation by those who can create. How can we prevent a neo-colonization and one-way flow of content based on the massive amount of content published by richer nations? How do we promote worldviews and exchange if we do not build systems and capacity so that minority groups effectively contribute?

Our future holds immensely valuable promises based on OER: an OER-based university, global communities of learning, and the free exchange of open

content. But for these and other promises to come to life, there is an urgent need to discuss how educational resources can effectively be exchanged between the peoples of the world. If we are to find this global voice we must again go back to these borders and frontiers which are obfuscated by discussions which focus on wealthy nations and within the confines of higher education: boundaries between rich and poor, peripheral and mainstream, connected and disconnected. This will lead us to a fruitful revisiting of OER from the perspective of culture: instructional design, systems for dissemination and collaboration, capacity building in resource-poor locations, methods for development, among others.

These proceedings are the result of a meeting entitled 1st International Symposium on Open Educational Resources: Issues for Globalization and Localization. It stems from a long-time working group on Technology and Education financed through bi-national FIPSE-CAPES grant programs. It was born out of a set of concerns:

“The number and quality of these resources continue to grow, but an important question remains. How can these resources be accessed, reused, revised, remixed, and redistributed effectively? The concerns are mostly based in two fields: first, a technical concern in the infrastructures necessary to produce and disseminate ever more flexible resources; second, cultural concern with the possibilities that are made available by technical “openness” but nonetheless exclude the non-target audience from making use of these quality resources.” (From the Symposium call)

Invited researchers met at Utah State University during the month of April, 2011 not only to present these works, but to benefit from a great variety of perspectives and lively debate. You will find here a collection of original peer-reviewed articles that are the result of these discussions. We hope they will

contribute answers to the questions highlighted above. Plans for a second symposium are underway and we hope a large number of researchers from around the world will join us in thinking about these issues.

Proceedings presentations, more information on the authors, and other information on the Symposium and upcoming activities are available at <http://www.educacaoaberta.org/rea/eventos/symposium>.

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The Localization of Open Educational Resources: The role of culture, user and activity

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Abstract. In this article we argue that Open Educational Resources (OER) provide avenues for a more seamless exchange and localization of valuable content for educational use. But instructional design must be adapted to consider the process of remix and reuse which needs to take place for OER to benefit users worldwide. This paper argues that instructional designers interested in creating or adapting open materials must begin with the “event” or “activity” as a focal point in the development of educational resources.

Resumo. Neste artigo, argumentamos que Recursos Educacionais Abertos proporcionam maiores oportunidades para a troca e localização de conteúdo para uso educacional. Mas o design instrucional precisa ser adaptado para que *remix* e reuso possa beneficiar usuários ao redor do planeta. Este artigo argumenta que designers instrucionais interessados na criação e adaptação de recursos abertos devem começar com o “evento” ou “atividade” como ponto focal no desenvolvimento de recursos educacionais.

Introduction

Since the coining of the term “Open Educational Resources” (OER) in 2002 the movement has gained substantial momentum (UNESCO, 2002). Millions of dollars have been used to promote the production and research around OER, especially by foundations (West & Victor, 2011) but governments as well (CERI, 2007). OER can be defined as:

There are expectations that OER can promote a new, distributed model for higher education (Taylor, 2007); that open formats and licenses will encourage a more liberal exchange of resources; that new models for the production and dissemination of resources will emerge, among others. Importantly, it is believed that OER can encourage teachers and students to become producers of content rather than just consumers of prepackaged materials (Rossini, 2010). These and other possibilities make OER an exciting field of inquiry for those involved in educational change and innovation (see, Plotkin, 2010) .

In this article we argue that OER will suffer from the same limitations faced in the past by educational innovations if the issues of context and culture are not taken into consideration. We examine OER from the perspective of cultural barriers, particularly within the universe of online content. It is argued that access and use of OER is limited not only by the well known limitations learned through research into the digital divide, but also suffer from serious cultural constraints which are largely unaddressed.

In order to discuss this intersection between design, culture, education, and resources, it is assumed that in instructional design a particular standpoint on culture must be taken (Amiel, Squires, & Orey, 2009). Negating the neutral grounds with which “school” and “cultural groups” are often proposed is of particular importance here. In order to do so I must therefore argue from a particular standpoint. I take the case of Brazil, particularly in the context of K-12 public schooling. From this argument I hope the reader will be able to interpret,

filter, accept or dispense with the arguments based on comparison with the context and situation to which she might be faced. I begin with the example of textbooks in Brazil as a case for the potential benefits of OER. Next I discuss a series of concerns around access and participation in online environments. Finally I discuss the relationship between instructional design and OER, and propose a framework based on activity or “event” in order to consider culture in the instructional design of OER.

Educational Resources and Context

Public school students in Brazil receive a printed textbook for all areas of knowledge from 1st through 8th grade. The National Textbook Program (PNLD; *Programa Nacional do Livro Didático*) is one the largest federal textbook distribution program in the world. It has had particular impact in providing a minimum set of educational resources to students and teachers in isolated and/or poor communities (Correios, n.d.). In 2009 alone, the Federal government spent R\$330 million reais in book purchases (MEC, 2009a). Between one fifth and one third of the annual production of books is made of government-purchased textbooks, corresponding to over 30% of publisher’s profits. Approximately 75% of all PNLD purchases are made from four major publishing houses (“Maior segmento do mercado editorial é o de livros didáticos,” 2007; Ortellado, 2009). The program is complemented by a similar initiative focused on high school, which began in 2004 (PNLEM; *Programa Nacional do Livro Didático para o Ensino Médio*). Costs for the program, not counting distribution of the resources was R\$416,9 million in 2008 alone (MEC, 2009b). This initiative is complemented by other book ‘kits’ (MEC, 2009c).

Books are commissioned and approved by the federal Ministry of Education. Once analyzed for their physical resistance and appropriateness, and rated on the quality of their content, teachers receive a book-guide and a menu from which to choose from. Though free to choose, publishing houses heavily advertise and

promote their textbooks at the local level. Importantly, the federal government purchases the physical entities, but never the content itself. Therefore, every three years books are re-purchased in full and the sums transferred to publishers (and/or authors) who remain copyright holders of the published materials.

In São Paulo, the PNLD is complemented by a statewide program that distributes textbooks to teachers (CP; *Caderno do Professor*) and students (CA; *Caderno do Aluno*)¹. The textbooks cover the statewide curriculum and are closely aligned to an annual evaluation (SARESP; *São Paulo State Evaluation of School Performance*) conducted at years 2, 4, 6, 8 and last year of high school focused on the subjects of Portuguese, Mathematics and Science. These are then connected to bonus and incentive schemes for school personnel (Oliveira, 2009). The increasingly strong ties between curricula, materials, accountability measures in the form of student-exams, and financial incentives, have lead to substantial dependence on the official books as a source of both curriculum and content to be covered in these specific areas of knowledge, a trend which is similar to recent developments in the United States (Ravitch, 2010).

At the same time, modern discourse directed at educators and parents often emphasizes the incredible wealth of information available online to which students and teachers now have access to enrich their classroom experience. In this article we focus more specifically on the context of a traditional school, where a teacher is able to select educational resources based on personal preference, teaching style, knowledge of student-audience, and other factors. Initiatives focused on the K-12 level propose a series of challenges not only to the traditional textbook but also to teacher and student roles which are quite different from higher education, for example.

The role of the traditional designer has shifted even within the more traditional realm of public schooling. Schools in Brazil have depended (and most

¹ Other resources are also distributed, such as a guide focused on the administrators (*Cadernos do Gestor*)

still do) on the distribution of books by the Federal and State governments. But gaps do exist, and new designers of educational resources have begun to penetrate the walls of schools. Teachers who share their resources (using portals such as the *Portal do Professor* sponsored by the Ministry of Education) are effectively *designers* sharing their resources. The community at large has also become a class of designers, insofar as individuals and groups begin to produce quality educational material (for example, Khan Academy or Wikipedia). Even the traditional textbook has become flexible and open to customization by a user-cum-designer. Textbooks can now be purchased from traditional publishers in customized formats², or from upcoming publishers in very flexible formats (see for example, the publishing company Flat World Knowledge). This shift towards customization stems from recognizing that the audience can indeed be part of the design process. This also means that users, such as teachers, should be able to tailor resources to their needs, rather than adapting their needs (or objectives) to existing resources. While access to these resources is largely through digital formats, the principles behind them pose interesting challenges to the production and dissemination of print materials as they point to new models encouraging choice, print-on-demand, and alternative instructional design (such as modularity).

Whichever the case, this is a far cry from choosing a single textbook to be used for a period of three years with three different groups of students, from a menu offered by the federal government for use in *all states* of the federation; or at a more localized level, making use of a small set of textbooks in more than 5000 high schools across the state of São Paulo.

New media, technology, and the school

It is now a cliché that the Internet has changed how education is operating

² See for example Pearson's "Custom Library" at <http://www.pearsoncustomlibrary.com> or Wiley's "Custom Select" at <http://customselect.wiley.com>

and will operate in the near and distant future. A large section of these expectations is directed towards the use of the plethora of digital materials available on the Internet in order to enrich and modify current educational practices, both in formal and informal contexts, from pre-school to post-graduate education. This truism, unfortunately, is the offspring of historical expectations towards the power of educational change that can be fostered by technological tools. Without an explanation of constraints and context, the power of technology to change education seems feasible and tangible. Despite increasing availability of computer and laptops, the challenges to accessing and making use of these equipments are systemic and have been well documented in Brazil and elsewhere with remarkable symmetry. These include the difficulty in transferring knowledge about home use to pedagogical use of technical artifacts; a lack of interest by some teachers, lack or diminished access to resources and infra-structure; lack of support and maintenance; tenuous guidelines for equipment use, among others (Amiel, 2006; Bueno, 2001; Paulo Gisleno Cysneiros, 2001; Paulo Gileno Cysneiros, 2003). There is ample evidence that unless a comprehensive, long-term, and holistic approach to technology integration is taken, there will only be sporadic successes and general disappointment even in the most innovative projects (Severin & Capota, 2011).

As a recent example, high schools in the state of São Paulo are generally equipped with a state-sponsored 'kit': a functioning computer laboratory with approximately 15-20 computers, with Internet access and regional support by 1-2 trained students who offer support (the program is termed "Acessa São Paulo"). Repeating previous findings in the literature, access to the Internet is intermittent and unavailable for long periods of time, and student monitors are not always available, rendering the space unusable or problematic (Amiel & Morceli, 2007).

The Internet does indeed provide a variety of tools and content, but as we know from 20-odd years of research into the digital divide, it provides only for some. The examples above are part of a larger phenomenon – the assumption by

more affluent groups that *everyone* is connected. Recent statistics indicate that 65 out of 100 Europeans have access to the Internet, which is the highest ratio worldwide, and that roughly 1/3 of the world population is connected (ITU, 2010). But we also know that usage can mean many things, including a range of devices with varying capabilities and connection quality. We also know that many other factors determine the actual usage of Internet services based on the network of people and things that are at play in a particular event (Amiel, 2006; Lima & Brown, 2007; Strover, 2003). We therefore continue to live in a paradox. The provision of information and communication technologies (ICTs) in the form of hardware and infrastructure continues to proliferate inside and outside of school. Internet access through these devices follows the trend (NIC.Br, 2010). However, the problems in making these developments associate themselves with school improvement and participation remains illusive.

Participation

Once one has reasonable access to the Internet, what does it take to create and contribute? Warschauer (2002) has proposed that this divide is better thought through the framework of “social inclusion” which expands beyond concerns over equipment and infrastructure:

“There is not one type of ICT access, but many; the meaning and value of access varies in particular social context; access exists in gradations, rather than in a bipolar opposition; computer and Internet use bring no automatic benefit outside of particular functions; ICT use is a social practice involving access to physical artifacts, content, skills, and social support; and, acquisition of ICT access is a matter not only of education, but also of power.”

Perhaps the greatest initial barrier to making use and contributing online are the linguistic constraints to the web-based experience. In a three set approach to

international interface usability, Nielsen (1996) proposes that language is the first and foremost element one should examine. An interface must be able to display the users’ language, character set, and notations; and the interface and documentation must be usable and understandable in the users’ language as well³.

Estimating the linguistic diversity of the online environment is quite difficult. The most reliable study using a complex search of terms employing particular search engines indicated that in 2007, for every 100 pages in English on the web, there were approximately 8,5 in Spanish, 10 in French, 6 in Italian, and 3 in Portuguese (Pimienta, Prado, & Blanco, 2009). The authors point to some interesting factors affecting linguistic diversity online. First, the presence of English online, though significant, hovers around 45-50% and not a substantial majority as anecdotal evidence will have it (and perhaps even less, considering the percentage of Internet users). Second, increasing the access of native speakers of a particular language to the Internet naturally leads to an increase of language-presence. Third, early adopters of Internet-access technologies tend to be consumers of content and only later, producers (DeGennaro, 2008). There is therefore an undetermined delay between providing access and expecting content on a specific language to increase, which has particular implications for poorer countries. Finally, since English is considered a *lingua franca*, many linguistic groups feed content in English online either as their *online* language, or as a second language (translation) of content in the native tongue (Pimienta et al., 2009). By this and other studies and methods, content in Portuguese online does not surpass the 5% mark (Pimienta et al., 2009; UNESCO, 2005). Language has become an issue of access. The translation of materials has become the final effort in many educational projects aimed at promoting open educational resources⁴. While translation does indeed help increase there is much

3 The third and part in this three-pronged approach is that a system must “match the user’s cultural characteristics”, a concept we will discuss below.

4 A high-profile example is the translation of MIT’s OpenCourseWare materials to multiple

to be done in order to promote the OER agenda, and to provide access to quality educational resources to people around the world.

Digital educational resources

Initial optimism regarding digital learning objects⁵ would have us believe that only a small number of resources would suffice to quench the thirst for knowledge. Downes' (2001)⁶ position illustrates this best when he said that "...the world does not need thousands of similar descriptions of sine wave functions available online. Rather, what the world needs is one, or maybe a dozen at most, descriptions of sine wave functions available online." This is also defensible from a financial perspective:

"It makes no financial sense to spend millions of dollars producing multiple versions of similar learning objects when single versions of the same objects could be shared at a much lower cost per institution."
(Downes, 2001, p. 2)

If the percentages for language presence on the web hold, and dozen learning objects were created to explain mathematical concepts, Portuguese speakers would stop at the first and barely learn addition⁷.

languages

- 5 In the context of the original article it was used to describe small simulations such as "sine wave functions" but we can extrapolate it to consider a more open definition, including most digital content (images, audio, video and text) for the purposes of the argument.
- 6 This was an early position, and I'm unsure if Downes has changed it or, likely, enriched it with further arguments. It is used to illustrate a perspective that is still endemic.
- 7 We have only recently begun to (partially and insufficiently) address some of these concerns through just-in-time translation (as those available in search engines) and user generated content (as in *Universal Subtitles*). Translation is only a limited tool, with substantial human, resource, and financial constraints.

An attention to multilingual content is not only a question of human rights guaranteed by the Universal Declaration of Human Rights (Particularly article XXVII; (United Nations, n.d.) but also as a way to assure that the people around the world can learn from and contribute to an open web, and as an important tool in the preservation of material and immaterial culture and educational opportunities (UNESCO, 2003). Indeed we do need multiple version of very different content to satisfy the multitude of languages, contexts, and activities to which people belong and engage in, even if they do originate from a single set of five-star materials as has been done to Massachusetts Institute of Technology's (MIT) OpenCourseWare (OCW) materials, translated to Portuguese⁸, among others languages. This is indeed an unlikely and mostly undesirable case, as it discourages development of local production and voice, and in last instance re-create old colonialist attitudes, a point made by OECD (Organization for Economic Cooperation and Development; CERI, 2007).

The issues of language provide a strong example supporting the need to think about educational resources beyond the purpose representing those who are "different", or being "tolerant" of minority perspectives (Sleeter & Grant, 1994). A more appropriate objective is that of integrating content and perspectives, and promoting insights into how knowledge is constructed (Banks, 2004) which can only happen when we empower users who constitute these minorities.

Designing to promote access

This theme has begun to attract substantial attention within the OER movement, which has attracted a vibrant and diverse community of people involved in all areas of education from around the world. There is now substantial concern in regards to how these educational resources can be adapted and modified to satisfy the linguistic and cultural concerns of end-users, a non-trivial

8 See <http://mit.universia.com.br/sobreocw.jsp>

process (Lin & Lee, 2007). Thomas, Mitchell, & Joseph (2002) have argued that:

“...historically many professionals in the field of Instructional Technology have taken a culturally neutral position in the creation of instructional products. By not directly addressing culture in the design of instruction, many products have been designed that inadequately address the needs of the population for whom the instruction was designed. Unintended consequences of this shortcoming include the production of ineffective instructional products, the under use of potentially effective products, culturally insensitive products, and products that are deemed overtly culturally offensive by some members of certain populations.” (p. 40).

Indeed there is limited discussion on the topic of culture within the texts focused on the design of instructional materials, and courses on instructional design (ID) do not often make reference to the topic. Thomas and colleagues propose that the traditional model for instructional design, ADDIE⁹, must be complemented by elements of interaction (collaborative/participatory design), introspection (reflective practice), and intention to assist in a culturally-aware design that permeates all phases of the project. Following this rationale Amiel, Squires, and Orey (2009) systematized three design schemes or scenarios for a more culturally-aware design of open educational resources. The three schemes are, essentially:

1. Incrementing resources to include cultural introspection in the form of resources which discuss and complement the resource itself
2. Promoting participatory design with end users and a varied development group

⁹ Focuses on five linear steps: Analysis, Design, Development, Implementation, and Evaluation, though many alternative models have been developed based on these five elements (Gustafson & Branch, 2002)

3. Creating technically flexible resources that can be customized at point-of-use

These recommendations are useful to begin thinking about the possibilities for adaption of open resources, a technically more open production of materials, and the localization of existing materials by local producers. But how does this play out outside of the realm and resources of traditional instructional design? Specifically, how would design look like if focused on cultural concerns in complex scenarios like those in public schools classrooms? What “culture” are we addressing when we address “cultural” concerns?

Culture for design

Fortunately or not, definitions of the concept of *culture* abound. If taken within the monocultural perspective, the teaching of culture in the classroom focuses on the customs, festivities, and languages of particular “others,” generally groups of people from different nations or ethnic groups. A monocultural perspective tends to imply that the group one belongs to is comprised of a single dimension of culture everyone can identify with, such as “American”. Little attention is paid to the diversity evident on individuals, even in a small community. Bullivant (1986) offers a wider definition of culture which highlights its fluidity and its constant struggle to adapt and persist:

“...the generalized composite of interdependent and valued traditional and current public knowledge and conceptions, embodied in behaviours and artifacts, and transmitted to present and new members, both symbolically and non-symbolically, which a society has evolved historically and progressively modifies and augments, to give meaning to and cope with its definitions of present and future existential problems” (p. 42).

Proposing multiculturalism is not simply to recognize different ethnic groups such as Latinos, Jews, or African Americans. Multiculturalism examines

group identities (ethnicity, nationality, race) but necessarily highlights the individual, proposing “[a] focus away from the surface, outward aspects of culture and points our attention to the deep structure of culture, to people’s beliefs and understanding of the world” (Noel, 2000, p. 3). It recognizes the many latent identities of every individual. Identifying a “Latino” community can serve as a useful construct in some circumstances, but presupposes a homogeneity that does not exist and often undermines substantial differences. Latinos diverge in national origin, religion, values, traditions, attitudes and beliefs. An individual could spend a lifetime examining *all* sources of identity, but exploring a gamma of individual characteristics provides a far better account of the “self” and others than a single label such as “Latino” could possibly provide.

Still, complex definitions of culture might be instructive, but pose a serious challenge to the designer of instructional resources. Considering that one must be introspective about culture in the process of design, such definitions provide little in terms of guidelines. Defining the learner becomes a difficult task for the designer or teacher:

"Although no one will disagree with the statement that human beings differ, the question of what makes differences into cultural differences is not easy to tackle. If two students, one from Latin America and one from North America, perceive the interpersonal behaviour of their teacher differently we are inclined to label these differences as cultural... However, if two students from the same country perceive teacher behaviour in different ways, we will explain these differences as determined by personal preference or character." (Oord, 2005, p.180)

A common approach to creating “world-ready” materials is to generalize characteristics of particular groups according to a wide-angle view of culture (Hoft, 1996). Hoft presents a series of popular segmentation schemes focused on “cultural variables”. These include the well-known scales proposed by Hofstede

to distinguish the people of different countries: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation. These wide segmentation schemes are useful when generalization and expedience is of utmost importance, but many times they simply do not hold in specific scenarios (Rebolledo-Méndez, Orey, & Alvarez-Rodriguez, 2011). More localized approaches have been advocated at least in the sphere of formal schooling. These include having deeper and more consistent understanding of the history and struggles of particular ethnic groups (Banks, 2000). Another proposes a better understanding of how students view their “cultural pie” (Noel, 2000). In this case, a teacher could ask students to identify membership to different groups. A student might identify herself as partially by nationality (Brazilian), but also ethnically (say, Latino, if living in the United States), but also as a parent, footballer, or other memberships which constitute *affinity groups* (Gee, 2007).

This reflection points us to how the now well-established idea that a culture is not just composed of groups of exotic folks in a far away land, but affinity groups which share particular plans, symbols, routines, beliefs. Designing for affinity groups is a far more complicated task. Let us contrast two strategies, within a particular context of application: a group of 35 students (a class) in a public high school in the State of São Paulo, Brazil. If considering the cultural adaptation of educational resources, the teacher might use her knowledge of the class as a whole to adapt or create a set of materials that correspond to the audience at hand. A general audience analysis might yield a series of generalized constructs: these students are at a poor neighborhood, in the periphery of a large urban area, with low reading comprehension and writing skills, and mostly from evangelical Christian families. One could go on, but these elements provide enough generalized “cultural” knowledge to modify or direct the design. In contrast, should the teacher attempt to identify the affinity groups with which students identify themselves, she could begin by using the cultural pie example outlined above. The resulting cultural analysis would prove to be far more chaotic. Students might be evangelical Christians but perhaps with contradictory

practices and beliefs (most certainly contradicting what a general construct ‘evangelical Christian’ might provide). They might see themselves as living in a relatively “good” neighborhood, contradicting assumptions of negativity towards their socio-economic status. The analysis of these cultural pies might lead to student and teacher awareness of class diversity (which is good, and is its main purpose), but in assisting the teacher in the design of educational materials, the compounding intersections of affinity groups would not result in useful guidelines for the designer of instructional materials.

The challenge is thus: if we design according to a general segmentation scheme such as described above we risk reaching inadequate assumptions regarding a student population. It will also configure practice that is distant from the way a teacher would operate in “intuitively” analyzing a student group. Local cultural analysis of affinity groups is a reasonable activity to conduct, say, during a first week of class. It does a better job of providing an understanding of how students themselves understand to what groups they belong. In either case, generalization from data is essential, but in the second a student-generated conception of affinity is used to create a basis from which to generalize.

An activity

While the approximation to student-generated data provides a better lens, the use of this data is likely an elusive task. An alternative is to look at culture from the perspective of an *activity*. When people exercise a particular practice, within a particular affinity group, there are certain routines, behaviors, ideas and rules (implicit or explicit) that are at play. These semiotic domains (Gee, 2007) are different for a student investigating chemical bonds in a chemistry course and a student learning poetry from a literary group. Learning these codes and practices are part of what makes a physicist, a poet, or a footballer. At the bottom of these semiotic domains, are particular sets of activities that take place. At every activity students engage particular skills and concepts, which derive from affinity groups to which they belong (or belonged to in the past).

At the heart of this argument is the degree to which a cultural determinant or a “structure” imposes particular patterns of action. This of course does not play out in actual events. Individuals do not have complete cultural-autonomy in order to negate their historicity. Sahlins (2000) examines this tension from the perspective of a historical “event”¹⁰, concluding:

“The structures interact in the medium of people’s projects. According to the nature and manner of the interaction, local structures can restrain, intensify, orient, and otherwise direct the development of larger historical forces” (italics in the original, p. 343).

Another, more closely related lens to the nature of the event is that presented by *activity theory*. Here one presupposes that subjects and objects do not exist before engagement in an actual event (activity). This enigmatic phrase proposes that in the design of instructional projects, it is better to think of the student through the activity which will take place rather than to begin with the analysis of the characteristic of the group itself. In other words, students never bring their complete arsenal of cultural habits to bear on every activity that takes place. As humans, we come to select appropriate behaviors, routines and actions based on particular practices, in an adaptive and non-determinant fashion. A Brazilian student might well fall within Hofstede’s description that Brazilian society does not readily accept change and is very risk adverse in a particular domain and activity, but this risk aversion might completely disappear within another domain of activity. Similarly, students who identify themselves as evangelical Christians might as well engage their beliefs when discussing issues of abortion but might not do so when discussing relationships. The contingencies of an activity mediate the sort of cultural determinants which will come into play, not only because of the diversity which exists in a particular individual, but

¹⁰ Sahlins context is that of war and struggle in the Fijian islands, but the relationship between cultural “structure” and people’s “events” are, I believe, transferable to this context.

because of the collective characteristics of the individuals which make up a unique cultural group at *each activity*. As Sun (2006) contents: "...we should move toward designing local technology with rich understandings of use activities in context instead of simply applying cultural conventions to localization work" (18).

Instructional systems design models which propose circular or iterative processes of analysis and design, to provide space for such introspection. As such we agree with Thomas and colleagues (Thomas, Mitchell, & Joseph, 2002) that culture has been a neglected component of instructional systems design. Though it might not be explicit as part of an audience analysis phase, there is clearly room for methods of elicitation and investigation of cultural makeup to be included in existing instructional design methods. What is called for is not so much a transformation of existing models, but for an inclusion of techniques and processes that can make interaction possible. We suggest that the nature of the activity itself be an orienting or focal point to instructional design. This is particularly important when trying to consider how a different cultural group will engage with instructional materials. Focusing on activity rather than on the cultural "structure" helps the designer avoid the pitfalls of structure-as-determinant-of-event, cultural generalizations and stereotypes which do not materialize in the individual, and ignoring the true diversity of affinity groups that each individual is composed of.

We have recently begun examining this perspective in the collaborative design of activities (lessons) for high school sociology (Pezzo, Amorim, & Amiel, 2011). Through school visits and interviews, pertinent contextual elements including resources, preferences, student groups and characteristics and other relevant instructional elements are elicited. An iterative process of instructional design is done in collaboration with the teacher in order to arrive at an instructional piece that is aligned with the cultural configuration at hand. While this might not be an thrifty process, it does provide valuable insights into the differences that exist between pre-conceptions based on stratifications schemes

and specific groups as unique cultural configurations based on specific events (like a lesson on sociology).

Conclusion

In this article I discussed how OER can be used to think about an instructional design that considers context and cultural concerns. I began by proposing examining the issues of schooling, access and participation to defend the idea of OER as a viable movement, but also to highlight some of the concerns related to the discourse around remix and reuse. Finally, I presented an alternative to cultural segmentation as a way to analyze culture in design of OER. The present work reaffirms the importance of open licenses and formats as an essential starting point in supporting local remix and reuse.

The concept of activity as the focus of design has been elaborated elsewhere and frameworks for investigation of activities exist (Kaptelinin & Nardi, 2006). There is a need to extend these analyses into instructional design frameworks and bring these discussions into the field of OER. These are important tasks that will remain for further study and discussion.

Open Educational Resources provide an excellent platform for the exchange of educational materials around the globe. As designers of new resources, or *remixers* attempting to benefit from the plethora of materials available, designers must focus on adapting these materials to activities, events and the people and artifacts, which constitute local action. This mindset is quite different from what occurs currently within a publishing and design environment that encourages 'built it and they will come (or buy)'. As design become more distributed and participatory, new opportunities will arise to make great resources even better by adapting them to the activities, people, and resources of a particular event – but this can only occur within a design framework which considers adaptation, localization, and remix a standard practice, not an afterthought.

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Cultural Affordances and the Globalization/Localization Dilemma

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Abstract: Continued globalization and the need to localize materials for diverse audiences are becoming more and more necessary in today's shrinking world. Increasing amounts of learning objects and materials are becoming digital making them more and more accessible within open resources. Providing and using open educational resources allows educators to edit, adapt, and change digital learning objects as needed. Additionally, these resources allow for more flexibility, distribution, and utility. As the global availability of these educational resources increases, the need to consider how to provide cultural affordances increases as well. Several dimensions of affordances will be explored such as language, familiarity or experience, education, cultural, and sub-cultural memberships. Some instances require altering learning objects to the end user and some instances require preparing users to learn more about the global context. A heuristic model is presented here and will show the categories of affordances that should be included when determining the best manners to adapt educational resources to local and global contexts within these varying dimensions.

Resumo: A continua globalização e a necessidade de se localizar materiais para diferentes grupos categoricos estão, cada vez mais, indispensáveis no mundo atual. Um bom número de materiais e de objetos de aprendizagem estão sendo digitalizados, o que os torna mais acessíveis e os recursos muito mais amplos. Oferecendo e utilizando recursos educacionais abertos permitem aos educadores editar, adaptar e mudar objetos digitais de aprendizagem conforme à necessidade. Além disso, esses recursos permitem maior flexibilidade, distribuição e utilização. Com a crescente viabilização global desses recursos de aprendizagem educacionais aumenta-se também a necessidade de se considerar como providenciar tais saliências culturais. Inumeros aspectos de

saliências culturais serão exploradas como: linguagem, familiaridade ou experiências, educação, grupos cultural ou sub-cultural. Algumas instâncias exigem a alteração de objetos de aprendizagem conforme o usuário, outras exigem a preparação do usuário de acordo com o contexto global. Será apresentada aqui uma tabela modelo que mostrará as categorias de saliências que deverão ser incluídas considerando os recursos educacionais tanto no contexto local quanto global.

Introduction

Education is enhanced when it employs the use of exemplars and simulations. The number of these exemplars and simulations has exploded over the last ten years thanks to the Internet and local digital transmission and storage technologies. Most of these digital artifacts are created by a digitally dominant western nations, or advanced and global economies culture. Access to these digital artifacts by non-western cultures and their desire to consume these artifacts has also grown exponentially in the last ten years. Conversely, members of the American culture are also clamoring to consume artifacts from non-American sources. This creates a challenge to make each of these artifacts consumable by larger audiences.

At first blush, this means language translation, however, making a digital artifact consumable by members of a different culture can require much more than language translation.

Consider Gulliver's Travels. Although an English speaking consumer can read the words, without annotation, the nuance that makes Swift genius is likely lost. Although the need for creating cross-cultural adaptability is growing, the process in varying forms has been around for a long time. The Bible is a prime example. Although bible translations have been around for a long time, many other strategies for broadening its consumption have been employed, and continue to be invented. Current thoughts about the process of creating cultural adaptability consider both altering the object for new consumers, and preparing new consumers to understand the object as it is.

This paper discusses the concepts of culture and sub-cultural influences on the developmental processes of recognizing and acquiring the needed knowledge and abilities to succeed in today's global society. The need to acknowledge and address this change is ever more important. Higher education is attempting to prepare students to learn and work effectively in this international environment. As the global availability of educational resources increases, the need to consider how to provide cultural affordances increases. Several dimensions of affordances will be explored such as language, experience, educational levels, cultural, and sub-cultural membership. The importance of understanding these dimensions assists in the design of the object and presentation of the ideas to the target audience or learners. It is also important to realize that no object is culture free, which is not particularly deleterious, but understanding that any object already has culture and a limited perspective is important to acknowledge.

The appropriateness of the changes can depend on the goals and needs of that particular group. At times teaching a global or new concept to the learners is desired to allow the learners to increase knowledge for the demands of a more globalized economy. Other times it may be more important to modify the object or lesson to the culture or current understanding of the learners or audience. This may occur when the desired outcome is to enrich understanding of the concept by bringing the object closer to the learners' cultural understanding. Many times there are cases where both globalization and localization are occurring for desired outcomes. The heuristic model proposed in this paper is designed to assist in deciding what and how to design learning objects across several criteria.

Before engaging in the discussion of which domains to consider for creating affordances of products or materials across cultures, it can be helpful to review some concepts and definitions as discussed by various theorists and practitioners across several disciplines. Defining and discussing concepts such as globalization, localization, several views of culture, Gibson's affordances and learning to

perceive in new ways will be helpful to understand the concepts for creating cultural affordances. This paper was conceptualized as a way to guide the creation of affordances and the interplay between globalization, localization, and the learning of new ways to perceive.

Globalization

As the world becomes more interdependent economically and politically, it becomes more important to have transferable abilities to navigate more than one culture and even interact with many cultures and ideologies. This interdependence is occurring regardless of whether one acknowledges the shift or not. With the ever increasing access to technology, international media outlets, internet, and social networking, knowledge travels the world almost instantly. Globalization makes an object applicable to a worldwide audience. Globalization is described as "the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa" (Held, 1991, p. 9). Held suggested that globalization is the product of the ever emerging global economy, collective decision making, development of intergovernmental institutions, and continually increasing of global communications (1991). Bringing technology, effective global knowledge, and skills to other locales can be helpful in assisting individuals obtain the skills necessary to access and interact with the global economy. It is also important not to denigrate or destroy culture when bringing global resources to local audiences. The interplay and balance between globalization and localization can be a delicate line to walk.

Localization

In contrast to globalization, localization falls on the other end of the spectrum. Localization can be understood in several ways. The process of localization consists in accommodating a product or service to a specific culture. This

includes the translation of idiomatic expressions, local time, money currency, color interpretation, and men's and women's roles within the culture (Cyr & Trever-Smith, 2004). The Localisation Industry Standards Association (LISA) defines localization as the adaptation of a product or service to meet the local language, cultural, and other expectations of a target population (LISA, 2001). Debry (2001) suggested that localization is adapting a given product, service, material to a specific culture, so it can be easily used by the people in that culture.

Culture

Localization is dependent upon culture and culture specific nuances. Models of culture have traditionally been constructed to explain humanity, explore diverse learners and learning, and provide a framework for cross-cultural analysis, research, and design. These models of culture are multi-disciplinary, dependent on various fields and domains. These domains have conceptualized to contemplate what is known, unknown, and yet to happen. In the field of psychology, researchers formulated models of culture to explain processes of the mind (D'Andrade, 1990; Quinn, 1987; Schank & Abelson, 1977). In anthropology, models of culture take a holistic examination of cultures looking for shared behavior and knowledge (Hall, 1976). Researchers in intercultural communications have designed models of culture to explain value systems, value orientations, and the differences in values across cultures (Condon & Yousef, 1975; Hofstede, 1980). Models of culture in the field of business help personnel to better understand how culture affects management and specifically the impact of cultural values and practices in business (Javidan & House, 2001; Trompenaars & Hampden-Turner, 1998). In the field of instructional design (ID), models of culture focus on integrating culture in the design and development process and on improving learning through culture-based design specifications (Edmundson, 2007b; Henderson, 2007, 1996; Kim; 1999; Lee, 2003; Thomas, Mitchell, &

Joseph, 2002). This multi-disciplinary inquiry suggests that models of culture provide a framework to examine cultures, guide the design of culture-based products and services, and foster cross-cultural communications, relations, and meanings.

A behavioral definition of culture can assist in understanding culture as well. Skinner (1984) explained that "culture may be defined as the contingencies of social reinforcement maintained by a group" (Skinner, 1984, p. 221). Skinner suggested that cultural practices increase the likelihood of survival of that group. As survival increases with the behavior, the contingency to maintain the behavior is strengthened. These shared or common behaviors are important markers of culture as the behaviors are reinforced.

This understanding of culture can help describe the process of acculturation. One way to understand culture is described as "patterns of behavior that are passed from one generation to the next... [and] that serve as the resources for the current life of a social group" (Cole, 2005, p49). Culture is a way of seeing, perceiving, and believing. Gibson (1955) suggested that the ability to perceive or perceptual learning improves with experience and that the acquisition of new knowledge based on the improved ability to perceive. Vygotsky posited that members of every culture teach their children the beliefs and habits they would need as adults, or the psychological tools necessary to succeed in that society (Werstch & Tulviste, 2005). The Vygotskian perspective places a strong emphasis on social interactions and how these interactions influence learning and knowledge that is co-constructed or socially constructed.

Vygotsky's Socio-historical Development

Vygotsky focused his research on the effect of culture and how historical contexts affect mental functioning. Through interactions with parents, peers, schools, and the culture in the community, individuals learn the habits of the mind and cultural tools to succeed (Crain, 2005). According to Vygotsky, the

“shared history, culture, and knowledge shape the thinking and actions” of the individual (Crain, 2005, p. 222). This framework of learning and development is commonly referred to as Socio-historical or Socio-cultural development.

Vygotsky adds that to understand an individual’s learning, one must understand the historical and cultural background of the individual. Not only looking at specific experiences of an individual, but experiences that the culture endures or celebrates together helps comprehend the individual. It is the interaction an individual experiences within his or her own culture that informs and shapes the thoughts, actions, and experience. A child’s parents teach how to act at home and in public. Later, a teacher contributes to what the parents have taught or formalizes the cultural expectations, then peers, and then society continue to shape how one perceives the world and then acts in it. The learning and developing process occurs through the encountering of continually novel concepts (Gredler & Sheilds, 2008).

Rogoff followed Vygotsky’s socio-historical perspective with intercultural subjectivity as she compared values and requirements of a child’s society as shaping culturally adaptive knowledge and skills (Mejia-Arauz, Rogoff, & Paradise, 2005). Culture then, is a social context, socially constructed way of perceiving, learning, and acting. Becoming aware of one’s own culture can also help one recognize and learn about other cultures.

With this view of culture, looking at education, research, or any interaction in the world today cannot be strictly any one culture. Arnett suggested that American Psychology needs to be less American (Arnett, 2008). Arnett’s rationale for this approach includes; Americans only constitute 5% of the world population, research on the whole of humanity is necessary to understand human behavior, and globalization is intensifying (Arnett, 2008, 2002). Arnett continued to suggest that more cultural and international research is needed to be able to generalize findings to a broader audience and to be able to better understand the diversity of humanity and human behavior. Gaining these cultural

sensitivities and competencies are psychological tools that are necessary for today’s global society and economy. As these views of culture are important to understand and acknowledge, it is also necessary to include cultural affordances, or the ways of perceiving, and take into account the ability to learn to perceive in new ways, or understand new or other cultural perspectives.

Gibson’s Affordances

Gibson and Gibson (1955) suggested that perceiving and learning to perceive are important facets of learning. For perception to occur, detection of external stimuli must occur. Sensation is the physical ability to detect stimuli in the environment with the sensory system (visual, auditory, olfactory, haptic, and gustation). Sensation is described as the “reception of stimulation from the environment and the initial encoding of that stimulation into the nervous system” (Ashcraft & Radvansky, 2010, p. 69). As an individual’s senses improve with age, development, and experiencing interaction with one’s environment, the ability to perceive or interpret what one senses also improves and develops. What an individual does with the sensory information, as the brain processes the stimuli is perception. Processing the stimuli with the information sent to the brain from the sensory organs results from improved sensory ability, past experiences, and neurological connections primed by the information are engaged in the process of perception. Perception includes interpreting and understanding sensory information. How one interprets and understands sensation can also be taught by others. Even what information to process, to what one attends, can be influenced by the meaning taught by others. Likewise, as sensation improves, and experience gives meaning to what one senses, perception develops. Berger (2010) describes this interaction of experience (perception) and sensation as follows: “Without experience, newborns stare at lights, startle at noises, and consider every face the same. By six months, they are far more discerning” (Berger, 2010, p. 97).

Gibson's affordances come from the ability to perceive and the learning of how to perceive. Affordances are the interaction of current abilities to perceive and learning new manners to perceive distinguishing features that were not apparent with the previous perceptive abilities (Gibson & Gibson, 1955). This is an ongoing process as the ability to perceive and learning how to interpret constantly interacts in a bi-directional fashion. Experience continues the development of perception. Gibson outlines several concepts that describe the process of learning. Perceptual learning is the process by which an individual learns to perceive (Gibson & Gibson, 1955).

Gibson described affordances as the interaction between the individual's abilities to perceive and the distinguishing features of the environment (Greeno, 1994; Gibson & Gibson, 1955). The process of perceiving is described as "the relationship between an object and an organism that accounts for its utility... affordances [are] one of the primary perceivable aspects of the environment, ... affordances may be among the first properties of the environment differentiated in perceptual development" (Pick, 1992).

The improvement of perceptual learning includes improving the ability to perceive with experience and the acquisition of new knowledge based on the improved ability to perceive. Perceptual development is an important part of cognitive development. Learning and increasing conceptual sophistication comes from increased ability to detect meaningful aspects of external stimuli. Part of how one interprets and assigns meaning to external stimuli comes from what one is taught by others. What may be meaningful to one culture, may not be meaningful to another culture, or can have a completely different meaning.

The interaction between learning to perceive and perceiving is developmental, or that change occurs over time. In the context of learning this means the better we perceive, distinguish, discriminate differences, the better we learn, and learn in new meaningful ways. Perception improves because individuals detect more aspects, features and nuances of the complex stimuli in

the environment, not just because one is rewarded for the new perceptions and differentiations (Gibson & Gibson, 1955; Pick 1992).

Throwing a ball and catching a ball is an example of the interplay of affordances and perceiving. The instructor needs to know the ability of the child, and throw the ball in a way that the student can catch the ball. The student needs to be able to learn to catch the ball, and learn to throw the ball back. At some point the teacher can then throw the ball differently; faster, harder, higher, lower, etc., until the child learns that level of affordance. As the student learns to perceive how to catch better, the difficulty can be increased so the student can learn to perceive at the next level. Performance, or ability to complete task improves and perception of how to perform better improves. This can occur not just because of learning a new way but also an increased ability to perceive. Learning a new language or culture can be like the analogy of learning to throw and catch the ball. Learning ways to interact appropriately in the setting and within the cultural norms need to be successful in intercultural endeavors. Learning a new culture or language is also learning a new way to perceive. Perceiving and learning to perceive new cultures and views of the world can also assist one in understanding one's own culture under a new light. McAllister and Irvine suggested that in order for teachers to be effective with "diverse students, it is crucial that they recognize their own world views" (McAllister & Irvine, 2000, p. 3). Other researchers suggest similar tenets, that understanding or becoming aware of one's own view is paramount to beginning to understand and interact with sensitivity with others' views (Bennett, 1993; Sue, 1982). Multicultural awareness, competency, and appreciation are necessary and advocated by many (Fowers & Davidov, 2006; Sue, Arredondo, & McDavis, 1993; APA 2003).

The remainder of the article includes a discussion of the following facets of creating affordances for various groups and cultures; Learning Objects with Cultural Adaptability, Learning Objects with Multicultural Affordances,

language, direct experience, indirect experience, sub-cultural membership, and modality. Within each row of the table there are several ways to consider that category. Depending on the goals of the creators and end users of the materials, the reasons for choosing one over another can vary.

Loca/Loma within cultural context or ability to adapt	Learning Objects (LO)	Learning Objects with Cultural Adaptability (LOCA)	n - Culture	Learning Objects with Multicultural Affordances (LOMA)	
Language	Indecipherable Language	Proximal Language	Poor Language	Local Language	Universal
Direct Experience (age)	Precise Age	Old Enough	Young Enough	Age Appropriate	Universal
Indirect Experience (Education)	Requires Advanced Education	Requires Esoteric Knowledge	Requires Secondary Education	Requires Basic Literacy and/or Numeracy	Requires No Education
Sub-Cultural Membership	Ethnic Culture	Religious Subculture	Political Subculture	Social Subculture	Universal
Modality	Text Only	Audio File	Still Image	Moving Image	Universal

Table 1

Strategies for Cultural adaptations in Education

Amiel, Squires, and Orey, (2009) suggested several strategies for providing cultural adaptation of learning objects and affordances for diverse cultures; Learning Object with Multicultural Affordances (LOMA), n-Culture, and Learning Objects with Cultural Adaptability. These strategies could be used in other contexts as well. The researchers suggested that learning objects (reusable

digital learning materials) use contextual elements for instruction of targeted learners (Amiel, et al., 2009). Many times these learning objects are published online and others can use it for their own contexts and purposes. The difficulty becomes, as suggested by the authors, how flexible do the learners need to be to come to understand the original context, compared with changing the designed use of the learning object to meet the objectives of the current context. Knowing whether the design should occur within the current cultural context so the recipients can understand within their own vantage point, or whether the desired outcome is to assist the learners to perceive the world in a new way based on another cultural context or vantage point becomes the impetus behind the design of the learning objects. The following table shows a way to visualize what Amiel and colleagues described followed by the definitions and explanations of these facets of design.

LOCA/LOMA Design within cultural context or adaptability to new culture	Learning Objects (LO)	Learning Objects with Cultural Adaptability (LOCA)	n - Culture	Learning Objects with Multicultural Affordances (LOMA)
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Table 2

The LOMA approach instructs the learners in a way that allows learning a more global view. This design enhances the learner's ability to perceive in a new way (outside one's own culture or current understanding). LOMA moves the learner towards the learning object. Amiel and colleagues (2009) suggested that the LOMA approach would allow the instructor or designer of the learning object to ask "what opportunities for teaching about culture does this resource provide" (Amiel, et al., 2009, p 31)? Using the original learning object to teach the cultural context of the learning material is an opportunity to help students understand the original cultural context. The resource can be used to help students perceive in a new way.

The n-Culture approach is a strategy that reduces the need to make affordances for multiple possible culture or subgroup. The designers of the learning object in the n-Culture design come from various cultures, and design the object to be used within each of their sub-cultural groups. This multicultural design team designs the product or object to be used and reused in multiple cultural contexts (Amiel, et al., 2009).

LOCA or Learning Objects with Cultural Adaptability affords the facility of designing the learning object without having to partner with various cultures or contexts in which it might be used. The responsibility for the adaptation falls on the instructor, end designer, or end user to reuse and repurpose the object to fit the needs of the context. The reusability and the ability to repurpose the learning object are implicit in the design. Examples of these resources are akin to Open Educational Resources (OER) (Amiel, et al., 2009). The LOCA design brings the learning object closer to the learner's current level of understanding, or transforms the object to the cultural perception.

These designs and strategies are useful and have specific advantages and disadvantages. Deciding on the design and intended outcome of the objectives of the instructor, designer, and the needs of the learners, assists in the decision to employ either of these strategies. These strategies can be applied outside of education as well in marketing, international and multinational training, corporate training, among other uses. While these strategies are helpful to consider when it is appropriate to either change of a learner's ability to perceive or change the learning object in a way which the student already perceives, it does not address the ways these changes can occur and the facets of the cultural affordances that can be transformed. The remainder of the paper will discuss other strategies that are either included in these strategies or in addition to these four strategies. The following definitions of terms can aid in the conceptualization and employment of these strategies.

Learning Objects (LO) - cultural or contextual design of the learning materials

based on the designer or instructors original culture or viewpoint.

Learning Object with Multicultural Affordances (LOMA) – offers explanations for the learning object and the cultural artifacts or viewpoints within the original learning object.

n-Culture – designing the resource to include the various vantages of the multicultural/multinational design team, designed for repurposing and adapting to the various cultures involved with the project.

Learning Objects with Cultural Adaptability (LOCA) – flexible design for easily adapting and providing affordances for manifold contexts and environments (Amiel, et al., 2009)

Language

Language is a large part of how we perceive the world. We learn language and learn to understand the world differently, and as we learn new ideas we seek to express them through language. Vygotsky (1978) suggested that the cultural line of development is most strongly influenced by language. Others suggest that “language and culture are intimately linked” (DeCapua & Wintergerst, 2010, p. 23). Linguistic relativity is the term that describes the degree to which language influences thought. Whorf's hypothesis (1956) was that thoughts are so influenced by language that language actually determines thought. Where one does not have a word for a concept their thoughts are limited. While many have rejected the absolute application of the hypothesis, it has been moderated to accept that language shapes and influences how one perceives the world. It is not that one cannot learn new words, or a new language, and expand their way of thinking, but that the language one possesses will certainly have an influence upon cognition. When adapting an object to other cultures and places, language has long been considered perhaps the most important aspect of that change. When considering how and what to translate, the following dimensions of

language within the project to get the desired outcome can be helpful. Table three contains definitions which can guide the discussion as to how and what to translate.

Indecipherable Language – Literally, the object includes a language foreign to the user (e.g., Chinese to a native Portuguese-only speaker). This would be the case when a language is written in a completely different writing system such as the differences between Latin or Greek alphabet, Cyrillic as in Slavic and Russian language systems, Sanskrit for Indo-Arabic languages or Kanji as an example of logographic languages and writing systems.

Language	Indecipherable Language	Proximal Language	Poor Language	Local Language	Universal

Table 3

These differences are indecipherable, or could not even be read, by a person that does not speak that language or have some formal school in regard to reading that specific language.

Proximal Language – The object includes a language that is foreign to the user, but relatively understandable (e.g., Spanish to a native Portuguese-only speaker). While many languages have similarities they are different. Sometimes these differences are difficult to overcome, and sometimes there are enough similarities to get some meaning about written texts. This similarity allows some understanding and yet it would still be limited to the extent that one would need to learn the language better to understand more.

Poor Language – The object uses words from the user’s primary language, but their meaning and organization make them barely useful (e.g., Babel fish translation). Many times the object or language is translated into the language but the translation is done poorly. The words are recognizable to the native

speaker, but the meaning is lost. Many times this occurs because the original language has phrases or meanings that do not translate well or the same word may not have all of the possible meanings from one language to another.

Local Language - The object is written in the user’s primary language, but includes reference to local places or local people not known to the user, or colloquial phrases not understood by the user. This design is likely most desirable when the target audience has specific concepts they understand within a local culture. The words may make sense to other speakers of the language but the meaning may not make sense outside of that group or locale.

Universal Language – The object is well written in the user’s primary language and is free of Local Language. The idea with universal language would be remove any local or specific terms that may alienate or favor any one group. This can be the case in Spanish where there are many cultures and nations that speak Spanish. Spanish from Spain is different from Spanish from Mexico, Bolivia, Argentina, Central America, or Caribbean Spanish speaking countries. These regions have large variances in the meanings and colloquialisms from region to region and even within each specific nation or region there is much variability as well. This approach would be a broader approach to reach a larger audience.

To target a more universal approach, Baumann (2008) suggested several important steps for the translation of a project to universally acceptable language to include various subcultures. These steps include: 1) remove regional or common expressions from the text; 2) review and finalize the text before sending it to a translator, and 3) prepare a glossary for a consistent translation (Baumann, 2008). While Baumann suggested these steps in reference to the preparation of marketing materials, the principle underlying her suggestion is that the language needs to carry the same significance for any subculture in the targeted population. Using expressions that have significance for only one of the subcultures in the target population might cause the other subcultures to miss the

message that is being sent, whatever that might be. While the message might have meaning for one group of people, for all of the others it might not. Using more universal terminology should increase the likelihood of reaching every group within a particular culture or set of cultures.

In finalizing text, the preparer should review the material and pay special attention to any cultural-specific vocabulary or other such items that might not pertain to every subculture in the target audience. It may be wise to eliminate these and replace them with more neutral vocabulary. The translator could also be instructed to pay particular attention to the potential for this issue in the translation of the material to avoid the perpetuation of any verbiage that may alienate a part of the target audience (Baumann, 2008).

To target specific local audiences, some suggest localization. Melitz (2008) suggests the need for flexibility when dealing with varying subcultures. This may be especially true owing to the fact that, while language is a “tool of communication” (p. 692), it also reflects other aspects of any given culture as well. One study showed that language can have an impact on the success or failure of the implementation of multilingual marketing websites (Nantel & Glaser, 2008). The quality of the translation of the website into the language of the local target market was shown to impact buyers’ decisions to buy or not to buy from the website. Translating into a localized language allows changes the marketing message to match a specific group. Ricks (1999) recommends hiring local translators rather than American-born language experts. Ricks gave several examples of international translation blunders: In German, "Come alive with Pepsi" was translated clumsily as "Come out' of the grave with Pepsi!" "Body by Fisher" came out as "Corpse by Fisher." In other cases, "car wash" became "Car - enema." One U.S. airline advertised in Brazil that its 747s had rendezvous lounges. To Americans and Frenchmen, rendezvous is one thing. To Portuguese-speaking Brazilians, rendezvous has an illicit meeting.

Direct Experience (age)

Another aspect to consider when localizing a project would be direct experience and the age of the target group. This historical context and shared experience of a group is often called the Cohort Effect. A cohort is a group defined by age. Different age groups share different meanings for events because they experienced and perceived these events together. Because these individuals move through life together they experience and perceive the same events in history as well as the same social movements, and cultural changes that may occur. An example of this would be how different age groups interpret meaning around World War II, the shooting of John F. Kennedy, the Fall of the Berlin Wall, the terrorist attacks on the New York Twin Towers. All of these events have a cohort effect because those with a similar age are more likely to perceive these events and ascribe meaning to these events in a similar manner as others within the cohort. The shared experience is typically influenced by age, one’s peers, and group membership. The following distinctions of age may help one transform a project to the target audience better because the consideration of these ages and groups can enhance the accessibility of the product for the audience.

Direct Experience (age)	Precise Age	Old Enough	Young Enough	Age Appropriate	Universal

Table 4

Precise Age – The object references persons (e.g., one hit wonder), places (e.g., Club 54), or things (e.g., Boogie board), or uses language that only people of a specific age would understand.

Old Enough – The object references persons (e.g., old movie star), places (e.g., route 66), or things (e.g., gas wars), or uses language that only users of a certain age or older would understand.

Young Enough - The object references persons (e.g., current Disney star), places (e.g., the hood), or things (e.g., Bluetooth), or uses language that only users of a certain age or younger would understand.

Age Appropriate - The object references persons, places, or things, or uses language that might be inappropriate for users of a young age.

Universal Age - The object references persons, places, or things, or uses language that is ageless and appropriate for users of all ages.

Deciding whether the content is age appropriate or developmentally appropriate is helpful. To do so, it is necessary to understand the target audience, the ages of potential recipients of the product (end users), or learners of the educational materials. It is also helpful to know what is considered age appropriate in other cultures. It can be offensive if children in a culture are not expected to learn about a taboo topic, or the material may be too difficult based on the target audience as well. Likewise, adolescent or adult learners may also be bored or uninterested with a topic that may be watered down because the original material was intended for a younger audience.

Indirect Experience (education)

Understanding education levels of the students or a target audience is imperative when designing resources. Knowing the literacy levels, ability to use technology, and background knowledge is valuable. Table five shows the facets of education that assist in understanding the learners' education levels when creating affordances for the audience.

UNESCO (2009) estimated that 85% of the world's children have obtained some form of secondary education (grades 7-12). The increase in secondary education at such a high rate is due to the acknowledgment that "secondary education has the transformational ability to change lives forever. . . . For young people all over the world, primary education is no longer enough"

(World Bank, 2005, p. xi-xii). The World Bank also reported that health increases with education as does the reduction of poverty (2005). Knowing the common education levels of a culture, nation, community is an effective strategy for addressing the design of educational materials, a project, or a product. Nearly all the youth in the western hemisphere, east Asia, and Europe are reported to have access to some level of secondary education; 70% in South Asia; and only 40% in sub-Saharan Africa (UNESCO, 2009).

Indirect Experience (Education)	Requires Advanced Education	Requires Esoteric Knowledge	Requires Secondary Education	Requires Basic Literacy and/or Numeracy	Requires No Education
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Table 5

Obtaining an awareness of educational levels, literacy rates, and access to technology is also beneficial. Knowing whether a community or group has an advanced education, esoteric knowledge of specific domains, level of education, or lack of education necessitates examination. Knowing that the intended users or recipients have some secondary education, or very little education would facilitate planning the medium that is most likely useful in that context. The following definitions can assist in determining how to consider differential levels of education.

Advanced – The object references concepts or vocabulary that would exclude most readers without an advanced degree (e.g., statistics).

Esoteric – The object references concepts or vocabulary that would exclude most readers without an esoteric knowledge (e.g., dog breeding). This is a specific domain of knowledge, which may or may not require an advanced degree but certainly would require learning from domain experts or practitioners the manners and language necessary to be included in the group.

Secondary Education – The object references concepts or vocabulary that

would exclude most readers without a high school diploma or some form of secondary education (e.g., World History). The object or materials are outside of the reach of someone with basic literacy or numeracy skills, but within the capacity of comprehension for someone with some secondary education.

Literate – The object uses written language.

No Education – The object is free of written language (e.g., images, YouTube, audio files). This domain may be very difficult to identify and the groups to which one would target may be difficult to access even if identifiable.

Sub-cultural membership

Cultural identity is comprised of several facets including worldview, beliefs, and behavioral practices (Jensen, 2003). Cultural identity would then include religious or moral identity, values, and practices like etiquette pertaining to eating, dressing, work, recreation, expected life transitions within a culture, and other shared beliefs and behaviors amongst the group. Many divisions or subgroups within a culture also have a subculture of expected practices and beliefs. Not all individuals in any one culture may have the same groups or combination of groups. For example, one could be from most nationalities and not share ethnicity, political ideology, or religious beliefs. Using the following heuristic for sub-cultural membership assists in considering the cultural affordances for groups within a culture or sub-culture.

Sub-Cultural Membership	Ethnic Culture	Religious Subculture	Political Subculture	Social Subculture	Universal
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Table 6

The interaction with other groups may also differ. While one group may have certain expectations and beliefs, the exposure to other views and beliefs can influence the acceptance and knowledge of other views. Identifying oneself with

one ethnicity, religion, political ideology, or certain social groups can all interplay with the other groups with which one belongs or interacts. If an individual associates with a social group that is not accepted by one's ethnic or religious group, then a conflict of differing expectations can occur. Subcultural membership can include ethnic identity, religious identity, political ideology, and social groups or associations. Ethnic identity is particularly salient for minority ethnicities within a school, community, or culture (Phinney, 2006; Umanta-Taylor, Bhanot, & Shin, 2006). According to Arnett (2010) religious beliefs socialize for three main objectives: "self-regulation, role preparation, and sources of meaning" (2010, p. 105). While industrialized nations are becoming more secular (Bellah, Madsen, Sullivan, Swindler, & Tipton, 1985), religion helps preserve cultural and ethnic traditions, especially in immigrant populations (Peek, 2005), and furthermore some suggest that religious identity is as important or more important than ethnic identity (Sullivan, 2000). Furthermore, different cultures can express or practice the same religion in various ways (Mahmoud, 1996).

Political subculture can be conveyed in terms of political ideology, systems of government, political party affiliation, social identity, and social structures based on ideals of the society the structure represents. Subgroups within any culture may not be apparent to those outside the culture. While diverse and rancorous arguments for political candidates within a nation can be made, outside that nation others may see the candidates as very similar. Within the United States one may be able to discern distinctive features and ideologies between conservative, liberal, and progressive ideas, while onlookers from other nations may see these as fine grades of capitalism and not make such distinctions. Individuals from capitalist nations may have a hard time distinguishing between socialism, and various brands of communism. Nationalism, patriotism, and multiculturalism are also facets of how political identity and subgroups can be considered (Huddy, 2001). Some researchers have found that many ethnic minorities identify more with the national identity firstly, and secondly self-

identify with their ethnic or racial groups (Citrin, Wong, & Duff, 2000; Sears, Citrin, Vindage, & Valentino, 1994).

Some aspects or values may be universal, or that can be applied to all or most cultures. Most times this means that references to specific cultures or groups have been eliminated or not included purposefully to make the product or materials acceptable and useful for all cultures and subcultures.

All of these facets of subcultural membership have an impact on how to approach the adaptation or affordances of design for targeted audiences. Exposure to groups within a society and navigating these groups' differing values can become difficult, let alone having more and more exposure to cultures and subcultures from across the globe adds to the complexity of developing and maintaining identification with any certain group, its values, and expectations (Jensen, 2003). Having at least a working understanding of ethnic majority and minority relations within a region, or differing religious groups within a society is a valuable practice. The following terms and definitions help identify areas of concern when considering how to provide affordances for subcultural membership.

Ethnic – The object references persons, places, things, or activities that are unique to any ethnic cultural not understood by the user.

Religious – The object references persons, places, things, or activities that are unique to any religious culture not understood by the user.

Political – The object references persons, places, things, or activities that are unique to any political cultural not understood by the user.

Social – The object references persons, places, things, or activities that are unique to any social cultural not understood by the user. While this concept is more difficult to define, this could include the macroscopic view of a culture or society. It would likely include ethnic, religious, political, and other interactions

among groups and values within the society. This is more likely to occur in metropolitan societies.

Universal Culture – The object is free of ethnic, religious, political, or social cultural references not understood by the user. This category would be very difficult to find commonalities across all cultures, if not impossible. It may only exist in theory if at all. Although the attempt to make an object as universal as possible or that it could apply to as many cultures as possible. One would be cautioned not to expect that one's own ideas or cultures are how all others do or should perceive or understand the world.

Modality

Another aspect of providing affordances is that of modality. Modality can refer to the mode in which information is created, stored, and disseminated. Consider varying modes of marketing or educational materials that can be adapted to reach audiences not commonly regarded, like individuals with developmental delays or those with visual difficulties, visually impaired, deaf or hard of hearing, or other accessibility challenges. Refer to table seven to view and compare the examples.

A text only document can impede those without vision as well as those that do not speak or read the language from understanding. An audio file precludes those who are deaf or hard of hearing. Still images are also not accessible to the visually impaired. At the same time still images many times do not need translation, unless the context of the image is foreign to the individuals in the target culture.

Modality	Text Only	Audio File	Still Image	Moving Image	Universal

Table 7

Video would limit access for those with visual impairments and would require captioning for the deaf and the hard of hearing. Some objects are more universal or intentionally designed for adapting to various modes of accessibility. The following terms and can assist when considering how one should attend to making allowances for modality.

Text only – Object is not accessible to the blind.

Audio file – Object is not accessible to the deaf.

Still image – Object is not accessible to the blind.

Moving Image – Object might have limited access to the blind and requires captioning for deaf.

Universal – Object meets universal accessibility requirements.

Conclusion

These aspects and components of the affordance process can support the reasoning behind how and when one makes decisions regarding the globalization and localization. There are times when more localization makes sense, and others when more globalization suits the goals of the project or product. Depending the goals and purposes of the initiative, and considering the factors outlined, bringing the individual targeted the materials in a way in which he or she can best understand or creating the most culturally affordable object can be helpful. If the desired outcome is to educate the recipient regarding the global context, the increasing the ability to perceive at the global level would be advantageous.

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Affordable mobile learning: Conventional cell phones for English as a foreign language teaching

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Abstract. The increasing use of cell phones among teenagers and young adults has contributed to the growth of mobile learning in different educational fields, including English as a foreign language (EFL) teaching. However, many learners in Latin American countries have limited access to this new learning modality due mainly to economic factors. It is necessary to provide EFL students with affordable mobile learning activities that will allow them to enhance their language learning experience. The present paper addresses an overview of mobile learning, including definitions and learning theory approaches used in its implementation. After presenting several studies on cell phone use for EFL teaching, this paper discusses several alternatives to implement more affordable activities to students using conventional cell phones. The final sections present potential advantages and disadvantages of cell phones as teaching tools, ending with recommendations for possible implementations.

Resumen. El incremento en el uso de teléfonos celulares entre adolescentes y jóvenes adultos ha contribuido al aumento del aprendizaje móvil en distintos ámbitos educativos, incluyendo la enseñanza de inglés como lengua extranjera. Sin embargo, muchos estudiantes en países de Latinoamérica tienen acceso limitado a esta nueva modalidad de aprendizaje, debido principalmente a factores económicos. Es necesario asistir a los estudiantes de inglés con actividades de aprendizaje móvil asequibles para que puedan mejorar su experiencia de aprendizaje. El presente artículo muestra una visión general del aprendizaje móvil, incluyendo definiciones, y enfoques basados en distintas teorías del aprendizaje. Además de presentar estudios realizados con teléfonos celulares para la enseñanza del inglés como lengua extranjera, este artículo discute varias alternativas para crear actividades más accesibles a los estudiantes, usando teléfonos celulares convencionales. Las secciones finales identifican posibles ventajas y desventajas en el uso de teléfonos celulares como herramientas de enseñanza, terminando con sugerencias para una posible implementación.

Introduction

Mobile devices are changing the way we learn with technology, providing potential advantages that can be applied to the English language teaching field (Kukulsma-Hulme & Shield, 2008). The use of mobile technologies around the world has grown rapidly in the last decade with mobile cellular subscriptions globally increasing from 12% in the year 2000 to approximately 67% in 2010 (ITU, 2010). The most popular mobile devices, cell phones, have also been the most used in studies on mobile learning (or m-learning) for English as a foreign or second language (Cui & Wang, 2008; Meurant, 2007; Cavus & Ibrahim, 2007). English as a foreign language (EFL) means that English is learned in a country where it is not the official or native language, it is taught within the learner's culture, and has limited opportunities to be used outside the classroom. English as a Second language (ESL) means that English is learned in a country where it is the official or native language, or is of general use within that country's culture, giving the opportunity to the learner to practice it outside the classroom (Nayar, 1997; Brown, 2000; 2001). Both terms have been used interchangeably in the literature reviewed to refer to English language teaching to non-native speakers. The term EFL as used in this paper will refer to the teaching of English language, irrespective of the terms used by the authors in their articles.

Cell phones, called mobile phones in Europe, are electronic portable devices primarily designed for communication purposes. Today, cell phones differ from earlier models in that many new features have been added, making these devices more versatile. For the purpose of this paper, cell phones will be classified in conventional cell phones and smart phones, considering their design and affordability. In general, low-cost cell phones with basic features are known as feature or conventional cell phones. These basic features include voice messaging, text messaging, picture camera, video and audio recording, Bluetooth and sometimes internet access for browsing (Lu, 2008; Cui & Wang, 2008; Ekong, 2008).

Smart phones are defined as “integrated communications devices that combine telephony, computing, messaging, and multimedia (Wagner, 2005, p.44). They are usually seen as devices that combine features from a conventional cell phone and a portable digital assistant (PDA). Two important differences between conventional cell phones and smart phones are that smart phones work through an operating system (OS) and run native applications (applications already installed in these devices).

The majority of studies on the use of cell phones for EFL have been developed in countries of East Asia, Europe or Africa, with activities and applications on smart phones or sophisticated cell phones that usually require internet access to be implemented (Orr, 2010). The use of cell phones in most Latin American countries increased over a 100% by 2008. However, mobile broadband subscriptions (internet access through cell phones) accounted for only 11% in Latin America and the Caribbean, compared to 89% in North America (ITU, 2009). Consequently, implementing similar studies in Latin American countries would represent a challenge for learners with limited internet access. Other alternatives should be considered to make mobile learning activities in EFL courses more accessible in these countries.

Adolescents and young adults in Latin America represent the sector of the population with the highest use of cell phones (ITU, 2008; Bahamóndez, Doring & Schmidt, 2009). Today, cell phones play an important role in teenagers’ everyday activities, not only for oral communication, but also as a tool to monitor their social life and relationship with peers (Campbell, 2005). Depending on the cell phones’ capabilities, teenagers can keep in touch with friends, through text or instant messaging for example, as well as to include people who share their interests in their networks.

Since teenagers and young adults carry their cell phones with them almost all the time, these technologies offer a potential opportunity to help the youth learn anywhere they are. Smart phones and cell phones with access to internet

offer a wide range of potential uses in EFL, such as mobile version of language dictionaries and English courses applications, among other options. However, many language learners cannot afford smart phones with data plans to access Internet for learning content.

The following sections will present an overview on mobile learning, a term that has emerged from the use of mobile technologies for teaching and learning. The paper also discusses the role of mobile devices in EFL learning, especially cell phones, at different educational levels. Alternatives to implement affordable mobile learning activities with conventional cell phones are also described. Lastly, the paper identifies potential advantages and disadvantages of using cell phones as teaching tools, ending with recommendations for future implementations.

What is Mobile learning?

Advocates of mobile learning do not agree on a single definition due to the rapid development of the field, as well as the different connotations given to the term “mobile” (Kukulka-Hulme, 2009; Caudill, 2007; Traxler, 2009; Rajasingham, 2011). Chinnery (2006) defined mobile learning as a subdivision of e-learning, whereas Corbeil and Valdes Corbeil (2007) stated that it was a combination of mobile computing and e-learning. Lu (2008) defined it as ‘learning assisted by mobile technologies’ (p. 515). For Kukulka-Hulme & Shield (2008), mobile learning is learning through handheld devices that may be available in any place, at any time. Caudill (2007) defined this modality as “any e-learning application delivered on-demand via mobile digital device” (p.3). Sandberg, Maris and Geus (2011) defined mobile learning as “the acquisition of knowledge through a mobile device” (p.1335).

Traxler (2009) considered some definitions in the field as very broad and imprecise, like the one presented by the Mobile learning network (MoLeNET) that defined mobile learning as “exploitation of ubiquitous handheld hardware,

wireless networking and mobile telephones to enhance and extend the reach of teaching and learning” (as cited in Traxler, 2009, p. 3). He argued that mobile learning’s definition should be limited to those devices that can be carried in a handbag or a pocket, and defines it as the use of PDAs/palmtops/handhelds, smart phones and cell phones to provide education and training. It can be inferred from all these definitions, that in order for mobile learning to take place, the use of portable and mobile electronic devices has to be involved. Therefore, the term mobile learning as used in this paper will be defined as learning with the assistance of a small portable electronic device available to the learner when needed.

Learning approaches to Mobile Learning

Approaches to learning have developed rapidly in the past twenty years, moving from behaviorist to cognitive and constructivist perspectives, with technology playing an important role along the way (Herrington, Herrington & Mantei, 2009). The advances in technology have helped classroom teaching tools to evolve from the use of classic chalk and blackboard, to the use of audiovisual materials, and eventually to the inclusion of computers, projectors and smart boards in the classroom. This progression has contributed to moving traditional classroom instruction from teacher-centered to student-centered, allowing students and teachers work together in order to achieve learning objectives. With the arrival and increase use of mobile technologies, learning can be taken out of the classroom, providing educators with the opportunity to apply existing approaches to the use of mobile devices for educational purposes.

Naismith, Lonsdale, Vavoula and Sharples, (2004) addressed how the major learning theory approaches have been applied to learning activities and projects with mobile devices:

- Behaviorism: mobile devices facilitate teacher’s feedback and positive reinforcement about students’ progress.

- Constructivism: mobile devices provide engaging experiences, letting students build their own learning at their own pace.
- Collaborative learning: mobile devices are means of communication and electronic information that can be shared with others.
- Situated learning: mobile devices can be used in real learning settings. Students can relate what they are learning to their daily activities.
- Informal and lifelong learning: learning takes place anytime and our environment has an influence on it.

Other precursors of mobile learning have also found its application to different learning approaches in EFL. Read (as cited in Lu, 2008) presented a behavioral approach to mobile learning, stating that empirical studies on vocabulary learning demonstrated that the systematic approach (learning vocabulary by memorizing target language words together with native language translations) benefits vocabulary development. Sending students vocabulary words with their translation to their cell phones through text could be an example for this approach.

Cavus and Ibrahim (2008) applied two learning approaches to mobile learning: informal learning and constructive learning. They considered mobile learning as ‘informal’ because it can happen at anytime, anywhere. Mobile learning is also ‘constructive’ because people construct their knowledge from their own experiences. Social-constructivist theories of learning can also be applied to mobile learning because it is “more personalized, ubiquitous and user-centered” (Motiwalla, 2005, p. 582). For instance, tasks with mobile devices can help students construct their knowledge about food concepts in English. Instead of reading in the textbook how to prepare an American dish, the teacher can assign students to prepare their favorite American food and record it on video with their cell phones, smartphones or iPods. In the next class, they export it to the class computer (if available) or exchange it through Bluetooth.

Rajasingham (2011) considered that a constructivist, interactive and self-directed learning is supported by teaching with mobile technology, as an expansion of traditional e-learning settings. Adult EFL learners with tight schedules can access their learning material from their mobile devices without the restriction of time and place, taking charge of their learning's pace.

As seen above, researchers take different positions on the application of learning theory approaches in teaching with mobile technology. Each of these approaches may have an application when designing mobile learning tasks in EFL, considering the factors that affect EFL learning, such as student's learning style and cognitive abilities, age, personality and socio-cultural factors. Teaching and learning with mobile devices allow teachers and students explore options to make the teaching-learning process more meaningful, within the different learning theory categories. On the one hand, a behaviorist example can be listening to the traditional "repeat after me" drill activity, still popular among EFL teachers, but through an audio-lesson in an iPod or recorded on a cell phone. On the other hand, a constructivist example could be a "scavenger hunt" during recess time, when students need to find the items corresponding to a list of new words sent to their cell phones in a text message.

Mobile Devices in mobile learning

What types of devices are mobile? Like the term mobile learning, the criteria to identify a device as mobile vary among authors. Trifanova and Ronscheti (as cited in Kukulsma-Hulma, 2009) defined a mobile device as any small and autonomous device that we can carry all the time without being noticeable. Mobile devices may include hand-held and laptop computers, portable digital assistants (PDAs), audio and video players (mp3 players, dvd players, ipods), handheld video consoles (nintendo DS, PSPs), digital dictionaries, e-book readers, smart phones, and cell phones (Chinnery, 2006; Stockwell, 2010; Cui & Wang, 2008; Meurant, 2007; Corbeil & Valdes-Corbeil, 2007).

Among the variety of technologies considered as mobile, some not necessarily meet the definition mentioned in the previous paragraph. Some authors argue that although the terms portable, mobile and handheld have been used interchangeably to refer to these technologies, there is a difference among them (Traxler 2009; Caudill, 2007). For instance, laptops, notebooks and tablet PCs are handheld, but they cannot be considered mobile devices because they are not small enough to fit in a pocket. In addition, these devices are usually turned off while users are in motion, which is not the case of mobile devices like cell phones.

iPods, PDAs, handheld computers, tablet PCs and especially cell phones, are the most commonly used devices in mobile learning language activities, whether in formal or informal settings (Chinnery, 2006; Corbeil & Valdes-Corbeil, 2007; Kukulsma-Hulme & Shield, 2008). For example, MP3s players can be used to listen to podcasts of English lessons downloaded from internet, as well as songs and audio dictionaries. iPods can be used to download audio-video lectures as well as e-books, and their recording feature can be used to record dialogues to assess students' listening skill and pronunciation. PDAs were initially used as translators, but today their use offer more advantages with the design of language learning programs (Thornton & Houser, 2005). Besides the potential advantages offered by handheld computers with internet access, the keyboard and screen make them suitable for language learning with written activities that require students' information input. Tablet PCs basically provide the same options of a laptop computer, but their smaller size makes them easier to use in mobile learning activities.

Cell phones are probably the most widely used mobile devices around the world (Ekong, 2008; Cui & Wang, 2008). In general, the student population owns more cell phones than computers, mostly due to their affordability, and this is one of the reasons why researchers consider them helpful to improve students' motivation toward language learning (Cavus & Ibrahim, 2008). In a pre-study questionnaire, all students in a preparatory school of a university in Turkey had at

least one cell phone, while less than half students had personal computers (Saran, Kursat & Seferoglu 2008). Similar results were found in a study carried out with students in a vocational high school in Taiwan, where 137 students admitted to have at least one cell phone, while only five did not have them all the time (Lu, 2008).

According to results of surveys by Pew Internet (2010), on average, 80 % of American teens between 14 and 17 years old own a cell phone. Although cell phones have become part of the lives of younger generations, their use for educational purpose in elementary and high schools in the United States is very limited, and research on their educational impact has been scarce (Campbell, 2005).

Cell phones in language learning

Research on the use of mobile devices in education has not been very extensive (Saran et al, 2008), but a fair number of studies and projects have been carried out using cell phones for language learning purposes. The Stanford Learning Lab developed one of the first projects in this area, designing Spanish learning material to be delivered via voice and e-mail in cell phones (Brown as cited in Chinnery, 2006). Initial results of the experiment were not satisfactory due to irregularities in voice and audio features, and problems with internet connections. However, it was found that simple chunks of instruction sent to students' cell phones increased their motivation to learn Spanish. Outside the United States, research on mobile learning using cell phones has been conducted to teach languages, such as Dutch, Portuguese, French, and mostly EFL. Studies have been implemented in European, East Asian and African countries at elementary, secondary and higher educational levels.

Studies on cell phones at Elementary and Secondary schools

Studies on cell phone use for language learning, including EFL, have been

conducted in elementary and secondary education. For instance, in an effort to raise Irish students' interest in their once native language, the National Council for Curriculum and Assessment in Ireland carried out a pilot project where high school students would learn Irish using their mobile phones and web-chat (Cooney & Keogh, 2007). The results indicated that both students and teachers perceived improvement in speaking Irish after participating in this project. Moreover, students found the use of technologies more stimulating than conventional teaching.

In another research, the Dutch Early Bird foundation in the Netherlands conducted a study in which fifth grade students used smart phones applications to learn English vocabulary (Sandberg et al, 2011). In order to show evidence of these devices' efficacy, children were divided into three groups: 1) children who used traditional materials, 2) children who used smart phones in activities at school and in the field trips, and 3) children that took smart phones home for the two weeks that the study lasted. The authors concluded that children in the third group -who spent more time with the smart phones- learned significantly more and achieved better results in the post-tests than children in the other two groups.

Furthermore, Lu (2008) analyzed the effectiveness of short vocabulary lessons when delivered to EFL students' cell phones through short-message-service (SMS). In a study with Chinese high school students, he found that students who read SMS lessons recalled more vocabulary than those who read them in paper based material. He also observed that students felt more motivated using this technology as a medium for self-learning.

Studies on cell phones in higher education

In higher education, research on the use of mobile devices for EFL has been conducted on a larger scale than elementary and secondary education. In Turkey, Basoglu and Akdermir (2010) conducted a study about the effectiveness of cell

phone applications compared to traditional flashcards for English vocabulary learning in first year college students. Although both techniques yielded satisfactory results, students that used cell phones obtained higher scores in the post-tests and reported they felt more motivated for learning.

Many studies on mobile language learning have focused on the short-service-message (SMS) and e-mail features to deliver English vocabulary words to students. Saran et al. (2008) conducted a study where they created instructional materials and sent them to Turkish prep school students through SMS and mms(multimedia messaging), to improve their vocabulary acquisition. The results showed that using mobile phones to deliver these instructional materials enhanced students' motivation, and improved their vocabulary.

Cavus & Ibrahim (2009) used SMS supported by a system they developed to teach new technical English words to first-year Turkish college students. The findings showed that participants enjoyed the new way of learning outside the classroom and were satisfied with what they had learned. Also, results in post tests showed that average scores increased considerably, suggesting that there was a significant improvement in their vocabulary. In a similar study conducted in Japan, students' cell phones received text messages and emails related to EFL learning activities through a software developed for these purposes (Thornton & Houser, 2005). Results presented that students who preferred their cell phones over desktop computer to work on the activities, reported more improvement in their learning.

Kiernan and Aizawa (2004) also used cell phones to teach EFL to Japanese college students, this time through task-based learning activities. Students were divided into three groups: 1) using cell phone email features, 2) using PC email, and 3) using face to face conversation. Besides students' learning improvement, this study also researched the platform preference. All members in the face to face conversation group finished the tasks on time, while only some in the PC and cell phone email groups finished their tasks in the time given. However, the

results in the post-tests showed a significant improvement in the cell phone group in comparison with the other groups, as well as students' satisfaction in using cell phones in the activity.

Research on use of cell phones at a college level has also been conducted for languages other than English. For instance, Moura and Carvalho (2010) affirmed that SMS represented an effective tool in language teaching after using this feature to assist Portuguese and French languages teaching to young adults learners in Portugal. The results showed that most students had positive attitude toward this teaching modality and obtained considerable improvement in their language learning.

In some studies, researchers also reported limitations and drawbacks. For instance, in Kiernan and Aizawa's study, the group performing the speaking activity was supposed to do it over the phone, but students could not afford the high costs in phone calls, and changed the strategy face to face conversations. In a class of 31 students participating in Lu's study, one student did not carry a cell phone on a regular basis, so his data was excluded from the study (Lu, 2008). A drawback in most studies for potential generalization is that programs and applications were developed by the researchers specifically to implement the studies. It is possible that some of these programs were not used again once the studies were over. This factor would represent a challenge if similar research is intended to carry out in Latin American countries. However, the positive results reported in general suggest that cell phones may be effective tools for EFL learning, with the design of mobile learning strategies that match the possibilities of teachers and learners in their own environment.

Mobile learning in Latin America

Projects

With the rapid development of mobile learning in the United States and

countries in Europe, East Asia and Africa, and the implementation in Latin America is taking off. Higher education institutions in some Latin American countries have developed projects in mobile learning for online courses. For instance, the Universidad de San Buenaventura in Colombia developed a mobile learning project in which students could access educational content through their cell phones or pocket PCs (Jiménez, Cortés, Martin & Lozano, 2007). The project consisted in the design of a mobile learning management system that could be accessed from mobile devices supporting java applications. The authors indicated that the mobile application allowed students interact with the content in a user-friendly way. Trials showed that the applications worked regardless the mobile device, but the layout of the information varied due to the devices' configuration.

Similarly, the Instituto Tecnológico de Monterrey in Mexico, started in 2008 a project called "Tecnología Educativa para el Aprendizaje Móvil" (Educational Technology for Mobile Learning), which has improved and expanded gradually (www.ccm.itesm.mx/techmovil). The project consisted in the design of a mobile learning management system for the delivery of online courses through Blackberry smart phones. Participants in the project are also conducting research evaluating the effectiveness of mobile devices for educational activities.

In some Latin American countries, it seems that mobile learning in higher education has been used as a mobile modality of electronic learning, where students use their cell phones to access online material. However, this type of mobile learning is not accessible to all students because is mostly promoted by the use of cell phones requiring internet connections, usually smart phones.

Studies

Studies on mobile learning found in the literature are few, but it is possible that considerable research on this matter is taking place in some Latin American countries. Saccol, Schlemmer, Barbosa, Reinhard and Sarmiento (2009)

conducted a series of online, telephone surveys and face to face interviews about mobile learning practices in Brazil, and concluded that in both business and academia mobile learning's development is still in an early phase. According to them, there are challenges to overcome in different aspects, such as technological and economic limitations, and the opposition to embracing new technologies in learning.

Bahámondez, Doring, and Albrecht (2009) addressed the potential of cell phones as tools to teach impoverished children in underdeveloped Latin American countries. Based on the potential benefits of mobile computing technology in learning, they proposed a study in which 5th graders in a Panama's public school would practice basic math concepts (addition, subtraction, multiplication and division) using cell phones, through exercises developed with simple java applications.

Kim, Miranda, and Olaciregui (2008) presented a review of potential uses of mobile devices to teach underserved Latin American indigenous children to read Spanish, their native language. The authors presented a series of alternatives to provide these children with learning material for reading, using a mobile device similar to a cell phone. The authors also discussed some factors to consider when implementing this mobile learning technology. These factors included the type of mobile learning model, learning conditions, living conditions, and needs. Also, the design of the mobile device to be used should be sturdy but with a user-friendly interface. Kim et al. (2008) felt optimistic that a mobile learning project would be beneficial to improve the poor literacy conditions of people living in rural areas with little or no access to technology.

Authors in these three studies concluded that further investigation was needed due to the increasing use of mobile devices, especially cell phones. Furthermore, more effort should be directed toward these technologies in order to utilize their benefits in educational settings.

Mobile learning research on EFL in Latin America seems to be minimal

compared to other regions, according to a gap found in the literature after looking through different sources. In the studies presented, only Kim et al. (2008) addressed mobile learning for language learning. However, his purpose was to teach illiterate indigenous children to read in their own native language. This finding suggests that further research would be suitable to measure the effectiveness of mobile learning activities that do not require complex-technology.

Affordable mobile learning in EFL teaching

Although many results in research studies have shown the effectiveness of mobile devices in language teaching, the limited or lack of access to technology as well as the costs of high-tech mobile devices (Meurant, 2007; Elias, 2011) are among the reasons why mobile learning has not yet expanded in some Latin American developing countries. Implementing mobile learning strategies in English language instruction under these circumstances is challenging, but not impossible. Satisfactory results may be obtained if mobile learning activities are adapted to the technology available in order to meet the learners' needs (Caudill, 2007).

Two important elements must be taken into account in order to design effective instruction with mobile learning activities: the context and the learners (Dickerson & Browning, 2009). When adapting mobile learning for language teaching, teachers must consider the affordability of the technology adopted to create instructions that correspond with the learner's demands and the setting where language learning will take place.

Sharples (2006) defines context as "a dynamic entity, constructed by the interactions between learners and their environment" (p. 5). That is, mobile learning context links to other daily activities, like riding the bus and walking in the mall, among other activities. The mobile learners' context emerges from their social context; therefore, when designing mobile learning activities for EFL

teaching, it is necessary to have a clear picture of how and where learners will be interacting with the target language. EFL learners mostly interact inside the classroom and chances for further interaction decrease once classes are over. Most learners will not practice the target language outside the classroom, unless they are highly motivated. Thus, using devices that students are already familiar with is an innovative way to increase their motivation (Caudill, 2007). Teachers must be aware of the capability of the students' cell phones, verifying that they have the features that are intended to be used and students are able to perform the activities. Similarly, teachers must prepare activities taking into account other technology available in the classroom, such as computers, projectors, or even radio.

Implementing affordable mobile learning activities

As stated previously, many EFL learners from low socio-economic status (SES) may not afford sophisticated devices typically used in mobile learning environments, like iPods, PDAs and smart phones. Thus, conventional cell phones provide affordable opportunities for mobile learning activities in the EFL classroom. In Latin American developing countries, low SES people do not interact with mobile devices in the same way as middle and high SES people do. Because of financial factors as the main reason, the former often opt for prepaid conventional cell phones using mostly voice and text, the basic features (Galperin & Mariscal, 2007; Galperin, 2010). Consequently, English language teachers must prepare activities that are applicable to their context, and can be performed within their capabilities. Short-message-service (SMS), picture camera, Bluetooth, audio and video are basic features available in most conventional cell phones and are suitable for language learning activities (Cavus & Ibrahim, 2007; Lu, 2008; Cooney & Keogh, 2007). Teachers can use conventional cell phone features to develop affordable mobile learning activities in the following ways:

Short message service (SMS)

As seen in previous sections, the SMS feature has been utilized in mobile learning studies to send quizzes, mini lessons, and vocabulary words to students. In most cases, these have been sent with programs designed for the purpose of the studies. If an English language teacher working with low SES students wants to make use of this feature, even with the most inexpensive rates, delivering multiple SMS on a regular basis may become an economical burden.

Many EFL teachers can access internet to work on their lesson plans from the computer labs in their schools. Some teachers have their own laptops or desktop computers from where they prepare their class material looking for additional resources online. Internet provides with alternatives that teachers can utilize to send students information through text messages. Several free online group-messaging services can be used in Latin American countries, making possible the delivery of class material or information to students' cell phones. Teachers can use these websites to send short messages containing new vocabulary words for review and reinforcement, as well as reminders about pending assignments. Cell phones SMS feature can be also utilized for students to receive short quizzes (Ekong, 2008) sent through computer software programs that can be downloaded from the internet for a very low price. These software programs are usually offered on trial periods that allow teachers to experiment before fully implementing them with the students.

Picture camera

Proper use of cell phone pictures can enhance students' understanding and retention of new vocabulary (Basoglu & Akdemir, 2010). In EFL beginner and low-intermediate levels, cell phone camera pictures can be used in lieu of picture cards to help students reinforce new vocabulary words. When learning new words on certain topic, students are usually limited to the vocabulary in their books, with little opportunity to learn vocabulary about their surroundings.

Besides using with the course book material, students working on parts of the house vocabulary can use their cell phones to take pictures in different part of their homes and in the following class they exchange the pictures via Bluetooth, or transfer it to the class room computer (if available). Students can then take turns to describe what they see in the pictures, either orally or writing sentences.

Graphic representations permit learners to work with events, places and objects missing in time and place (Norman, 1993). A typical assignment in EFL classroom for writing activities is having students write a paragraph or a short composition of what they do or where they go over the holidays. Students can use their cell phones to take pictures of places they visit over the weekends or holidays, and later show them as a slideshow in the computer to the teacher and classmates, while reading about the places in the pictures and what they did in those places. Depending on the capability of the cell phone and the options for the student, a variation of the activity could be using mms or Bluetooth to send the teacher and other classmates (if in the classroom), a picture of a holiday vacation with a short description of it.

This cell phone feature can be used to create fun learning activities to reinforce students' vocabulary learning, writing and speaking skills, but there is a disadvantage to consider. As stated earlier, the EFL teacher and students need to make use of what is available in their learning context for an effective mobile learning experience. Many schools in developing countries cannot provide all classrooms with technology; thus, some activities with cell phones cameras would not be suitable if other technological resources, such as a computer, are missing in the classroom. In this case, if there are not other alternative activities with this feature, the teacher would decide to give up its use.

Audio and video recording

Audio and video features have a great potential as tools in EFL activities, since students can use them to practice listening and speaking skills (Kukulmsma-Hulme,

2008). For example, with the audio recording feature, students can record an English speaking activity, such as introducing themselves, interviewing an English speaking person or reporting on an event. The recording can be transferred to a computer if it is available in the classroom, or a radio with usb port to be listened by the teacher for assessment and by classmates for listening comprehension. Similarly, with the video recording feature, students can act out in groups, recording dialogues in English about a topic of their interest. The recording can be transferred to the classroom computer to be watched by the rest of the class and evaluated by the teacher.

Bluetooth

This short-range feature is available in almost any conventional cell phone, and represents an inexpensive alternative to exchange and share class material. As seen in the previous examples, this feature is useful to transfer pictures, video and audio files from a cell phone to another cell phone or a computer. The main drawback of this feature is that devices exchanging information should be relatively close, which restricts its functionality. However, this limitation can be used to promote team work and collaboration among students.

Advantages and disadvantages of conventional cell phones as teaching tools

Mobile learning introduced new modalities in teaching and learning that are accompanied by many benefits, but also by many challenges. The use of cell phones as language teaching tools presents advantages and disadvantages that should be considered.

Advantages

These are some advantages in using cell phones as teaching tools:

- Affordable, small size and lightweight. Their low cost, small size and

portability (Cui & Wang, 2008; Lu, 2008). Cell phones allow access to other type of connectivity besides internet, like infra-red, Blue-tooth, which are usually inexpensive and easy to use (Csete, Wong & Vogel, 2008).

- **Motivating and engaging.** Cell phone use in mobile learning may increase teen learners' motivation and engagement in learning a new language. Their use in language teaching opens doors to a new learning environment for learners (Stockwell, 2010), where students can experience different ways to learn a new language, using a familiar device.
- **Complement traditional language teaching.** With the adequate design of instruction, cell phones provide relatively inexpensive m-learning opportunities, as well as situated learning experiences (Elias, 2011). Their use can complement language teaching material and resources inside the classroom and therefore contribute to the achievement of the learning objectives.
- **Flexibility of time and place.** Cell phones enable both teachers and students to take English language learning out of the physical classroom space. Students can receive reinforcement of new vocabulary material taught in class while they are out of school. (Lu, 2008; Kukulska-Hulme & Shield, 2008).
- **Collaborative learning and teamwork.** When using cell phones, students can engage in class activities and teamwork in higher cognitive levels than traditional teaching methods do (Kukulska-Hulme, 2006). Mobile learning activities also encourage interaction between teachers and students while working in group activities in the classroom, making learning more meaningful and the instruction more learner-centered.

Disadvantages

Cell phones also have some limitations used as teaching tools:

- Small screens and keypad. These aspects can make cell phones difficult to use for instruction. A small screen size reduces the display of information, and a small keypad makes the input of data difficult (Sharples, 2006; Shudong, & Higgins, 2006).
- Primary purpose. For teenagers and young adults, cell phones' primary use is not for learning but for communication and entertainment (Cui & Wang, 2008; Stockwell, 2010). That is, students usually have access to mobile features and applications that are not designed to teach. This might be a challenge for their use in the classroom. Some students would find difficult to see their devices as learning tools, feeling reluctant to use it for this purpose.
- Disruptive devices. In many classrooms, it is assumed that cell phones represent a tool for distraction, disruption and cheating (Domitrek & Raby, 2008). The access to games and texting during classes are the most common disruptive activities among adolescent students, whereas adult learners might take instruction time to use their cell phones for personal or work purposes (Meurant, 2007; Ekong, 2008). These types of situations have led some institutions to restrict or completely ban cell phone use inside the classroom.
- Pedagogical implications. Teachers may have to deal with the pedagogical implications of using mobile devices in instruction (Shudong, & Higgins, 2006). Although some educators may find mobile devices very innovative and motivating teaching tools, others would be skeptical about their use, either for the extra time spent in planning and designing the activity or for the lack of familiarity with this technology.

Recommendations

In comparison with other learning modalities, mobile learning is just getting started and still requires more research to fully exploit the benefits that it can offer (Saran et al, 2008). Recommendations for future implementation on affordable mobile learning and a better use of cell phones as teaching tools are worth pursuing. First of all, teachers are responsible to integrate mobile learning into the classroom, thus will need to understand how to implement these mobile technologies in their teaching. Cui and Wang (2008) recommended that teachers receive the necessary training to use this technology in their classroom and how to employ it properly with the students. In addition, even when mobile learning has had a great impact and success in the educational field, educators cannot rely only on technology to guarantee learning. Teachers and students' determination and zeal is necessary to achieve the learning goal (Cooney & Keogh, 2007). Learning with mobile devices cannot substitute classroom learning approaches, but it can complement and add value to classroom activities (Motiwalla, 2007). Mobile learning is not meant to replace conventional teaching-learning methods; its purpose is to help improve students' learning in a new and exciting way.

Conclusion

Mobile devices have contributed to make learning ubiquitous. This factor has become a challenge to educators and has made them rethink some current teaching approaches (Elias, 2011). The inclusion of cell phones as teaching tools inside and outside the classroom has helped to increase students motivation to learn and has opened new doors for teachers to explore new ways to enhance learning (Corbeil & Valdez-Corbeil, 2007). As discussed previously, research in mobile learning has yielded positive results in its implementation in language teaching in developed and developing countries across East Asia, Europe and Africa. Nevertheless, the mobile learning phenomenon in English language teaching is little known in developing countries in Latin America. It is necessary

to promote it throughout the different educational levels, so that educators be aware of all the benefits of this learning modality, of course, adapted to the reality of Latin American cultures in economic and social aspects. Conventional cell phones' features represent an affordable option for English language teachers who want to implement mobile learning strategies in their classroom, but facing students' limitations in affording expensive and sophisticated mobile devices.

The aim of this paper was to find out and discuss the possibilities of conventional cell phones' application for educational purposes, specifically in EFL. However, the use of mobile learning in language teaching cannot be considered separate from traditional teaching methods, but as a complement to them. Its effectiveness will depend on how teachers decide to integrate it once they have identified the students' needs. Further research is needed in order to study in more depth the pedagogical implications of cell phone use as teaching tools for EFL teaching, taking into account the learners' needs, socio-economic status and what type of technologies to which students have access.

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Towards Intelligent Cultural Adaptation of Educational Technology: An exploratory study

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Abstract. This paper describes an exploratory study in the area of cultural differences to inform the design of educational technology. The objective of this work was to investigate the role of Hofstede's cultural dimensions as a framework to understand cultural traits of undergraduate students at the College of Informatics, University of Veracruz, Mexico. The methodology consisted of collecting information from a pool of 65 students considering cultural, motivational orientation and learning styles information and performing segmentation analyses to group the data into profiles. The resulting profiles use motivational orientation and learning styles as variables that explain cultural characteristics for these learners. This study serves two purposes: on the one hand, the profiles can be employed as rationale for the development of culturally adaptive learning technology. On the other it paves the way for the understanding of cultural variations and how these can be investigated in relation to educational technology.

Resumen. Este artículo describe un estudio exploratorio de las diferencias culturales para informar el diseño de tecnología educativa. El objetivo de este trabajo fue investigar el rol que las dimensiones culturales de Hofstede como marco referencial para entender matices culturales entre estudiantes de licenciatura en la Facultad de Informática, Universidad Veracruzana, México. La metodología consistió de la colecta de información entre 65 estudiantes considerando orientación cultural, motivacionales y estilo de aprendizaje así como la realización de un análisis de segmentación para agrupar la información en perfiles de estudiantes. Los perfiles resultantes

usan la orientación motivacional y los estilos de aprendizaje como variables que explican características culturales de los estudiantes. Este estudio sirve dos propósitos: por un lado, los perfiles pueden ser usados como base lógica para el desarrollo de tecnología educativa culturalmente adaptativa. Por otro lado, facilitará el entendimiento de variaciones culturales y como estas pueden ser investigadas en relación a la tecnología educativa.

Introduction

Cultural variation in students could provide criteria to underpin intelligent adaptation of learning technology. Intelligent Adaptation refers to Artificial Intelligence techniques that deal with problems pertaining the provision of specific information as required by individuals instead of offering generic responses to a population. In this sense, adaptation of learning technology refers to software facilities that decide the type of content individual students will receive. The rationale for these decisions is often a criterion in connection with learner's characteristics.

This paper presents preliminary results in the area of cultural traits of undergraduate students that could inform the redesign of learning objects for first year introduction to programming. The research question pertaining this research is: How could cultural differences be understood to inform the design of adaptive learning technology? To explore the question, Hofstede's [1] framework was employed to investigate whether the cultural dimensions could be explained in terms of educational variables such as motivational orientation and learning styles. The objective is to provide evidence towards understanding cultural variability that may be employed to underpin cultural adaptation in learning technology. This research departs from the concept of culturally adaptable learning objects [6] to present a theoretical background, the methodology and the results of this research. In the discussion and future work sections, some pointers are given that establish a research path to re-design and evaluate the resulting learning technology.

Background

The use of cultural elements to inform the design of educational technology is a topic that has received increased attention because cultural attributes might affect learner's attitudes and perceptions. Hofstede's previous work [2,3,4,5] provides a starting point to explore cultural variation and its probable role and influence in the learning process. Hofstede [2] defines culture as a "collective programming" that distinguishes a group of people from another. This collective programming is normally associated to regions or countries and provides an interesting standing point to explore learners' attitudes to learning. According to Hofstede, [2] this collective programming is imprinted in the brain and can be observed only when the peoples from one particular group behave similarly under similar circumstances because implicit rules and norms predispose group members to behave in a particular way to known circumstances. According to Hofstede's theory, cultural variation can be explained with a set of five variables or dimensions: Power Distance Index (PDI), Uncertainty Avoidance Index (UAI), Individualism (IND), Masculinity (MAS) and Long Term Orientation. Hofstede define the cultural dimensions as:

- Power Distance Index (PDI) refers to ease with which less powerful people accept power disparity between. Hofstede suggests that power disparity is accepted both by more and less powerful people in a particular society.
- Individuality (IND) refers to the bonds existing between the members of a given society. Its opposite is collectivism and expresses the degree to which members of a group define themselves as part of a group.
- Masculinity (MAS) defines the preference for values such as competition and the acquisition of material possessions as indicator of success. Its opposite indicates a group's preference for values associated to the promotion of the quality of life among the group members.

- Uncertainty Avoidance Index (UAI) is the degree of tolerance that a group of people has towards uncertainty and ambiguity. The UAI also describes the comfort felt by the group members to new and unexpected situations. Rigid cultures tend to minimize uncertainty by establishing strict rules and laws and tending to believe in absolute truths and tend to be more emotional.
- Long Term Orientation (LTO) refers to the preference for values associated to longer term gain such as saving and perseverance. This cultural dimension was not employed in the current study because Hofstede's latest results [5] for the culture of interest could be used as benchmark against which the results of this study could be compared.

Further studies devised by Hofstede, evidences the relation between some dimensions such as power distance index and individualism given that groups of people with higher individualism have a smaller power distance index and vice versa. Hofstede's evidence for the "collective programming" that defines groups has been collected mainly in big multinational corporations [3, 4, 5] which is a very different setting to education. Some studies based on Hofstede's cultural dimensions present evidence that a cultural characteristic (power distance) plays a role on how learners perform and persist in online learning environments [7]. It has also been suggested that students from collectivistic cultures are less motivated to participate in online learning courses than those from individualistic cultures and that students from ambiguity intolerant cultures might be less motivated to participate than their counterparts [8].

The attractiveness of utilizing culture in the design of technology-enhanced learning environments lies in the possibility to alter presentation elements (language variations, examples, styles, motivation style) to match users' culture as opposed to be a reflection of the designers' culture. Arguably, existing educational technology (i.e. tutoring systems) could, inadvertently reflect goals beliefs and/or expectations originated in one culture and could or could not be

shared by end users in a different culture. Furthermore, it would be desirable that educational technology be endowed with elements to automatically adjust its content delivery considering the cultural background of individual users [6]. While this proposition is attractive to intelligent educational technology designers, culture is a topic difficult to conceptualize and implement as rationale for adaptation.

The work of Hofstede [1] provides a starting point for the understanding of cultural variation. While Hofstede's work relates to values in business environments, it provides a framework that is applicable to teaching and learning. Hofstede's five cultural dimensions are relevant in academic settings because many students' values, such as motivation and learning orientation, could be related to them. To explore the role of motivation and learning styles, two other measures were considered on this study: Harter's motivational orientation [10] questionnaire and Kolb's learning styles inventory [11]. These scales were selected, as they are typical to academic environments and could be valued differently supporting Hofstede's idea of cultural differences. Harter's questionnaire [10] consists of five subscales each related to an aspect of motivation. Responses to individual subscales provide an idea of the learner's orientation (intrinsic or extrinsic) for that subscale. The subscales are 1. preference for challenge vs. preference for easy work, 2. curiosity/interest vs. pleasing teacher/getting grades, 3. independent mastery vs. dependence on teacher, 4. independent judgment vs. reliance on teachers' judgment and 5. internal criteria vs. external criteria.

Kolb's learning styles inventory [11] works on two levels: the first level consists of four orientations that when combined (second level) can be used to describe individual student's styles that reflect preferences on managing education, decision-making, and problem solving in the classroom. Before defining the learning style, Kolb's questionnaire [11] established the students' preferences for four orientations (first level): Concrete Experience (CE), Reflexive Observation (RO), Abstract Conceptualization (AC) and Active

Experimentation (AE). These orientations are then combined to produce four learning styles: Diverging (CE/RO), Assimilating (AC/RO), Converging (AC/AE) and Accommodating (CE/AE).

Methodology

The methodology consisted of utilizing existing instruments to collect data from the target population and analyze the results. Both, Harter's questionnaire [10] and Kolb's inventory [11] were adapted so that the questions referred to students' characteristics for the introduction to programming class. The data collected was analyzed using correlations and further analyzed using segmentation analyses to procure a set of four styles.

Instruments

The instruments underwent an adaptation so that the questions were expressed in the area of study (first year introduction to programming) and phrased in Spanish. Hofstede's instrument consists of a series of 26 questions (6 for demographics and five related to each of the cultural dimensions). All the questions are scored individually on a five-point scale (strongly disagree, disagree, neutral, agree, strongly agree). The motivation self-report was an adaptation of Harter's test [10] with five subscales that represent characteristics associated to either intrinsic or extrinsic motivation. The scale consisted of thirty questions, six questions per subscales, the subscales are preference for challenge vs. preference for easy work, curiosity/interest vs. pleasing teacher/getting grades, independent mastery vs. dependence on teacher, independent judgment vs. reliance on teachers' judgment and internal criteria vs. external criteria. The questions were alternated and prompted the student to indicate the degree (in a scale from 1 to 4) to which that aspect is true or less true for that student. The original subscales were adapted to determine the motivational orientation of the learner towards the class of interest since the original scale [10] consists of

generic questions.

Finally, Kolb's test [11] was employed to assess students' learning style in the class of interest. The test consisted of nine sections asking the student for the degree to which he or she adheres to one of four stages of the learning process. Each question could be answered with a Likert-type scale (1-4). The resulting instruments were tested for internal consistency in a pilot test to estimate the reliability of test scores. The pilot (N=28) indicated internal consistency estimates as for Hofstede's (Alpha = .635), Harter's (Alpha = .861) and Kolb's (Alpha = .973). These results indicate good reliability for Hofstede's adaptation and very good reliability for both Harter's and Kolb's adaptations.

Population and data collection

The population for this study consisted of 65 students between the ages of 18 and 23 years old. There were 44 male and 21 female undergraduate students, all of whom had previously taken or were taking the class of interest in the semester from February to August 2010 at the College of Informatics, University of Veracruz, México. The students all consented to answer the three questionnaires and take part in this experiment. The students answered the questionnaires individually via a web page in an average of 20 minutes. The answers provided by the students were automatically stored in an online database.

Analyses

The analyses consisted of calculating the degree to which this population of students could be defined considering Hofstede's dimensions. Analyses were also performed individually to determine the type of motivational orientation and learning styles associated to each of the students of the sample. To determine the population's index for Hofstede's cultural dimensions, the following formulas were used: $PDI = 35m(03) + 35m(06) + 25m(14) - 20m(17)$; $UAI = 25m(13) + 20m(16) - 50m(18) - 15m(19) + 120$; $IDV = -50m(01) + 30m(02) -$

$20m(04) - 25m(08) + 130$; $MAS = 60m(05) - 20m(07) + 20m(15) - 70m(20) + 100$, where $m(X)$ is the mean score for question X. To assess whether students' motivation was intrinsic or extrinsic, individual responses to the adaptation of Harter's questionnaire [10] were analyzed. Answers to the questions related to individual subscales were averaged out to determine the pole towards which an individual student was more oriented. For example, questions 4, 9, 14, 19, 24 and 29 were related to subscale 4 (Independent judgment vs. reliance on teachers' judgment). Lower scores relate to the extrinsic motivation pole of this subscale (i.e. reliance on teacher's judgment) whereas higher scores relate to the intrinsic motivation pole (i.e. independent judgment). Finally, to analyze the learning style associated to individual learners a computation of the scores associated to the learning process (CE, RO, AC, AE) was performed. Depending on the value for each learning process, individual learners could be allocated to one of four learning style representing the combination of two preferred styles as indicated in the background section. For example, if a student scored high in CE and RO, this student was considered as having a diverging learning style. Subsequent analyses were carried out to study the relations between the different variables of interest using correlations and segmentation analyses.

Results

Hofstede's indexes for this population were calculated as follows: $PDI = -13.69$, $UAI = 53.15$, $IDV = 56$, $MAS = 45.70$. The values associated to the cultural dimension could be negative as in the case of PDI for this sample, indicating a decreased perception of inequality between students and teacher in the classroom, Table 1. As can be seen in Table 1, the results indicate that this group of students tends to be slightly more intrinsically than extrinsically motivated. This suggests students would prefer to work for their interest and learning rather than for rewards or recognition.

Subscale 1		Subscale 2		Subscale 3		Subscale 4		Subscale 5	
M	SD	M	SD	M	SD	M	SD	M	SD
2.36	0.55	2.78	0.38	2.27	0.48	2.39	0.54	2.59	0.52

Table 1. Results of Harter's (1981) subscales

Finally, regarding the learning styles the majority of this population (63%, 41 out of 65 students) was classified as divergent or students who have inclinations to concrete experience (CE) and reflexive observation (RO). 17% of the students (11 out of 65) can be defined as Accommodating or having preference for Active Experimentation (AE) and Concrete Experience (CE). 15% of the population (10 out of 65) fell in the fourth quadrant indicating an Assimilating learning style associated to abstract conceptualization (AC) and reflexive observation (RO).

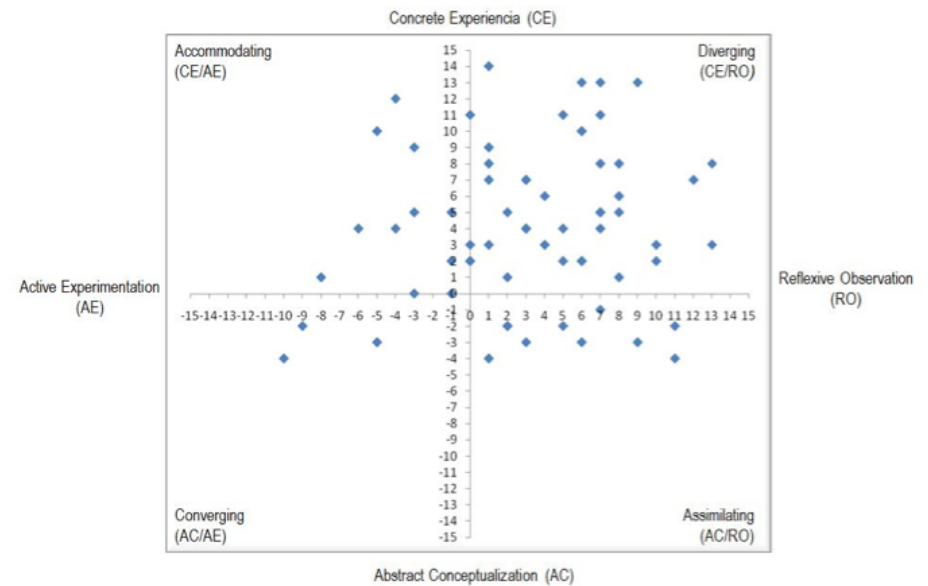


Figure 1. Results considering Kolb's learning styles

Finally, only 5% of the students (3 out of 65) can be identified as having a Converging learning style related to Abstract Conceptualization (AC) and Active Experimentation (AE) see Figure 1. Since the objective of this study was to investigate whether Hofstede's cultural dimensions could help understand how particular populations could be categorized, a series of correlations were performed, see Table 2.

	Subscale 1	Subscale 2	Subscale 3	Subscale 4	Subscale 5
PDI	-.1328 p=.291	-.1332 p=.290	.0518 p=.682	.0660 p=.602	-.1881 p=.133
UAI	-.2234 p=.074	-.2618 p=.035*	.0162 p=.898	-.1509 p=.230	-.0735 p=.561
IDV	.2548 p=.041*	-.1186 p=.347	.0427 p=.736	.0130 p=.918	-.0331 p=.794
MAS	.0472 p=.709	-.1518 p=.227	.2426 p=.052	-.1641 p=.192	.2696 p=.030*

Table 2. Correlations, Hofstede's cultural dimensions and Harter's motivation
(*p < .05)

As observed in Table 2, there are 3 significant correlations. The first positively correlates individualism (IDV) with subscale 1 (preference for challenge vs. preference for easy work); this result suggests students who are more individualistic tend to be more intrinsically motivated. The second is a negative correlation between Uncertainty Avoidance Index (UAI) and Subscale 2 (curiosity/interest vs. pleasing teacher/getting grades); this correlation suggests students who score high on the uncertainty avoidance scale tend to be more extrinsically motivated. The third is a positive correlation between the masculinity index (MAS) and Subscale 5 (internal criteria vs. external criteria); this result suggests students who scored higher on the masculinity index also have more intrinsic motivation.

To further explore the data, a segmentation analyses was performed to define user profiles that could be used to describe this particular population. The styles could be used to predict important behaviors based on Hofstede's cultural dimensions. The approach taken was that of Automatic Interaction Detection (AID) [12]. A segmentation tree was generated dividing the population into

homogeneous segments with respect to a response variable. The aim of defining segmentation trees is to divide a population in homogeneous segments with respect to a variable of interest. To achieve that, it is necessary to 1) group the categories of the variables to analyze, 2) consider all the population and assume all variables have a chance to occur and 3) add up partial probabilities taken from each categories. Given the interest on cultural aspects, the response variables were Hofstede's cultural dimensions and its relation to the independent variables (learning styles and type of motivation).

To segment the population, three categories were defined for the response variables considering individual scores: low (< -75) medium (≥ -75 a ≤ 75) and high (>75). Segmentations trees were formed considering these segments and grouping students by learning style first and by type of motivation later see Figures 2, 3, 4 and 5. As a result, four profiles were identified for this particular population:

- Profile 1: Medium IDV, divergent student with either preference for challenge (intrinsic) or preference for easy work (extrinsic).
- Profile 2: High IDV, divergent student with preference for challenge (intrinsic).
- Profile 3: Medium to high UAI, divergent students with preference to learn because of curiosity.
- Profile 4: Medium to high MAS, divergent student with high internal criteria

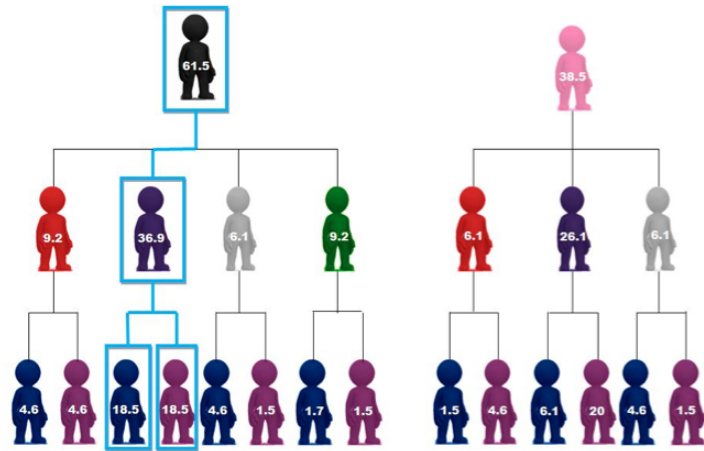


Figure 2. Segmentation analyses for Profile 1: IDV explained by divergent learning style and preference for challenge or preference for easy work motivation orientation

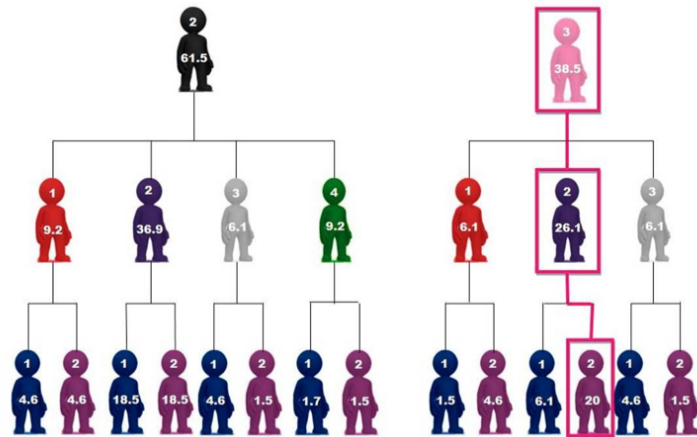


Figure 3. Segmentation analyses for Profile 2: IDV explained by divergent learning style and challenging motivation orientation.

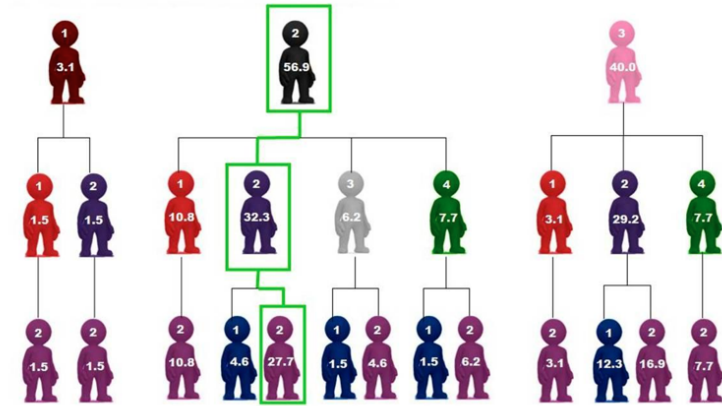


Figure 4. Segmentation analyses for UAI explained by divergent learning style and curiosity motivation orientation

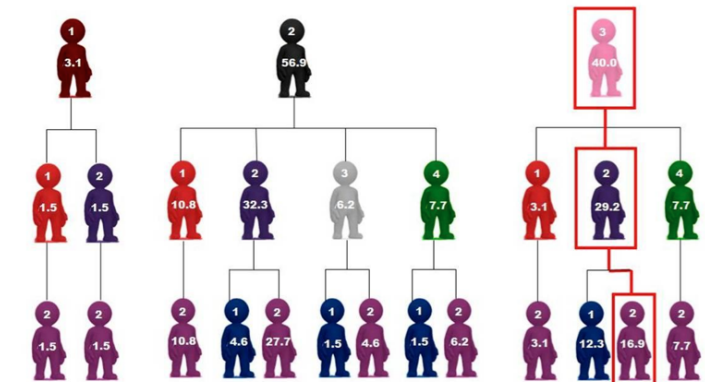


Figure 5. Segmentation analyses for UAI explained by divergent learning style and curiosity type motivation

Discussions and future work

The objective of this paper was to explore the suitability to use Hofstede's cultural dimensions as a means to understand cultural traits of a Mexican population of undergraduate students. Although Hofstede [9] provides an indication of the cultural traits for business-oriented contexts in Mexico, there are not studies for an academic environment. Thus, it was interesting to see 1) whether these cultural dimensions could be used to understand behaviors in an academic setting and 2) whether cultural behaviors could be described in terms of academic independent variables. Perhaps not surprisingly, a marked difference was found between the results of this study and the results provided in Hofstede's study in business settings [9]. Hofstede's original study reported the following results: PDI = 81, UAI = 82, IDV = 30 and MAS = 69. There are two possible explanations or their combined effects that might explain the discrepancies between the results: in terms of the context and/or in terms of the time elapsed since Hofstede's study. The most striking difference between the two sets of data relates to PDI. It was expected that in an academic setting, students would perceive the distance between the teacher and themselves in similar terms to that found by Hofstede. Surprisingly, this study found that students scored very low in this cultural dimension (PDI = -13.69) suggesting a perception of equality in their relationship with their teachers. Another surprising difference was noted in the IDV dimension as it was expected students would be less individualistic as Hofstede found (IDV=30); however, these students scored higher in this study (IDV=56). This difference could be due to the generational gap between Hofstede's original study in 1982 and the undergraduate students who participated in this study in 2010.

In order to investigate whether these cultural dimensions were correlated to typical variables in academic settings (motivational orientation and learning gains), a series of correlations were performed. There were three significant correlations between the cultural dimensions and Harter's subscales (see Table

1). The correlation indicate a) more individualistic students tend to prefer more challenges (intrinsic motivation) ($p < .05$); b) students who tend to avoid uncertainty in the class tend to please teachers (extrinsic motivation) ($p < .05$) and c) students with higher score in the MAS dimension depend more on internal criteria (intrinsic motivation) ($p < .05$). This last result might seem paradoxical given that the MAS dimension as define by Hofstede represents a behavior associated with competition and the look for recognition. However, in an academic setting, this might mean that students who know how to evaluate themselves would also bolster their successes by looking for external rewards or by competing with others.

To further investigate the relationships between the cultural dimension and the independent variables (motivation and learning styles), a segmentation analysis was performed. As a result, four profiles of students were defined considering the cultural behaviors of this particular population. The definition of these profiles represents a first step towards designing educational technology that could adapt automatically by responding to specific cultural traits of the students. Currently at the College of Informatics, University of Veracruz, a repository of Learning Objects exists and is available to introduction to programming students. It would be desirable that these objects could automatically adapt themselves to the student's learning style in a similar fashion to Amiel et al. LOCA paradigm [6].

The profiles described in this paper are a step towards automation, as it is possible to re-design the existing learning objects in the shape of the four profiles identified for this population. Adaptation would be possible, for example, if the learning object detects one particular student as belonging to one profile and provides the educational content accordingly. To that end, it is possible, for instance, to pre-screen students with a battery of tests. It could also be possible to investigate further and analyze student's behaviors for each profile to help in the implementation of automatic detection of student's profiles. An important concept to be taken into account is leverage obtained from exposing the learner

to non-preferred cultural orientation and learning styles so as to broaden the learners' capacities to work across a range of orientations and styles. The definition of Artificial Intelligence techniques such as neural networks or Bayesian networks, would allow for the automatic detection of behaviors and the calculation of success probabilities give a series of preferred learning styles while considering the learner's motivation. Subsequent studies will follow these directions.

Another direction to be taken will replicate the study reported on this paper in a different population of students in another region of Mexico and in a region of the South-Eastern United States. More importantly, future work will redesign and evaluate learning objects with four cultural traits for students at the University of Veracruz. An evaluation of this nature will shed light onto the effectiveness of adapting learning technology considering cultural variability.

Acknowledgements

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Guided Customization for Learning Objects

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Abstract. In recent years, the idea of open software has expanded and involved several new types of applications with the intention of democratizing information and knowledge. In the educational context, this idea has been evolved and called open educational resources (OER). One of the characteristics of OER is that users (i.e., teachers and students) can adapt the educational software to their needs. This adaptation is only feasible if users have access to software codes and expertise to perform the adaptation. However, adjustments for the OER community are quite specific and require the direct intervention of a teacher who usually does not have skills to perform technical changes. This work then describes a strategy for adapting Learning Objects (LO), called guided customization. This strategy proposes that, at the design step, the LO development team states precisely what resources can be adapted. Similarly, users of these resources will be associated with profiles indicating which level of adaptation, depending on their qualification, can be accomplished without, however, compromising the pedagogical content of the resource. Thus, resources can be customized by users at execution time, making the real benefits of OER become evident in practice.

Resumo. Nos últimos anos, a ideia de software livre tem se expandido e envolvido vários novos tipos de aplicativos com o intuito de democratizar a informação e o conhecimento. No meio educacional, esta ideia evoluiu e foi chamada de recurso educacional aberto (REA). Por exemplo, uma das características do REA é que os usuários (ou seja, professores e alunos) possam adaptar o software às suas necessidades educacionais. Esta adaptação só é viável se os usuários tiverem acesso aos códigos do software e expertise para realizar a adaptação. No entanto, os ajustes para a comunidade REA são bastante específicos e requerem a intervenção direta de um professor que geralmente não tem as habilidades para realizar alterações técnicas. Este trabalho então descreve uma estratégia para adaptar Objetos de Aprendizagem (LO), denominada customização guiada. Esta estratégia propõe que, na etapa de design, sejam indicados os recursos que podem ser

adaptados. Da mesma forma, os usuários desses recursos serão associados com perfis indicando qual o nível de adaptação, dependendo de sua qualificação, pode ser realizado sem, no entanto, comprometer o conteúdo pedagógico do recurso. Assim, os recursos podem ser personalizados pelos usuários em tempo de execução, tornando os reais benefícios do REA evidenciados na prática.

Introduction

In terms of globalization, sharing is not only an option but a demand, especially when information and knowledge are involved [SOUZA et al, 2011]. This idea first came up when some movements were created in order to support democratic knowledge sharing.

One of these movements that was highly responsible for this democratization is called *Open Source*. According to the Open Source Initiative (OSI), *open source* is a movement focused on software development and its distribution. Developing software according to open source philosophy requires that its source code must be opened. In addition to this, free distribution, derived works, license distribution and neutral distribution concerning technology must be guaranteed [OPEN SOURCE].

Open Source was established from the movement called free software in the 90's, as an alternative to the software industry whose point of view concerning the same software differs from the open source philosophy [OPEN SOURCE].

Another aspect that must be taken into consideration that is seen by both movements as essential to spreading knowledge is the collaborative idea. In this opening and collaborative environment that supports knowledge and information sharing, a movement in favor of opening educational resources has arisen, called OPEN EDUCATIONAL RESOURCE (OER), directed to sharing resources for the educational environment.

The acronym OER first appeared in 2002 at the UNESCO conference and it can be defined as digital educational materials freely available to those who use

them for teaching, learning and research [HILEN, 2006].

According to Hilen (2006), OER is a new phenomenon that is part of a bigger opening in colleges and universities, and includes other well-known, world-wide and established movements, such as Open Source Software (OSS) and Open Access (OA).

Instead of lack of educational resources, in this new age of technology, we have an availability of content, resources, teaching and also open architecture concerning virtual and physical spaces that have open code and knowledge [BATSON et al, 2008].

To Hilen (2006), this kind of opening must occur at an availability level as well as in usage, without technical, financial or legal problems for the target user. Thus, users will be able not only to use or read the resource, but they also will be able to adapt and therefore reuse it.

The possibility of modifying a resource, or even sharing it inside or outside its country are important issues for educational policies, since new demands in educational systems have arisen due to recent developments in communication and information technologies [DAGIENE and ZILINSKIENE, 2009].

In this chapter, we intend to explore feasible ways for building and reusing Digital Educational Resources (DER) in the form of Learning Objects (LO), based on an adaptation strategy used in its development process.

Adaptation of Digital Educational Resources

Since OER are shared worldwide, there is a need to adapt them to different users. In this section, the concept of adaptation is discussed in the perspective of Software Engineering.

The word adaptation in software was used to mean techniques used to rearrange parts of previously developed software and then reuse them in new systems [CANAL et al, 2006]. Adaptation can be done in two ways, dynamically

and statically [ROCHA et al, 2007]. The first is at a system level which is called personalization. The second is at an interface level called customization [FREUND, 2009].

Personalization must not be confused with customization. While customization is related to changing, shaping or modifying a product or service according to the user's needs, personalization involves intense communication and interaction between users and suppliers [FREUND, 2009].

In order to answer the globalization call to overcome all barriers, adaptation has been claimed as a resource to bring a higher number of people much closer. Thus, localization and internationalization techniques are highly valued, as follows [PRUDÊNCIO et al, 2005].

According to Prudêncio et al (2005), internationalization (also known as I18N) is a step in a software's development process that is responsible for adapting it and making it neutral in terms of legal, financial and cultural relationships in a country. International software must accept, for instance, different orders of numbers and algorithms that follow different rules in many different languages. In order to implement these characteristics some suitable procedures should be used to adequately localize the software.

Localization (also known as L10N) is the second step to be taken to prepare software for the international market. This is when the adaptation for a specific locale will be designed. It involves translation, cultural adaptation, standardization and characteristics of the target market.

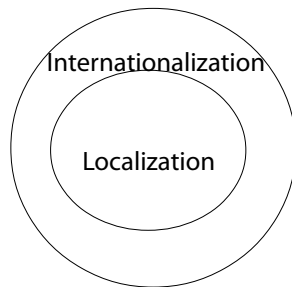


Figure 1. Relationship Between Software Internationalization and Localization

Figure 1 shows the dependency between these two techniques. According to the Localization Industry Standard Association (LISA), making software localizable implies making it linguistically and culturally adapted to the target region (country, region and language) where the software will be used [PRUDÊNCIO et al, 2005].

Although localization is a way of reducing the distance between software and users, for Amiel et al (2009), this strategy is not suitable when the focus is only on language translation. The design context is very important and must be taken into consideration.

Among all discussions concerning the possible paths of DER, a strategy for the creation of an adaptable LO is proposed in [SOUZA et al, 2010] and [SOUZA et al, 2011], called guided customization, and will be presented in the following section.

Guided Customization

The localization technique used in the software is capable of adapting it to any user. This technique is a kind of personalization and, as previously stated, it can adapt the system to its user. This technique actually allows the content to be adapted to different needs. However, to achieve this goal it is necessary to modify

the software source code.

Software localization is not an easy task because it requires specific knowledge to make the changes [SOUZA et al, 2010]. However, if the software is of an educational type, in which teachers and students are clients and users, respectively, this technique is not efficient, because it does not allow the adaptations to be done by the interested parties.

In this context, an adaptation strategy called guided customization is proposed in [SOUZA et al, 2010] and [SOUZA et al, 2011], and presented as follows. This strategy is based on customization of learning objects (LO), which allows clients to change or reconfigure the software's interface in order to adapt it to its new scenarios.

Guided customization allows one to execute adaptation in elements found in the LO, such as activities and their levels, buttons, text, video, image and audio. Another advantage in this strategy is that multicultural aspects can be more easily addressed, because teachers can take into consideration cultural diversity in their experience, thus, helping students to have more appropriate learning resources.

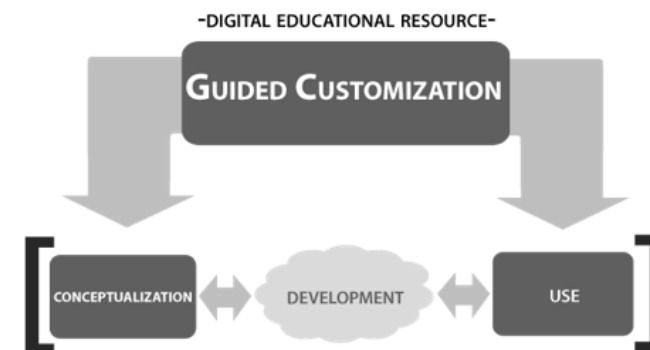


Figure 2. Guided Customization in the DER Development and Use

The guided customization strategy was developed to be used both during the conceptualization stage and during the use of the resource. Figure 2 shows the stages for the production of digital educational resources (DER), showing how guided customization is present in both stages, which are detailed in the next sections.

Guided Customization in the Conceptualization Stage

Creating a DER must begin in the conceptualization stage. During this stage, a description of each resource's scenarios is conducted, while decisions about what can and cannot be changed are made.

Each described scenario is formed by elements and actions with pedagogical potential, understood as the possibility of representing a concept. In this chapter, pedagogical potential is defined as the capacity that an element or action has, alone or in combination with other elements, to express or represent a specific concept, thus allowing its understanding. The elements of pedagogical potential that can be part of a DER include: text, images, buttons, videos and audios. A combination of elements can be used as a strategy to improve the learning process. That's why the conceptualization stage is the most important stage in the development process.

In this stage the developed resource's scope and its area are defined and a document called *storyboard* is produced to guide the implementation stage. The *storyboard* is a document used to represent the elements and actions that will be part of the resource. They are exactly the elements or actions that may be chosen to be customized and have to be carefully selected in order to maintain the DER learning goals, even if they are changed.

Once the elements and actions more likely to be altered have been identified, the resource goes into the development stage. During this stage, the professionals in charge will be responsible for implementing what was defined in the storyboard, including the customization of elements and actions previously

determined.

Figure 3 shows the interface design proposed and Figure 4 shows the screen of a LO developed from these elements. Two kinds of elements that can be customized are found on the screen (text and buttons).

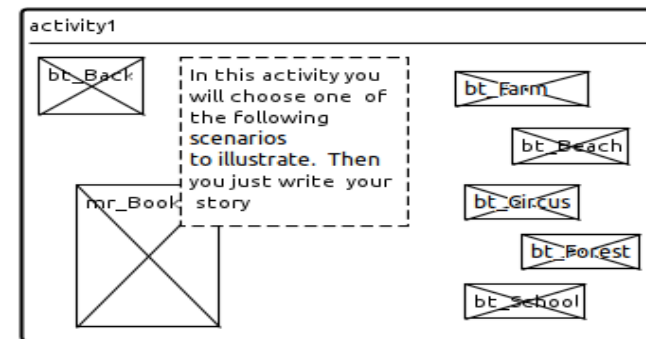


Figure 3. Interface Design of Activity 1 of the DER Customized Amazing Stories

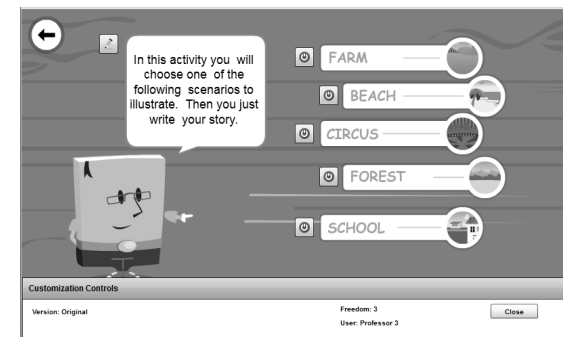


Figure 4. Interface of Activity 1 of the Customized DER Amazing Stories

The kind of customization that can be done on the element has to be specified. In the example in Figure 4, the user is allowed to edit the element text

and to turn on and off the element button.

The advantage of this approach is that adaptation is done by the client at the LO interface level, breaking the rule that only people with programming skill is able to modify or adapt a DER.

The approach used on guided customization aims to change the thought that planning must fit the resource, and it also makes it possible to fit the resource to the planning, giving more autonomy to teachers.

In the following section, the implications of guided customization on using a customized LO will be discussed.

Use of Guided Customization

In this chapter, DER can be classified in two categories: Adaptable (A) and Non-Adaptable (NA) (Figure 5). The latter concerns developed DER, but it does not have elements with pedagogical potential. That does not mean that the resource has inferior technical and pedagogical quality compared to those with this potential. On the other hand, Adaptable DER have elements with pedagogical potential elements and must offer advantages in order to be adapted.

As shown in Figure 5, concerning the kind of adaptation (A) possible, resources are divided into two forms: personalized (P), where localization (L) is contemplated, and customizable (C). In this chapter, three levels of customization are proposed: Basic (b), Intermediate (i) and Advanced (a). The number of elements with pedagogical potential available in the DER will define the level of customization.

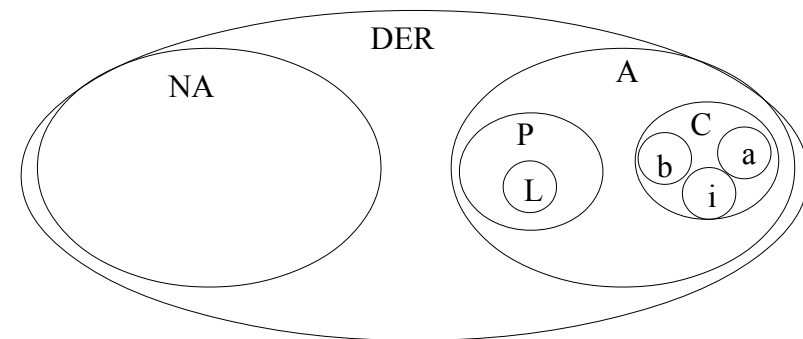


Figure 5. DER Classification According to its Capacity of Adaptation

The basic level of customization offers only customization of button elements. The intermediate level offers button and text elements, and the advanced level offers customization of audio and video, plus text and button elements.

Thus, guided customization strategy aims to facilitate the development of customizable LO and aims to make it possible for teachers to make their own adaptation of DER, regardless of the original language, country or culture in which it was developed. In order to help teachers and also attend to their level of knowledge, this chapter presents the definition of degree of freedom, which is the permission given to a client to modify a LO, taking into consideration his/her level of interest and knowledge.

The degree of freedom (DF) aims to permit adjustments to be carried out on the resource considering the number of elements with pedagogical potential and the level of knowledge required from the client in order to perform the right adjustments.

The freedom given to a client is based on the idea of freedom disseminated by the free software movement that states: point out, without restrictions, to the kind of modification to be done on a software by somebody, rating it from 1 to 4.

Each degree allows the client to modify from the highest level (Degree 1-3, modifications on the resource interface) to the lowest level (Degree 4, modifications on the resource code).

Degree 1 or simply DF 1, allows the client activating (ON) or deactivating (OFF) a certain activities. At this level, only this kind of action will be possible.

Degree 2 or simply DF 2 is more flexible because it has the permission of DF 1 plus the actions of ability to specify frames of a video that is going to be used. Taking the specification of frames as an example, it is possible to define the upper and lower limits of the video segments to be shown to the user.

Degree 3 or simply DF 3 includes the actions of DF 1 and DF 2 besides the permission to edit or rewrite a text and replace images, audio and video. Feedback texts should not be included in this list because, if they are modified, segments from the resource code will be altered.

At this level, the client is free to make several modifications and therefore determine which conceptual sequence must be presented to the user. DF 1, DF2 and DF 3 are usually designed to those who do not wish, or do not have knowledge, to make modifications at a low level.

Finally, degree 4 or DF 4 can be considered highest level of freedom to be offered on a LO, combining the permissions of DF 1, DF 2 and DF 3 with modifications on actions at a code level.

Taking as an example a LO with an advanced level of customization, in other words, with several pedagogically potential elements (texts, feedbacks, button, audio, video), unless the permission was given to the client within the project, it is not possible to make adjustments. Examples of modifications to be done at this level, besides the ones described in DF 1, DF 2 and DF 3, are the inclusion of text feedback. Even though they are text changes, they have to be done at the code level. This kind of DF 4 permission is usually taken by those who have knowledge to make changes at a low level.

The DF tries to create a relationship between the “want to modify” and “can

modify” regarding LO use and adjustments. Thus, besides making it feasible to open the content, this freedom also aims to allow opening the resource, allowing one not only to share knowledge, but also to include new ideas. For example, Figures 6 and 7 show the customizable LO Amazing Stories and its adaptation according to DF1. The Amazing Stories LO can be defined as intermediate because it has text and button elements.

In this resource, the user has the freedom to edit a text as well as activate and deactivate activities using the buttons. The client can choose the kind of adaptation to be done. If the client chooses to only deactivate an activity, (s)he will require DF 1. This action must be carried out using *login* and password that the DER must have in order to control these permissions. After that, the resource will be available to the client, as shown in Figure 5, where the character’s speech is available to be changed.

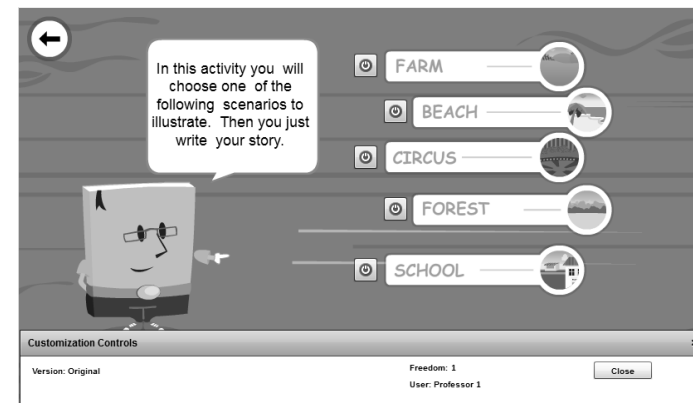


Figure 6. Customizable DER with DF 1

If the client simultaneously chooses deactivate an activity and edit the text, (s)he must require the DF 3. This action must be carried out using *login* and password. After that, the resource will be available to the client, as shown in Figure 7, but

now the speech of the editable character is included as well as the activities with the deactivate function.

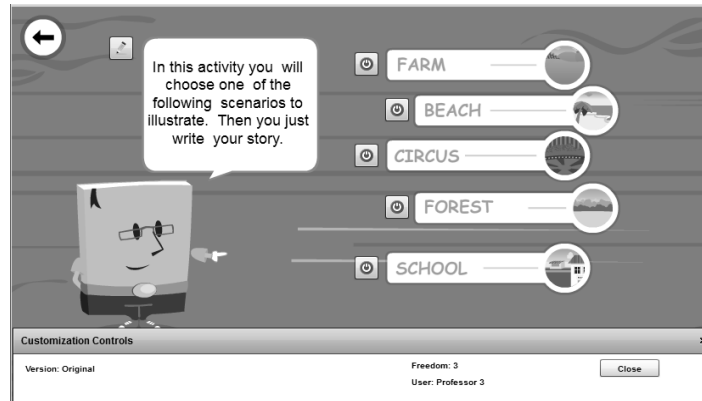


Figure 7. Customizable DER with DF 3

This freedom makes it possible to increase the teacher's autonomy, allowing for different learning opportunities. Souza et al (2007) argues in favor of the need for tools that would make this autonomy available, helping to produce a fascinating and encouraging environment for teachers and students.

Thus, we are going to discuss new perspectives in creating authoring and customization mechanisms designed to produce customizable LO.

Development Process and Authoring Tool

Before thinking about the usage of customizable LO, it is important to think about the development process used that gives support to its production, as well as the tools used.

In order to produce a LO, a multi-disciplinary team is usually required, which contains educators or instructional designers, content experts or teachers,

graphical designers and programmers.

When the developed LO has a customizable profile, the team involved in the development process is also a multidisciplinary one. However, it is not an easy task to develop resources with such characteristics, because more integration amongst all the professionals involved concerning formalism (use of diagrams) is required.

This formalism should prioritize the quality of communication among the professionals concerning the elements which should be available for changes in the LO.

Figure 8 shows the activities developed by teams and for each professionals working in the development of OA. In this process, there is not a standard for the documentation generated by each team (scope and sequence activity, modeling, animation and implementation) that promote a clear understanding of the DER requisites by all involved professionals.

In order to facilitate the development of customizable LO, a new developmental model is proposed in this chapter (Figure 9), based on model driven software engineering (MDSE - *Model Driven Software Engineering*) that uses specific languages (DSL – *Domain Specific Language*) [SCHMIDT, 2006]. These languages have representations aimed at a specific audience [SOUZA et al, 2008]. From these specifications, MDSE advises that some transformations should be applied to these models. That may be guided to any specific architecture on which codes can be created.

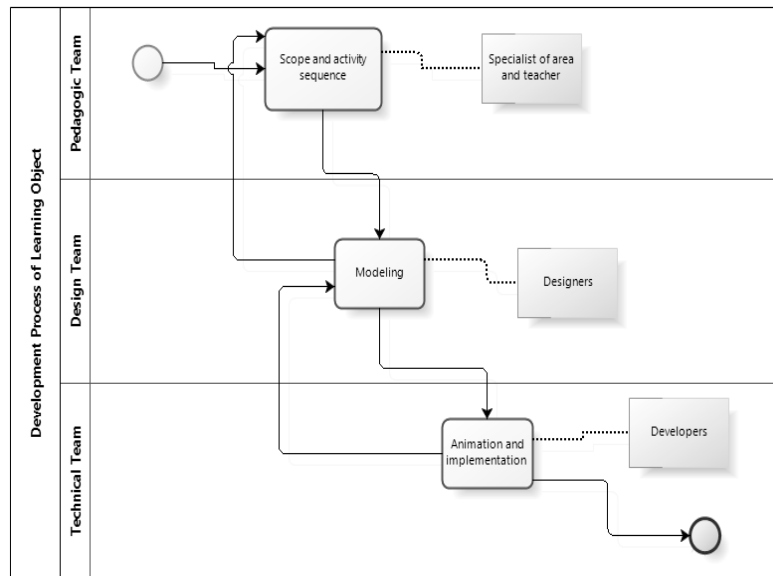


Figure 8. Generic Model of a Development Process of LO

Figure 9 shows a new development process based on model driven software engineering (MDSE - *Model Driven Software Engineering*) that uses specific languages (DSL – *Domain Specific Language*) [SCHMIDT, 2006]. These languages have representations aimed at a specific audience [SOUZA et al, 2008]. From these specifications, MDSE advises that some transformations should be applied to these models. That may be guided to any specific architecture on which codes can be created.

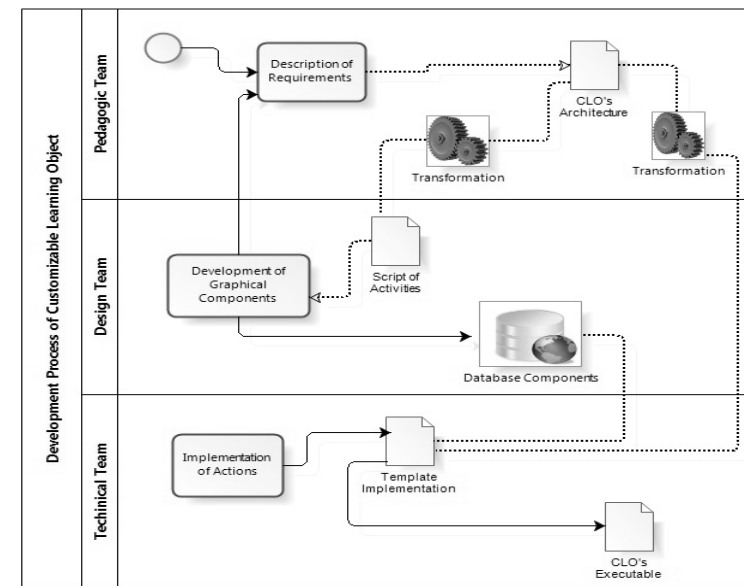


Figure 9. Development Process of MDSE based CLO

This new process allows a reproduction, while still in the project phase, of the interfaces that will be part of the object, and the relationships of dependency among them, as part of the customized learning object architecture (CLO's architecture). In order to reach this objective, a DSL is used that allows the creation of models, later used in the stages of development and implementation of the CLO.

The architectural model produced by this DSL is changed to create a plot or a storyboard that will be the basis for the production of interfaces and codes by the designers and programmers respectively.

The main idea of the MDSE is to strengthen the conceptualization stage, in order to reduce the effort in the implementation stage. In other words, the

concern is what to develop, and not how to develop [SOUZA et al, 2010].

To make the production of used documentation (templates and diagrams) easier, an authoring tool called CLO Studio was developed to build the LO's specifications and to create architectural models (Figure 10). It was developed as an Eclipse *plug-in* using the Graphic Modeling Framework (GMF) [ECLIPSE].

CLO Studio allows one to describe the LO's dynamics, the modeling of the interfaces and also the customization actions available to the user whenever the LO code is generated. Besides that, it has a metamodel and a DSL (Domain Specific Language) that will serve as a tool to build the LO.

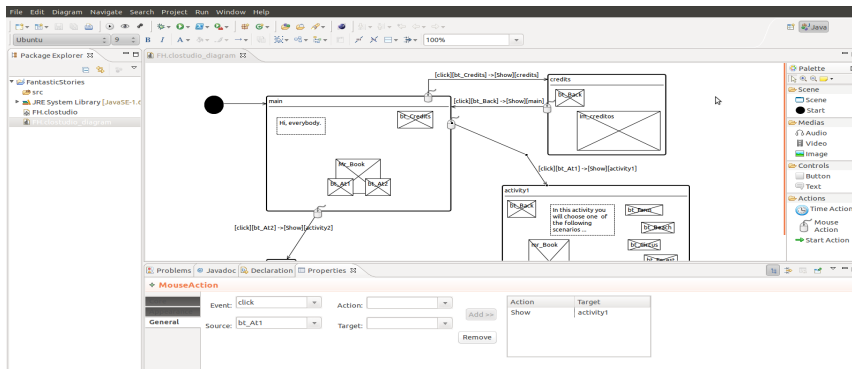


Figure 10. Screen of the CLO Studio

Figure 11 shows the importance of CLO Studio within the development process. This tool helps pedagogues and experts during the conceptualization stage by describing the resource's architecture. This description is produced in a specific language (DSL) that offers subsidies to generate the model that will represent the resource's architecture. The generated models are also described in a XML file. These documents will be used by designers and programmers as the basis to respectively model and implement the customizable resource.

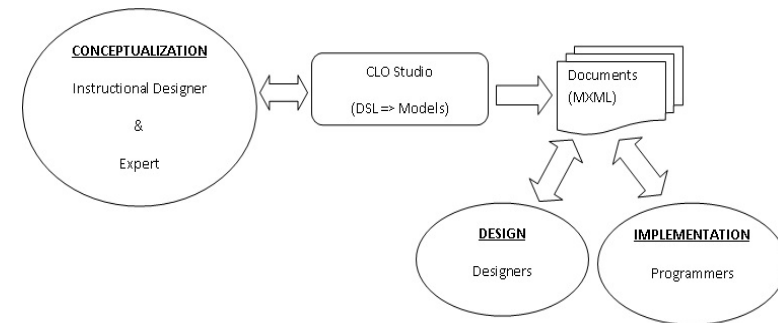


Figure 11. The Influence of CLO Studio in the DER Development

Conclusion

This chapter summarizes concepts and challenges related to OER and presents guided customization as a new approach to be used in the development and use of digital educational resources, making them customizable. This kind of approach allows increasing the resource openness, and therefore teachers' autonomy in planning is valued because there is a concern in balancing between the development and the usage of the resource.

Guided customization does not focus only on production, but also on the use of the resource, and in order to do so, it proposes the definition of pedagogical potential and degree of freedom. While the former refers to who is going to develop it, the latter refers to who it is going to use it.

Due to the concern in decreasing the distance between users of the resources and its development, guided customization allows content and resources to be equally shared.

For Wiley (2009), more than developing open content, it is necessary to effectively use them and decide how and when. One of the ways to reach this goal is by applying the 4R's (reuse, revise, remix and redistribution).

In this chapter, a process of development and an authoring tool called CLO Studio, were presented regarding the development of a LO that can be reusable. The customizable LO created is available on a *web server*.

Revise is made possible by the resource's customization characteristic. Remix is possible with the components created in the CLO Studio. Redistribution can be reached in future works with the resource's storage in a web repository.

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Comparing Learning Objects from one “worldwide” and two African Open Educational Resource repositories using the Learning Object Review Instrument (LORI) v. 1.5

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Abstract. In light of increasing emphasis on both localization and globalization of information technology and equal access to educational opportunities for all people, online Open Educational Resources (OER) are considered to be a promising approach for promoting free and adaptable education access to instructors and learners around the world. Wide variation in the quality and content of repository websites available in different communities indicates a need to investigate the similarities and differences between the Learning Objects (LOs) offered. A systematic comparison of three websites with contributors and end-users in Africa and around the world provides a clearer picture of how a community’s needs and resources inform OER availability and offerings. This project reviews OERAfrica.org, TESSAfrica.net (Teacher Education in sub-Saharan Africa), and OERcommons.org, using the categories of design, intended audience, and rank of five LOs per site using the Learning Object Review Instrument (LORI Version 1.5).

Resumo. À luz da crescente ênfase na localização e globalização do tecnologia da informação e no acesso mais igualitário de recursos educacionais para todas as pessoas, os Recursos Educacionais Abertos (REA) disponíveis online são cada vez mais considerados uma abordagem promissora para a promoção de um acesso a conteúdos educacionais livres e adaptáveis às necessidades de professores e estudantes de todo o mundo. Uma grande variação na qualidade e no conteúdo dos repositórios web disponíveis em diferentes comunidades e grupos indicam uma necessidade de se investigar as semelhanças e diferenças entre os Objetos de Aprendizagem(OA) oferecidos nesses repositórios. Uma istemática de três websites com colaboradores e usuário-final localizados na África e ao redor do mundo irá proporcionar uma imagem mais clara de como as necessidades e recursos de uma comunidade informam a disponibilidade e as ofertas de Recursos Educacionais Abertos. Esse projeto analisa os sites OERAfrica.org, TESSAfrica.net (Ensino de Professores na África Sub-Sahariana; *Teacher Education in sub-Saharan Africa*) e OERcommons.org,

usando as categorias de design, público-alvo e categoria de cinco Objetos de Aprendizagem por site usando o Instrumento de Análise de Objetos de Aprendizagem (LORI, Versão 1.5).

Introduction

Education is an internationally accepted human right (United Nations Children’s Fund, 2007) and leaders in countries around the world strive to provide education and training opportunities, often trying to draw from few available resources. Many developing countries with numerous demands on limited technology and other resources are becoming increasingly flexible in methods used to provide educational opportunities for learners and teachers. Learning Objects (LO), a type of digital educational resource (Friesen, 2004), potentially provide a way to offer educational materials free or at low cost to learners especially when offered as an open, or shareable, commodity (Kelty, 2008). As Friesen (2009) discusses, although LO and Open Educational Resources (OER) are generally considered separate in theory, these labels are often used interchangeably in practice. In countries without a history of debating the LO versus the OER movement, the practicality of the commodity might trump the specific label. For this paper, the term OER will be used primarily although the instrument for comparing material from OER repository websites is called the Learning Object Review Instrument (LORI v. 1.5; Nesbit, Belfer, & Leacock, 2003). This paper will refer to the instrument as LORI, a shortened name for LORI v. 1.5.

In many countries struggling uphold their Education for All (EFA) commitment to offer quality education to all children (United Nations News Centre, 2007) OER may be one of few efficient options for quickly disseminating information to a great number of aspiring teachers and learners. However, due to the wide range of choices for OER from around the world, additional training in how to locate and use OER materials has become a priority for many communities. An increasing number of communities offer or attend specialized

workshops on international OER and “e-learning tools” use and acquisition (Alikhan, 2011). Once a trusted OER source is found it can be challenging to provide locally relevant education that also takes advantage of the increasingly available international education resources. Internationalization makes it imperative that OER and other educational materials be *high-quality, accessible, and malleable* enough to be useful in a wide range of cultures.

The purpose and organization of online OER repositories varies greatly according to the vision and mission of the site and interest of the contributors and users. Whereas the free-form structure of many repositories invites a variety of formats for posted material, it must be considered that lack of website organization and OER criteria can limit the usefulness of the repository by decreasing the chances of finding relevant OER for search terms. The LORI provides a framework to conduct reviews and systematic comparisons. For this exploratory study this instrument was used to investigate website-repositories hosted by three organizations: OER Africa (OERA), OER Commons (OERC), and Teacher Education in Sub-Saharan Africa OER (TESSA). Comparing the material on these OER repository websites illustrates the multiple contexts that must come together to provide useful educational materials to learners across cultures. These contexts include, but are not limited to, funding sources, trainers and teachers, creators of software/hardware/internet technology, end-users, and designers.

Due to cost and time limitations, most designers of cross-culturally directed OERs cannot personally travel to all sites where the material will be used. In fact, many sites with cross-cultural audiences offer materials from countries far from the end-users. A look to the evolution of the OER movement indicates potential areas of growth and research for offering increasingly accessible materials for all users regardless of where the OER originated.

A Brief History of the OER Movement

The term “Open Educational Resource” originated in 2002 during a United Nations Educational, Scientific and Cultural Organization (UNESCO) forum sponsored by William and Flora Hewlett Foundation (WFHF) (Wiley, 2007). In the same year, Creative Commons (CC) was launched, helping to pave the way for increased creation and dissemination of low-cost and free digital OERs (Kelty, 2008). The CC licensing approach provided a user-friendly mechanism of shifting content licensing toward collaborations between creators who could share responsibility and benefit of their work without the restrictions and costs of traditional licensing (Kelty, 2008). Funding provided by the WFHF for nearly a decade has propelled the creation of numerous OER repository websites beginning in the mid-to-late 2000’s. These sites include OERA, OERC, and TESSA albeit indirectly through a comprehensive OER research and development project by the UK Open University (Wolfenden, Buckler, & Keraro, 2008).

A December 2005 UNESCO Forum on Educational Planning, also funded by WFHF, included 480 participants from 90 countries who, for over six weeks and 700 posts, addressed the need for improved support for OER use amongst teachers in developing countries compared with those in industrialized countries with high levels of technology (Stacey, 2007). Specific suggestions from participants in developing countries included:

- assurance of a high level of commitment to ensure quality across languages,
- easier navigation to locate appropriate LOs,
- supported research process for individuals without much formal schooling,
- improved support for teachers to use OER efficiently, and
- whether to invest in managing a lack of a pedagogical base.

Each of these suggestions speaks to the hope for the equalizing potential of OER and to the concerns about how developing countries can minimize possible barriers with the support of the western countries that are generally the source for these repositories. These concerns raised in 2005 are just now beginning to be addressed as they have persisted for over six years. This exploratory study aims to gather information that may further illuminate issues pertaining to access to OER for all people.

In 2010, CC officially embraced the OER movement by linking the two previously separate organizations to improve funding options and awareness of OER (Linksvayer, 2010). Clearly stated licensing expectations and support for international digital information dissemination are expected to improve opportunities for more individuals, schools, and other organizations to access the benefits of sharing and co-creating OER to be used by other learners and teachers around the world (Park, 2010).

Why Africa?

Currently, multiple Africa-focused OER repository websites provide free materials to anyone with access to technology. However, as discussed during the 2005 UNESCO OER forum, Africa, and more specifically, Sub-Saharan Africa, is a region consistently mentioned as an area of need. This was due to great numbers of people living in high levels of poverty with few life-sustaining resources (Stacey, 2007). The UN efforts to ensure education for all people have motivated many governments to change expectations for children who will need education in order to access more career options in adulthood (Republic of Rwanda, 2000).

With radical lifestyle shifts associated with mass movement from agrarian toward industrial society (Cardoso, 2009), children are often caught in the middle of radical lifestyle shifts associated with mass movement from agrarian

toward industrial society. These youngest members of society may be expected to fulfill the expectations of both family dependence on their labor and increasing social responsibilities to attend school, often an additional expense for families.

For children who are able to attend, the schools themselves may offer students and teachers limited physical and technological infrastructure (Weber, 2009). Additionally, the AIDS epidemic has impacted teachers particularly heavily, creating a situation where many trained teachers are becoming too sick to work even as more children are expected to attend school (Wolfenden et al., 2008).

Globalization, Localization, and Glocalization

Worldwide, access to income is increasingly dependent on one's ability to operate sophisticated technology and communicate knowledgeably. Increased education and communication opportunities have dual roles of building and restructuring the areas within which people live their lives, at times blending local practices with global expectations. Individuals and communities are increasingly mobile, convergent, and interactive (Jansson, 2007). As work and leisure activities shift toward immediacy and product personalization, classic radio and television broadcast formats give way to "narrowcasts," choice-driven technological interaction using mobile phones and/or the internet.

Communication using personal technology is at an all-time high, with 1/3 of the people in developing countries owning cellular phones (UN, 2010). Without leaving their local communities, a growing number of individuals have ready access to and can exchange ideas with people far removed from their immediate environment.

Digital information and communications technology (ITC) practices facilitate a merge of previously separate concepts, for example, public-private, send-receive, and global-local (Jansson, 2007). Glocalization, a mix of *global* frameworks and *local* practices, greatly increases the potential for independent learning by merging worldwide and local knowledge (Weber, 2009). A particularly poignant case of the adjustment demanded by glocalization is when

Disney opened in Paris, expecting identical employee behavior as their other internationally known locations. The Parisian employees and patrons similarly rejected the global way until the Disney leaders agreed to change some expectations to respect local Parisian culture (Matusitz, 2010). In order to succeed in attracting employees and customers in Paris EuroDisney needed to glocalize, to find a way to meet their global company's branding needs while respecting the local culture. Although it can be argued this scenario was extreme, it clearly shows the negotiation that can follow potential emotional impacts of introducing new social expectations into a country.

Individuals make meaning of their experiences and the introduction of new technology can challenge or confuse previously held personal and cultural beliefs. At first it might seem that more knowledge and technological access would automatically lead to improved lives for more people. However, there are concerns about the effects of experiences such as glocalization on individuals and communities who may be at greater risk of experiencing feelings of anomie. Anomie is a Durkheimian concept describing the individual and communal sense of disorientation caused by system-level exposure to too many new, foreign ideas in too short a time (Atteslander, 2007). Some individuals and families, when the thrill of learning the new information fades, may be left with an uncomfortable sense that the new information does not integrate with their traditional ways but that they are powerless to return to traditional ways. Without a recognizable connection to previously held relationships and identities, individuals may lose their cultural compass and their ability to enjoy the "progress" (Atteslander, 2007). There is also some concern that providing access to previously unattainable foreign-source education will negatively alter the existing routines and power structures in traditional societies (Nsamenang, 2005). For instance, choosing to delay childbearing for educational attainment can improve income prospects for individuals while also changing fertility patterns in some previously agriculture-centric countries such as Kenya (Schreffler & Dodoo, 2009). With planning, these worries may be minimized or even alleviated by innovators such

as OER designers who can make it a priority to take a respectful approach to each culture and include traditional elements and examples when possible (Nsamenang, 2005).

Open Educational Resources and OER Repository Websites

In communities with few education resources, a dependable supply of quality OER materials can efficiently support well-rounded learning if there is access for growing numbers of people (Wiley & Gurrell, 2009). The information contained within the OER may be useful but without a basic learning process or guided welcome to OER, end-users may have trouble applying the material to their lessons, or their lives, in a cohesive manner (Welsh & Sapire, 2008). Three websites described below each abide by their own operational standards, offer varying degrees of navigational planning within their repositories, and provide access to different numbers and types of OER.

OER Commons, started in 2007, promotes the use of OER to disseminate education throughout the world in an equitably accessible manner. Intending to be a single source of readily available resources to teachers and learners across the learning spectrum, the website has grown to include easily searchable terms, links to other OER sites, and a relatively clear system of reviewing and editing digital content housed on the site. Due to the high number of items within widely divergent learning categories, someone hoping for a quick search may benefit from taking time to become familiar with the site and stay focused to locate tools that meet predetermined goals.

OER Africa, started in April, 2010, is a service funded by the Hewlett Foundation in conjunction with the South African Institute for Distance Education (SAIDE). Intended for "African Academics" across the continent, the overarching goal of this website repository is to build and develop African societies and economies by facilitating collaboration networks around OER. Guided by the expectation that educational resources are infinite and generative

rather than finite and diminishing, it is expected that short-term investment in OER can remove barriers to education over time. An embedded webpage about finding OER offers a search resource which can make it easier to link to content on and outside of the website.

TESSA, Teacher Education in Sub-Saharan Africa (TESSA), with its first published newsletter in April, 2007, is a sponsored research and development project intended to create and disseminate materials to guide teachers and teacher educators in that region. This multilingual website offers numerous free Creative Commons licensed materials that are readily adaptable between countries in Sub-Saharan Africa (SSA). Designed in collaboration with Open University, UK, this is a pre-planned site with templates and other materials to facilitate standardized formatting of print, audio, and visual resources (Wolfenden et al., 2010). Unlike the other two OER repositories mentioned above, the original materials for TESSA were constructed in a coordinated process involving teachers and teacher educators across SSA. The learning materials were subsequently traded for peer review amongst the teachers and teacher educators who could provide feedback and add country-specific examples to ensure a good fit with local populations. Guided by the research nature of the project, the practices come about through explicit planning of templates, requesting original documents be written by African educators who represent multiple countries, and allowing a guided series of changes while retaining the original purpose of each OER. These are intended for on-the-ground teacher educators and teachers themselves. Each module offers options for all individuals regardless of a greater or lesser access to computing technology.

This exploratory study uses materials from the above-mentioned three OER repository websites to compare electronic learning materials intended for users locally and globally, in Africa and worldwide. Although the sites use the CC licensing scheme, each offers a unique web design and OER options which greatly influence the user experience.

Learning Object Review Instrument (LORI)

LORI is the second incarnation of a measure created by Canadian researchers to determine and influence the quality and utility of LOs by rating components of learning and accessibility at a metadata level (Nesbit, Belfer, & Leacock, 2003). LORI contains nine dimensions rated on a 1-5 Likert scale. The points from each section are added for a sum total. The total score allows for comparison of OER materials on an over-all usability level. For this section describing the LORI domains, the OER materials sampled will be called LO. According to Nesbit et al. (2003), “learning objects are information resources or interactive software used in online learning. A single image, page of text, an interactive simulation, or an entire course could all be examples” (p. 2). This description allowed for nearly any resource found on the three repositories to be included in the review.

The domains and ratings (5 highest; 1 lowest) offered by LORI:

1. *Content Quality* (is provided information free of errors and bias?)

- 5: No errors; presented without bias or omissions; logical argument for each claim; sensitive to cultural differences
- 3: Mostly correct but lack of clarity that can mislead users
- 1: Material is incorrect and/or misleading, has informational or cultural bias, lacks appropriate detail; lack of emphasis on critical information

2. *Learning Goal Alignment* (degree to which each component of the LO supports a stated learning goal)

- 5: A learning goal is clearly present and learner is supported by LO
- 3: Lack of appropriate information to answer questions, meet learning goal
- 1: Lack of learning goal, or inappropriate for intended learners

3. *Feedback and Adaptation* (degree of response to user input)

5: Takes individual user into account by providing responses matched to the learner's needs for answer correction

3: Correct answers are provided with an indication about which questions the user answered incorrectly

1: Does not take the learner into account for either answer correction or teaching alternatives

4. *Motivation* (is this LO interesting and engaging to users?)

5: Interesting to intended learners; offers choice, humor, life-like activities with relevant feedback and natural consequences

3: Lack of interesting narration; lack challenging learning opportunities and opportunities to control outcomes

1: irrelevant content; inappropriate challenge level; interference from the LO features; lack of choice

5. *Presentation Design* (visual and audio information designed to improve learning)

5: Production quality enhances learning; easily readable text; learning goals supported by audio and visual components; accurate

3: Lack of clear connection between text and visuals

1: Production quality interferes with learning; headings confusing or meaningless to learners

6. *Interaction Usability* (is the layout easy to navigate and predictable?)

5: User interface intuitive and explicit; logical; consistent; minimal lag

3: User interface works but does not enhance learning; inconsistent labeling

1: Many parts not working or lag significantly; lacks instructions

7. *Accessibility* (is the resource easy to use for persons with disabilities as well as those without)

5: Significant levels of support for learners with disabilities; accessible using assistive means; IMS guidelines for Accessible Learning at AAA level

3: HTML page with animation embedded and captions when appropriate; does not define acronyms; W3C level A

1: Lack of visual support for audio or audio support for video; color differentiation necessary to read chart

8. *Reusability* (is the resource easily transferred a variety of contexts and adaptable for users with diverse backgrounds?)

5: Useful with or without additional materials; transferable to multiple courses without alteration; included glossaries & prerequisite content statements make it applicable to a range of learners

3: Specific to users and contexts due to limited vocabulary and examples

1: Refers to originating organization limiting its generalizability; requires other resources to be useful; demands high level of prior knowledge

9. *Standards Compliance* (abides by international standards for LOs)

5: Meets all international standards for metadata and technical requirements (IMS, IEE, SCORM, and W3C); metadata included within LO and separate page

3: Meets some international standards for metadata tests but not compliance

1: Misses all relevant international standards

Eight of the nine LORI domains listed above were relevant for this project comparing five LO samples from each of three OER repositories. The *Standards Compliance* domain is not included due to lack of training and access to standards support. This is not expected to interfere with the findings since each site was sampled and scored without that domain. Additionally, the domains allowing for a non-digital application of a resource were most applicable for this project even if a high score was not possible in all domains. For example, the *Feedback & Adaptability* domain, when a LO includes feedback individualized to the learner it will receive a high rating (5). A LO with an answer key for quiz, problem set, activity, or other way to test learning, the LO will be acknowledged for that by earning a middle rating (3). Without an answer key for a quiz, problem set, activity, or other way to test learning, the LO would earn a low rating (1).

Method: Comparing LOs from three repositories

The manual separates the rating sections from the description sections so the first step was to use the LORI domains and items described above to create a table on a spreadsheet where the rating descriptions were visible at the same time as the recording section with the Likert scale ranging from 1 to 5. After studying the manual to become familiar with the item scoring process it was time to move to the next step.

To locate five LOs for each of three websites there was a systematic search and collect process intended to retrieve qualifying resources in a random manner. The primary selection process was that the first five sampled were considered representative of their originating repository website as long as each LO met specific criteria: English language (Anglophone) and educational (they could not be advertisements for other school programs, for instance). After first

opening one computer browser window for each website this author spent 45 minutes navigating through the pages to locate, download, and save copies of the English language LOs as they appeared.

The use of a limited number of specific search procedures allowed for obtaining representative LOs with education-related topics for comparison. Due to the difference of layout for each repository, additional criteria were added that was unique for each. For OERC the search criteria were the words “Africa” and “education” not including LO directly from OER Africa or TESSA links. For OERA, the search methods included using headings related to educational material (to exclude health LO housed on the same website repository). The TESSA repository is specifically targeted toward educational materials with clear directions for accessing the LOs, or “modules”, such that no special search criteria were needed.

The 15 sample LOs represent multiple teaching approaches for a range of content. Examples include: an academic conference poster about growing grains in state in the United States by three authors that was uploaded onto the site with no accompanying material; a hundred-page manual to train teachers how to teach math to students from a range of ages; and a three-page tutorial on teaching literacy to young children complete with case studies and additional resources.

After downloading and saving the five samples collected from each site it was time to review each LO with the Review Instrument. For each repository, the group of five from each site was reviewed sequentially in the order they were downloaded. Only then it was time to progress to the next LO sample. This allowed for assurance that if the preliminary screening during the selection process missed a disqualifying criterion, it would be simple to track which site needed a replacement LO. No LO replacement was needed as each LO from the original sample proved to have met all criteria.

Each LO was reviewed with the same process, rated with each domain of the LORI before moving on to the next, starting with Content Quality and

ending with Reusability. The domain scores for each LO were tallied to provide an overall score. This allowed for comparison between LOs as well as items. Each had a unique combination of LORI - rated strengths and weaknesses that provided insight into how the LO might be lacking or complete depending on the needs of the end-user(s).

Using LORI provided a cohesive method of comparing material from three OER repositories, OER Africa, OER Commons, and TESSA OER. Scores showed that of the three repository websites studied, TESSA site's requirements for formatting, such as templates with minimum quantities of specific criteria, seemed to be the source of the most consistent and self-contained units for education. When constructing and posting material, OER designers who keep their potential end-user in mind will better ensure their material is useful to others who may not be able to access the information in other ways.

Results

A look at the patterns show that TESSA scored highest in each domain. OER Commons scored next highest with a two low performing LOs bringing down the overall rating. OER Africa scored the lowest of the three sites due to numerous low (1) scores throughout. Consistent low scores in domains of learning goals, learner feedback, access, and reusability differentiated this LO sample from the other two. Looking to Figure 1 for ratings of each LO shows ratings for each item and the sum total for each LO sample. The bottom right corner provides a total score for each repository website, obtained by adding together the domain totals from each LO. Possible points for the total site are as follows: OER Africa scored 105/200; OER Commons scored 121/200; TESSA scored 140/200.

	Content	LG Align	Feedback	Motivate	Design	Usability	Access	Reusable	Total/40
OERA 1	1	1	1	1	3	5	1	1	14
OERA 2	1	1	1	1	3	5	1	3	16
OERA 3	5	5	3	5	5	5	1	5	34
OERA 4	4	1	1	4	2	3	1	1	17
OERA 5	5	5	3	3	5	1	1	1	24
									105/200
OERC 1	5	5	4	5	5	5	1	5	35
OERC 2	5	1	1	4	3	5	4	3	26
OERC 3	3	1	1	1	1	1	1	1	10
OERC 4	5	3	3	4	1	4	4	5	29
OERC 5	5	5	2	3	3	1	1	1	21
									121/200
TESSA 1	5	5	3	3	5	5	1	5	32
TESSA 2	5	5	3	4	5	3	4	4	33
TESSA 3	3	3	3	3	3	5	1	4	25
TESSA 4	5	3	1	3	3	3	1	4	23
TESSA 5	5	3	3	3	3	4	1	5	27
									140/200

Figure 1. LORI Scores for OERC, OERA, and TESSA

Discussion

This exploratory study found consistent differences in the quality, usability, and accessibility of LOs offered on the three OER repository websites as assessed with LORI's items of Content Quality, Learning Goal Alignment, Feedback & Adaptation, Motivation, Presentation Design, Interaction Usability, Accessibility, and Reusability. The higher ratings for the TESSA LOs may indicate the benefit of planning and providing templates when it comes to creating and offering LOs to enhance learning. Despite the guidance provided by TESSA the ratings were not perfect and might indicate some measure of flexibility for contributing authors. Overall, for the five TESSA LOs rated, the weakest area was Accessibility, the strongest was Reusability. These two ratings likely share a single factor: the emphasis on non-technical methods of acquisition and dissemination are a mismatch with the LORI which focuses on sharing LOs. The high Reusability factor was likely due to TESSA's mandatory simple templates and use of Microsoft Office Word, both to allow for easy printing and dissemination.

The slightly lower overall LORI ratings for OER Commons may have been caused by a single sample LO that scored very low in all but one item. The highest score was in the Content Quality, the lowest was a tie for Feedback and Accessibility. OER Commons is a well-established repository with monitored submissions, rating systems, and clear guidelines for what is acceptable. Its efforts to become the worldwide OER repository have increased the number of LOs into the thousands by offering its own LO as well as connections that directly link to other sites such as TESSA and OER Africa.

OER Africa scored the lowest overall, due to a few low performing LOs. Compared to the resources on the other two repositories, OERA seemed to have the most varied content with a higher percentage of the sampled LO not meeting the education criteria during the sampling process. This is where a few advertisements for other schools were found posted as OER during the sample selection process. One example of a resource that met the education criteria but

that some might not consider a self-contained LO is a stand-alone re-appropriated conference poster discussing farming in a Midwestern US state. This might have been useful to some teachers but did not provide a complete learning experience as rated by the LORI. Interaction Usability rated highest while the domains of Feedback & Adaptability, Accessibility, and Reusability rated lowest. The resources were useful for their intended use but may not provide a cohesive learning experience for the end user without instructor guidance.

In this review process, much was learned about using the LORI and about the three repositories included in the sampling process. Limitations of this study include using an instrument that is not well known, comparing websites across cultures, and having only one reviewer. Future iterations of this study should rate a larger sample of LO from each included repository and account for inter-rater reliability by including two or more raters who have come to agreement with the LORI ratings. Additionally, for cross-cultural comparisons of LOs, having a native speaker translate the LOs from their original language into English or translate the LORI into another language. Either of these comparisons will likely provide a more accurate representation of the LOs as they are used in the country or region of study. It may be important to have a cultural liaison to ensure appropriate and accurate translation that accounts for local nuances

The LORI offers a set of useful items to compare LO. With the increasing use of digital OER as educational materials on local and global levels within small and large organizations (UN, 2011) it would be useful to have a widely-used rating system with which to compare OER from different authors that are located on different repository sites. Even if developing countries do not have ready access to the technology for more advanced use of digital LO, including a rating system early in the promotion process will likely support higher quality services over time. That said, maintaining cultural respect is crucial when trying to balance global, local, and glocal elements of learning.

It is important to question whether automated translations are sufficient to

provide a representative picture of how the original would score on a standardized measure in another language. The LORI team endeavored to use this instrument across cultures (Li, Nesbit, & Richards, 2006) and their approach emphasized efficiency rather than quality of translating a LO from one language to another. Using a computer program called *Zope Localizer* (Richter, 2005) to translate the LORI into different languages allowed the authors to test their efforts to promote cross-cultural communities for sharing metadata and ratings about LO. The authors chose to use Chinese [sic] and French versions of the LORI providing the explanation that these languages are widely represented by individual websites. The authors are aware that despite their intentions efforts to provide a structure for cross-cultural engagement did not fully meet their expectations. Using LORI did meet their goal of supporting collaborative rating and sharing of metadata about individual LOs within separate repositories. However, the content of ratings and the decision to merge communities of practice (teacher groups or administrators, for instance) with ethnically and geographically diverse communities seemed to decrease the depth of understanding between the groups being studied. The authors suggested that future approaches might benefit from shifting focus toward local rather than universal translation practices.

Too few research projects focusing solely on local practices show that being too self-contained can also limit understanding. Although there have been reports from projects comparing LOs and other OERs between countries in Africa (Wolfenden et al., 2010; McKenney & van den Akker, 2005) these reports rarely compare their materials with that of other research teams. Additionally, the research and reports are generally conducted by organizations based outside of Africa, even if Africans are directly included in the data collection, analysis, and publishing processes. Ideally the successful dissemination of these reports will attract more research funding for African organizations to conduct their own research to officially disseminate locally and abroad beyond the traditional university location that is often limited to a university audience (Maclure, 2006).

On the other hand, with the increasingly international cries for African success it is important to respect African ways of life that may not directly integrate with increasing standards of evidence-based practice and more Western ways of categorizing the world (Nsamenang, 2005).

Conclusion

Despite obvious cultural limitations that English is not likely the first language for many OER users intended for audiences in non-English dominant cultures, using an English-only approach garnered valuable information about the structure of the OER repositories. The findings also provided insight into possible avenues for investigating and supporting these repositories in the future. The only repository website reviewed in this study that consistently used materials from African authors was TESSA. In order to submit materials it is necessary to have signed up as a member of TESSA and to follow their stringent requirements for what can be included and how it must be constructed. Some might argue that this site is not actually “open” due to the constraints on content and formatting. Despite the lack of variety in content and form, this meets the goals of the site, teaching educators in Sub-Saharan Africa. Wiley (2000) discusses the importance of using LO for learning within a coordinated educational plan, not just to provide a unique interest-grabbing component. TESSA OER is a prime example of a coordinated educational plan that focuses on functionality to the end-user.

Nearly 10 years after the OER movement began digital media and LOs are widely expected to help developing countries reach international education goals and standards that will promote successful entry into the global knowledge economy. With appropriate aid and planning, Sub-Saharan Africa will likely benefit from online repository websites that can provide digital OERs at low cost.

Additionally, a standardized measuring system that provides a culturally

sensitive summary of OER strengths and weaknesses can support improved judgment of which materials are high quality and useful to the population. Although not ready in its present generic form, with some updates and local cultural input the LORI may be a worthy candidate for tracking progress of LO development and dissemination.

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Una Federación de Repositorios de Objetos de Aprendizaje Con Elementos Multiculturales Procedentes de Latinoamérica

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Resumén. Actualmente los contenidos académicos digitalizados en términos de objetos de aprendizaje facilitan su acceso, reutilización y portabilidad en particular cuando están almacenados en repositorios distribuidos en diferentes regiones de un país. El presente trabajo preconiza integrar los aspectos culturales en los objetos de aprendizaje, con el fin de tomar en cuenta aquellas tradiciones y costumbres de una sociedad que ayuden a los estudiantes a un mejor asimilación del conocimiento de alguna área de la ciencia y la tecnología. En particular, se presentan aquí contenidos multiculturales de tradiciones latinoamericanas que se han plasmado en los objetos de aprendizaje. Estos objetos de aprendizaje pueden ser accesados a través de una federación de repositorios donde aquí se han aplicado algunas búsquedas y los resultados son presentados en la sección de caso de estudio.

Abstract. Nowadays, learning objects make possible the access, reuse and portability of academic contents in particular when they are stored in distributed repositories. For a better grasp of knowledge, current work purposes a model to take into account cultural aspects in learning objects such as best practices and traditions from a society. A great number of Latin-American academic institutions are producing a great number learning objects where it is possible to identify several cultural aspects. These objects could be accessed by a federation of repositories where some searches are applied and the results are presented in the case study section.

Introducción

Los países latinoamericanos se identifican por un lenguaje y raíces culturales comunes que abren inmensas posibilidades de colaboración, estos países a la vez son ricos en su diversidad la cual es necesario integrar soluciones comunes e interoperables. Los países latinoamericanos tienen una necesidad urgente de compartir, de unir esfuerzos y crecer juntos en todos los aspectos, pero muy especialmente en el aspecto de elevar el nivel educativo de su sociedad.

En el ámbito educativo, los jóvenes estudiantes de habla hispana de hoy en día tienen que avanzar en un entorno global multicultural, en el cual tienen que desarrollar una cantidad de competencias que antes requerían los egresados universitarios de hace dos décadas. Ahora ellos requieren de manejar tecnologías, adquirir experiencias, conocer y entender otras culturas. Un vasto número de instituciones latinoamericanas en particular las universidades han desarrollado sus cursos en líneas accesibles a través de múltiples plataformas. Mejor aun los contenidos de varios programas de estudio se han plasmado en términos de objetos de aprendizaje los cuales representan entidades digitales que facilitan su reuso, acceso y portabilidad (Wiley, 2000).

En un curso en línea, un objeto de aprendizaje encapsula una unidad de conocimiento y puede ser reutilizado para otros cursos afines con ciertas adaptaciones por parte del instructor. En general un objeto de aprendizaje es estructurado como una entidad digital, auto-contenible y reutilizable constituido por cuatro componentes, a saber: la teoría, la práctica, la autoevaluación y temas afines (Muñoz et al. 2007). Ahora bien, lo multicultural es un sistema de actitudes, valores, creencias conocimientos ampliamente compartidos en el seno de una sociedad transmitidos de generación en generación, la cultura se aprende aun si varía de sociedad a otra y lo que es más importante para nosotros puede transmitirse (Sánchez & Ordoñez 1997). En breve, lo multicultural puede entenderse como un todo conformado de experiencias y representaciones de la realidad que otorga cierta coherencia y significación al individuo que vive y

convive en varias comunidades.

Hoy en día, existen varias instituciones educativas de habla hispana que cuentan con repositorios de objetos de aprendizaje. Consideramos que es necesario mantener un análisis en el contexto de la cultura de estos países que permita comprender y entender el diseño de estos objetos de aprendizaje de manera que sean una alternativa tecnológica y pedagógica significativa en la educación de sociedades latinoamericanas.

El presente trabajo propone considerar los aspectos culturales en los objetos de aprendizaje y un modelo arquitectural que permita recuperarlos y distribuirlos en ciertas comunidad latinoamericanas. Para alcanzar este fin, la siguiente sección identifica una lista de dificultades para el acceso y especificación de objetos de aprendizaje de diferentes comunidades. En la tercera sección se define un modelo de objeto de aprendizaje cultural y sus componentes. En la cuarta sección se presenta una serie de repositorios de instituciones particularmente de América latina que almacenan, hacen accesible y distribuyen los objetos de aprendizaje en línea a través de un sistema gestor de contenidos. Al final se presentan las conclusiones del presente trabajo.

Problemática

Actualmente en la literatura de tecnologías educativas existen poco esfuerzos que consideren tomar en cuenta de manera sistemática aspectos multiculturales en los contenidos académicos, en particular en el diseño y desarrollo de objetos de aprendizaje (Henning et al. 2004). El considerar aspectos culturales en los objetos de aprendizaje implica hacer frente varios retos, he aquí algunos a tomar en cuenta:

1. Es necesario repositorios de aprendizaje distribuidos con criterios sobre la cultura en el momento de la búsqueda y selección de objetos de aprendizaje.
2. El aspecto cultural es considerado como implícito en la parte del

contexto de un objeto de aprendizaje (Wiley, 2000) (Fernández 2009).

3. Hay carencia de técnicas de especificación que cubran el aspecto estructural.
4. El diseño instruccional requiere ser enriquecidos contemplando diferentes nivel de abstracción en la cultura (Henning et al. 2004).
5. El desarrollo de objetos de aprendizaje multiculturales requiere de trabajo em grupo de profesionistas y/o expertos.
6. La evaluación de cursos en base objetos de aprendizaje multicultural se torna más compleja.

La presente propuesta tiende a mitigar parte de la problemática aquí expuesta.

Modelos de objetos de aprendizaje multiculturales

¿Es posible establecer modelos que permitan sistematizar la producción de objetos de aprendizaje? ¿Cuáles aspectos culturales pueden tomar en cuenta más fácilmente durante el diseño de objetos de aprendizaje? ¿Cómo es posible acceder a todo un conjunto de objetos de aprendizaje de diferente culturas?. Estas son posibles preguntas que un diseñador puede plantearse cuando especifican el diseño y desarrollo de objetos de aprendizaje con aspectos culturales, ello implicara integrar aquellas tradiciones y costumbres de una sociedad que coadyuven a una mejor enseñanza aprendizaje de la ciencias.

Un objeto de aprendizaje multicultural se basa en los fundamentos de un objeto de aprendizaje tradicional (fundamento teóricos, fundamento prácticos, evaluación y temas relacionados) donde el conocimiento puede ser asimilado con mayor facilidad en base a las tradiciones y costumbres de una sociedad. De acuerdo com la figura se considera aspectos multiculturales en los objeto de aprendizaje las buenas prácticas, tradiciones, hábitos, costumbres y experiencias exitosas aportado por una sociedad.



Figura 1. Modelo de Objeto de Aprendizaje Multicultural

El proceso de desarrollar objetos de aprendizaje multiculturales implica que sea una actividad social que va más allá de una colaboración entre profesionista en diseños y desarrollo de objetos de aprendizaje, se requiere también de la participación de las personas que hacen algún aporte a la sociedad. La educación nos compete todos, considerar que el profesor es el único educador es un equivoco. En si todas las personas de una sociedad son susceptibles de aportar a la cultura con sus experiencias, tradiciones, buenas prácticas y hábitos. El modelo de representación de la sociedad de la información implica el reconocimiento de las comunidades que la componen, en un ámbito geográfico determinado, la infraestructura que se cuenta para su desarrollo, el papel de las administraciones públicas, la incidencia en el entorno social, económico y tecnológico, los instrumentos de fomento a la participación y las estrategias de transferencia de conocimientos. Es aquí donde apunta la creación de un sistema de aprendizaje que no se limite a los esquemas institucionalizados, sino que tenga en cuenta a la

sociedad en su conjunto, dicho de manera explícita un mecanismo de participación interactiva que implica al menos establecer relaciones entre las comunidades con la academia-empresa y gobierno.

El tomar en cuenta información multicultural en los objetos de aprendizaje se logra impactar en su portabilidad y reutilización, coadyuvando con ello su máximo aprovechamiento en el aprendizaje y formación de comunidades. Las comunidades se les puede enseñar en base a sus tradiciones, buenas prácticas y costumbres de las sociedades, esto plasmado en objetos de aprendizaje digitales contribuye a la perseverancia y a la trasmisión tanto del conocimiento como de la cultura de las sociedades. Entonces los aspectos culturales pueden ir implícitos en los OA para coadyuvar en un mejor aprendizaje y además hacer del estudiante mucho más consciente, tolerante y conocedor de otras culturas. Con la tecnología de información se logra también enriquecerse las culturas en un periodo de tiempo mucho más corto, porque las transformaciones que requerían antes décadas en presentarse ahora se presentan en cuestión de semanas, cuando mucho.

En el aula el proceso de enseñanza-aprendizaje conforma un espacio de colaboración, reciprocidad y pleno respeto a los más significativos valores y formas de participación de los aprendices. Para esto en la enseñanza del maestro y auxiliado con los objetos de aprendizaje debe de rescatar y hacer ver a las experiencias más valiosas de sus tradiciones, historia y costumbre de la cultura en la que están inmersos y pertenecen los Estudiantes (Orey et al. 2010) . Los objetos de aprendizaje culturales deben ser un soporte tecnológico de apoyo a la práctica docente, el diseño de estos objetos deben de considerar de alguna manera que estén representados, se indaguen y se invite a la reflexión sobre los enfoques más valiosos de una cultura en específico, y a la vez integrar escenarios que coadyuven a crear situaciones de reciprocidad, igualdad e interacción entre los estudiantes fomentando el respeto, la tolerancia, la diversidad cultural de otros individuos.

Repositorios con elementos multiculturales en los objetos de aprendizaje

En los países latinoamericanos se tiene una necesidad urgente de compartir, de unir esfuerzos y crecer en varios aspectos, pero muy especialmente para elevar el nivel educativo de comunidades diversas y heterogéneas. De ahí la necesidad de mantener activa una discusión en nuestro contexto que nos permita conciliar la riqueza de nuestras exploraciones y visiones de los objetos de aprendizaje y tecnologías para la educación en términos generales, con la construcción de una visión común que permita hacer un uso efectivo de estos instrumentos para la educación de nuestros pueblos.

Desde el 2004 varias organizaciones y programas de investigación han surgido en los países de habla hispana con el propósito de investigar, con el propósito de investigar, producir nuevos desarrollos e innovar respecto de la utilización de los recursos digitales para el aprendizaje apoyados en medios electrónicos (Santibañez 2010) (Ochoa 2011). El movimiento hacia el desarrollo y la utilización de recursos para el tele-aprendizaje propios en América Latina es importante desde varios puntos de vista: proyectos de colaboración, cursos en línea bajo diferentes LMS soportados por objetos de aprendizaje y algunos de ellos están disponibles en repositorios de las instituciones, publicaciones de resultados y organización de foros tanto en forma presencial como a distancia.

Otro aspecto relevante en Iberoamérica ha sido la organización de eventos científicos que promueven y estimulan los resultados de la investigación, las aplicaciones y la utilización de los recursos para el tele-aprendizaje. A partir de esta necesidad, en Guayaquil (Ochoa 2011), la Escuela Superior Politécnica del Litoral (ESPOL) en el año 2006 organiza la 1ra. Conferencia Latinoamericana de Objetos de Aprendizaje y a partir de allí se forma la Comunidad Latinoamericana de Objetos de Aprendizaje (LACLO) (Ochoa 2011) que anualmente organiza la conferencia en distintos países de la región (Santiago de Chile en 2007; Aguascalientes México en 2008; Mérida México en 2009 y Brasil 2010). Año

tras año son más los investigadores y docentes que participan de esta conferencia, no sólo de Latinoamérica, sino también de Europa en particular de España.

La conferencia LACLO (Ochoa 2011) ha permitido conformar enriquecedoras espacios de discusión e intercambio de experiencias entre investigadores y docentes. Estas actividades han permitido que diversas instituciones acuerden convenios para colaborar y compartir recursos académicos donde varias instituciones educativas de habla hispana están interconectando sus repositorios de objetos de aprendizaje.

La interconexión de repositorios de latinoamérica y sus objetos de aprendizaje considera los aspectos culturales, esto se considera como un sistema de base para capitalizar, acercar y transmitir la cultura de las sociedades de quienes han producido dichos objetos. Los repositorios están distribuidos en las diferentes regiones de latinoamérica donde diferentes instituciones académicas pueden aportar con sus objetos de aprendizaje. Para lograr el acceso al conjunto de repositorios se propone aquí un sistema de búsqueda federado el cual permite localizar objetos de aprendizaje en la red de repositorios distribuidos con el fin de realizar cursos en línea de las diferentes instituciones miembro (Calvillo 2010). Es posible entonces conformar una federación de repositorios que ofrecen todo un conjunto de servicios transparentes a los usuarios, en particular la búsqueda, visualización y acceso, de objetos de aprendizaje.



Figura 2. Federación de Repositorios de Objetos de Aprendizaje con Elementos Multiculturales de Algunas Regiones de Latinoamérica.

De acuerdo al diagrama de la figura 2, un instructor desde su propio sistema gestor de contenidos (en inglés conocido como “Learning Management System”) puede consultar, obtener y visualizar objetos de aprendizaje de diferentes repositorios y así crear sus propios cursos en línea a partir de contenidos distribuidos en los repositorios de habla hispana. Tal es el caso para la Universidad Autónoma de Aguascalientes (UAA) la cual ha desarrollado cursos de morfología a partir de objetos de aprendizaje provenientes de los repositorios de ESPOL (Escuela Superior Politécnica del Litoral de Ecuador), APROA (Aprendiendo con los Objetos de Aprendizaje de la Universidad de Chile), UPA (Universidad Politécnica de Aguascalientes) y particularmente del repositorio de la misma UAA. Para las instituciones participantes se ve como un incremento en la diversidad cultural del acervo educativo disponible para la creación de cursos. Las características antes mencionadas ayudan considerablemente a las

instituciones a mantener una comunicación constante y así facilitar a sus estudiantes conocer de otras tradiciones y costumbres insertadas en los distintos materiales convertidos en objetos de aprendizaje, que cada institución aloja en sus respectivos repositorios.

El acceso a dicho repositorios es bajo el uso de estándares tales como el estándar SCORM para los metadatos, la iniciativa de archivos abiertos y el lenguaje script XML. Estos estándares coadyuvan a la reutilización y la portabilidad de los objetos de aprendizaje a ser utilizados en sistemas de gestión de contenidos académicos tales como Moodle que facilita la administración de cursos en varias áreas del conocimiento.

Caso de estudio

El presente caso de estudio presenta la puesta en práctica de la búsqueda de objetos de aprendizaje con elementos multiculturales bajo ciertos criterios de búsqueda. En la figura siguiente se muestra una de las interfaces sobre la búsqueda federada conforme al modelo arquitectural de la sección 2, en esta interfaz se despliega varios objetos de aprendizaje provenientes de universidades miembros de la federación como la UV, UPA, UAA y ESPOL.



Figure 3. Ventana con Objetos de Aprendizaje Resultantes de una Búsqueda Federada.

La figura 3 muestra una ventana donde se lista los objetos de aprendizaje resultados de una encuesta aplicada al repositorio federado. Después de aplicar una serie de consultas en la red de repositorios se obtiene una diversidad de objetos de aprendizaje, de acuerdo al modelo de objetos de aprendizaje multicultural de la segunda sección (ver figura 2), en la tabla siguiente una parte de ellos se describe de ellos rasgos culturales considerando valores, tradiciones y costumbres de la sociedad que los ha producido.

Descripción general	Imágenes sobresalientes
<p>Ensayos supervisados en uva de mesa (Universidad de Chile, Chile)</p> <p>Enseñanza sobre recomendaciones y parámetros para el cuidado de la uva del vino de mesa (Santibañez 2010).</p>	
<p>1492 (Universidad Complutense de Madrid, España)</p> <p>1492 es un objeto de aprendizaje que permite que “se ponga uno en la piel” de Cristobalín, un estudiante quien tiene que aprobar el examen, y los usuarios tienen que aprender nuevo material educativo sobre la conquista de granada. La evaluación del conocimiento adquirido se basa en un mecanismo de pregunta-respuesta (Fernández 2009).</p>	
<p>Música jarocho (Universidad Veracruzana, México).</p> <p>El un objeto con diversos recursos multimedia que permite escuchar canciones y demostraciones de baile jarocho, esta música es parte del folklore cultural del Golfo de México.</p>	

Identificación de Errores

(Universidad de Guadalajara, México).

El objeto de aprendizaje para la identificación de errores utilizando frutas tropicales, las cuales abundan en la región occidente de México, donde se sitúa la Universidad de Guadalajara (SEP-UNAM 2007).



El día de muertos en México

(Universidad de Aguascalientes, México)

El día de muertos en México tiene múltiples significados en todo el país, y cuando es enseñando a los estudiantes es explicado en términos de las tradiciones y costumbre de la región a la que se pertenece (UAA 2011).



Tabla 1. Lista de Objetos de Aprendizaje

Analizando la tabla anterior se observa que el objeto de aprendizaje del repositorio APROA (Santibañez 2010) de la Universidad de Chile aporta contenidos académicos sobre el cultivo y cuidado de la uva del bien reconocido vino de mesa Chileno.

Ahora bien, note que el trabajo de Baltasar Fernández de la Universidad Complutense de Madrid, España, hace de la realidad virtual en los objetos de aprendizaje y hace alusión a hechos históricos para motivar al estudiante en este caso sobre la conquista de Granada en España (Fernández 2009).

La universidad Veracruzana en México propone el uso de objetos de aprendizaje y con técnicas de ambientes virtuales para la escenificación sobre las tradiciones y costumbre del baile jarocho propio del estado de Veracruz situado en las costas de Golfo de México. Otro de los trabajos interesantes es el de la

Universidad de la Guadalajara donde propone recursos contextuales y patrones para generar objetos de aprendizaje, conforme a la tabla hacen uso de la selección de frutas tropicales abundantes en la región de Jalisco para apoyar al aprendiz en la identificación del error (SEP-UNAM 2007).

Finalmente, la Universidad Autónoma de Aguascalientes presenta en términos objetos de aprendizaje la tradición en México del festejo del día de muertos, esta tradición en el mismo país adquiere un sentido multicultural pues tiene múltiples significados en todo México, y cuando es enseñando a los estudiantes es explicado a priori en términos de las tradiciones y costumbre de la región a la que pertenece el aprendiz (UAA 2011).

Conclusiones

El presente trabajo preconiza considerar los aspectos multiculturales en los objetos de aprendizajes. Un modelo objeto de aprendizaje multicultural aquí propuesto toma en cuenta elementos culturales en términos de tradiciones, costumbres, experiencias, hábitos y la sociedad que los producen. Dado que varias instituciones de educación superior de Latinoamérica cuentan ya con repositorios de objetos de aprendizaje, aquí se ha propuesto la interconexión de estos para así conformar una federación de repositorios y ser un sistema de base para capitalizar, acercar y transmitir componente multiculturales de las sociedades que han producido dichos objetos. Un usuario puede hacer uso de los servicios a partir de su sistema gestor de contenido de manera transparente, en particular el servicio de búsqueda permite identificar todo un conjunto de objetos de aprendizaje en diferentes temáticas y de diferentes países de Latinoamérica. Esto hace factible el compartir los contenidos académicos y que sean un medio para darlos a conocer a los estudiantes sobre la diversidad y riqueza cultural con la que cuentan las sociedades latinoamericanas.

El trabajo a futuro es vasto, uno de ellos es proponer el diseño y desarrollo de ambientes de aprendizaje colaborativos que permitan tanto al maestro como al

alumno hacer uso de objetos de aprendizaje adaptables a diferente estilo de aprendizaje y a su contexto cultural.

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