

Universal Education through Open Educational Resources (OER): technical, socioeconomics and legal aspects

Educación Universal a través de los Recursos Educativos Abiertos (REA): Aspectos técnicos, socioeconómicos y legales

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***Abstract.** According to Dr. B.R. Ambedkar's definition, Open Educational Resources (OER) are based on the philosophical view of knowledge as a collective, social product. In consequence, it is also desirable to make it a social property. Terry Foote, one of the Wikipedia project's chairperson emphasize this: "Imagine a world in which every single person is given free access to the sum of all human knowledge". The importance of open educational resources (OERs) has been widely documented and demonstrated and a high magnitude impact is to be expected for OERs in the near future. This paper departs from a statement of OERs and its current usage. Then, the paper goes into detail some related aspects. Which are the technical resources needed for them? Is it possible to deliver OER in a sustainable way? Which is the impact of OER in society, specially for the less developed? and which legal aspects influence the diffusion and use of OER?*

1. Introduction

The Open Educational Resources (OER) is a new and wide concept that includes not only open contents (contents free of charge) for teaching and learning but also tools and services that allow the development and diffusion of those contents [1]. Extending this idea OERs not only references the usual idea of digital resource like a educative resource in a web format, including text, images or exercises, but this definition fits another type of materials like guidelines about how to teaching a determined subject or even datasets about the evaluation and performance of certain educative experiences.

Starting from this definition is easy to deduce that OERs means a revolution into the current vision of the learning and teaching process, in which an inherent mercantilism vision exist, that principally coming from two main sources: The Teaching Process and the Contents Development. E-learning has help to diminishing the first source since the students don't need to spend money in their movements to the school, and that have a very high impact specially in the third world where the communications are not so good; for their part OERs can diminishing the contents cost. Both meetings take a ideal situation in which the knowledge would be really more accessible to all the mankind, and this would have an very important impact especially in the most retarded countries.

The incredible possibilities that the spread of the OER could have for the people in many countries all over the world has produced that main organization starting for the UNESCO, across its International Institute of Educational Planning, which have develop an international community interested in OER, with more than 600 member for 94 countries [5]; the OCDE, across its Educational Research and Innovation Center (ERIC), which have develop an international study about OER; and many Other private and public institutions like the World Bank or the Massachusetts Institute of Technology, which have developed the famous MIT Open Courseware, in which a lot of different subjects courses are free for the people interested.

All of that does that a reflection about some OER aspects related with is of the major interest. This paper deal with this proposal and the OER technical, economic, social and legal aspects are explored. Technical aspects refer to which technology is beside the development and diffusion of these contents trying to respond the question if a specific technology will be needed or not. Economic aspects especially referrers to the impact that for the third world countries could be the free access of the citizens to a high quality education, this section introduce the quest of if OER could allow to change that societies and incorporate them to the developed countries set. And finally Legal aspects related with the licenses of the software and contents implied in OER.

The paper is organized in six sections, this introduction, and three sections dealing with one of the aspects exposed, a conclusion and the references.

2. OER Technical Aspects

Basically OER is a philosophy not a technique, for this not must be any special reason to suppose that a specific technology must be developed to deal with OER aspects different for other elearning issues. In this section a list of the needed technical aspects, especially related with the OER design issues, will be briefly exposed. Nevertheless in all of the OER repositories the units called “course” or “module” is used in order to have a indication of the development degree. That indicates a kind of tendency in the OER initiatives to be centered in the educational resources disposition. On the other hand this emphasis is logic if it is taking into account that contents are the resource that finally is used in the learning events. Clearly, the contents, in wide sense – the resources that are used in the final learning activities – are a fundamental element for the OER initiatives.

One of the main aspects to be considered in a technical approximation to OER development is the OER design. The Wikipedia define design like: “refers to the process of originating and developing a plan for a product, structure, or component “, and Open design is defined like “Open Design is the application of open source methods to the creation of physical products, machines or systems”. Some examples of design languages or specifications that could be used in the design of OER contents are [2]:

- Learning necessities: Competences in a general sense could be represented by languages like IMS, RCDEO o HrXML
- Students Access restrictions: Could be expressed platform restrictions in the technical category of IEEE LOM u specific dispositive thorough the IMS accessibility
- Activities design (Objetives, secuencies, referenced resources): IMS LD specification allows describing any activities sequence, its objectives, resources and the participants roles.
- Evaluation data: The IMS QTI specification allows to representing very different kinds of evaluations and its results.
- Realization data: Both IMS LD and the SCORM specifications set allow the use of participant’s properties in on-line activities that allows its control

- Metadata: About descriptive metadata, the IEEE LOM is a specific standar for educational contents.

3. OER Socioeconomic Aspects

A first issue to be treated in the socioeconomic approach to OER is about the production, today there are not an exact knowledge of the production volume but the number of initiatives is exponecially increasing. And this increment is at all verified in very different scale organizations from little organizations to big institutions. Taking into account [9] some items about OER development could be pointed out:

- More than 150 universities in China are participating under the initiative China Open Resources for Education
- 11 universities in France under the project Paris Tech OCW, with more than 150 courses
- 9 universities in Japan under the OCW Japanese alliance, with 250 courses in Japanese and 100 in English
- 7 universities in the USA, between then MIT or the Carnegie Mellon
- Projects in universities in Australia, Brazil, Canada, Hungary, India, Iran, Ireland, etc.

The second question is about the costumer in this aspect could be easily seen that a wide spread in the OER use could have an extraordinary impact in the socioeconomic development in many countries around the world, especially in the third world countries, usually located in Africa, South America and Asia. This is founded in the fact that the access of last knowledge developed would be more accessible for the people in this countries one time that the cost wall have been broken, and there is a lot of socioeconomic aspects that could be improved, some of the most relevant are:

- Medical issues. Medicine practitioners, teachers and students can have an access to the most recent advances and therapies to deal with the enfermedades that they must curar everyday. Also for the people in general they could have access to know a lot of more healthy techniques. This can reduce the overall health
- Engineering issues. People related with the engineering and architecture could have access to new construction material and techniques that can allow to reduce costs
- Educational issues. Teachers and students for all the degrees but specially at the University degree could have access to the same knowledge all over the world making easy for the people the mobility an the search of new opportunities.

A lot of other possibilities can be joined to these. For this reason and though it is very difficult to establish numerically, the use of OER is exponecially increasing and will be more and more used in the future. But a critical aspect to get a wide use of OER is the diffusion of the knowledge of their existence. A strong politic of OER publicity must be organized by countries or supranational organizations. For example OCDE and UNESCO have stated this way.

4. OER Legal Aspects

The creations of the intellect, between which are the literary and educative works, generate intellectual property and for their authors copyrights. The preoccupation to protect this type of creations is old and it back goes back many centuries in history, in 25 year b.c., Marco Vitruvio in De Architectura, demanded a severe punishment for which they used like own the thought of other authors. Of this form the recognition and consequently protection of the Intellectual Property has been tie historically to the scientific, technological and really social progress .

Nevertheless the technological profits reached in the field of the denominated Information and Communications Technologies, and more concretely, the appearance of Internet is causing a drastic and turbulent restructuring process in all the economic and social sectors [10], affecting very specially the form in which take place the interchanges, publicity and consumption of literary works, and among them, the denominated educative resources. Prior to the appearance of electronic and digital media and tools, the authors of educational, investigation or educative materials, made their publication and distribution by means of physicists supports, Internet has radically changed this situations [3], currently there exist digital tools that allow to produce, to publish and to authorize the access to digital products. On the other hand, the Internet appearance favours the universality of spirit works, allowing them to easily transcend the geographic and physical borders.

These circumstances, from the legal point of view, indicate the importance of the content of the licenses that indeed, it has as main target, to regulate the digital transaction (conditions of use, distribution, publication, modification and commercialization) of the intellectual goods and among them the educational resources. The content of the licenses on open educational resources is varied and heterogeneous, because it responds to the particular preoccupations of each author on the protection that they want to grant to his work. Upon this point it is advisable to remember the RoMEO project that in the United Kingdom during years 2002 to 2003 carried out a survey between 542 investigators, on what type of rights wanted to maintain on their works [4]. The majority, more than 60%, would allow that third parts exposed, recorded, printed, mentioned or distributed their own articles, respecting the corresponding work quote and as long as all the copies were literal. On the other hand, 55% wanted to limit the use of their works to educative and not-commercial uses. The RoMEO report concludes that the protection granted to articles of investigation by the intellectual property law is over which most of academic requests. This circumstance together with the fact that the education can be considered an essential and public good implies that the application, in this field, of the Intellectual Property laws must have certain specialties.

Indeed such specialties have been gathered in a new type of licenses that is having an ample diffusion in the publication and diffusion of opened educational resources. These denominated licenses of open content allow to share, in controlled way, the copyrights that the author of the resources shows. The most extended licenses of this type are the Creative Commons license [5] designed by the Creative Commons organization who were created in 2002 in the university of Stanford by professor Lawrence Lessing, and the GNU Free Documentation License [6], designed by the FSF (Free Software Foundation), this last one more oriented to the software documentation, although also presents certain diffusion in other documentary areas.

Concretely in the educative scope such type of licenses presents the advantage to provide certainty and clarity in the digital access and use of educational, educative or investigation contents generated by other authors, on the other hand, simplifies enormously the administrative proceedings relative to the transaction of author copyrights and, mainly and very specially, they grant to the author the possibility of designing a customized system of use right cession on the generated resources, allowing, for example, to establish a double system, in terms of economic rights: (i) Free use of the resource for educative or without intention of profit uses, and at the same time, (ii) Payment for use rights if the work will be used with commercial aims.

The main goal that persecutes these kind of licenses is, in the educative scope, to establish a legal framework, away from the traditional copyright system, that offer the necessary legal guarantees in the collective interchange of work educational, educating and scientific works, with the aim of spread the culture, the formation and the education.

Taking as example the Creative Commons license, perhaps the most spread at the present time, and centering the analysis in the educative field, the chosen system to carry out the task described in the previous paragraph, has been the development of an application Web that allows the design of six licenses by means of the combination of four variables, the different possible combinations allow the author to highly personalize the license content destined to regulating the use of its work. The indicated variables are the following ones:

1. Attribution: You let others copy, distribute, display, and perform your copyrighted work — and derivative works based upon it — but only if they give credit the way you request
2. Non commercial: You let others copy, distribute, display, and perform your work — and derivative works based upon it — but for non-commercial purposes only
3. No Derivate Works: You let others copy, distribute, display, and perform only verbatim copies of your work, not derivative works based upon it.
4. Share alike: You allow others to distribute derivative works only under a license identical to the license that governs your work.

By means of the combination of such variables six different licenses can be obtained. They are the following ones:

1. Attribution Non-commercial No Derivatives (by-nc-nd). This license is the most restrictive of our six main licenses, allowing redistribution. This license is often called the “free advertising” license because it allows others to download your works and share them with others as long as they mention you and link back to you, but they can’t change them in any way or use them commercially.
2. Attribution Non-commercial Share Alike (by-nc-sa). This license lets others remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms. Others can download and redistribute your work just like the by-nc-nd license, but they can also translate, make remixes, and produce new stories based on your work. All new work based on yours will carry the same license, so any derivatives will also be non-commercial in nature.

3. Attribution Non-commercial (by-nc). This license lets others remix, tweak, and build upon your work non-commercially, and although their new works must also acknowledge you and be non-commercial, they don't have to license their derivative works on the same terms.

4. Attribution No Derivatives (by-nd). Choose by-nd license This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.

5. Attribution Share Alike (by-sa). Choose by-sa license This license lets others remix, tweak, and build upon your work even for commercial reasons, as long as they credit you and license their new creations under the identical terms. This license is often compared to open source software licenses. All new works based on yours will carry the same license, so any derivatives will also allow commercial use.

6. Attribution (by). Choose by license This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation. This is the most accommodating of licenses offered, in terms of what others can do with your works licensed under Attribution.

Once the author has designed the license that adapts better to its pretensions, the system Creative Commons creates a license expressed in three different ways:

1. *Commons Deed*. A simple, plain-language summary of the license, complete with the relevant icons.
2. *Legal Code*. The fine print that you need to be sure the license will stand up in court.
3. *Digital Code*. A machine-readable translation of the license that helps search engines and other applications identify your work by its terms of use.

In order to use the license, the author must include in his Web site a Creative Commons "Some Rights Reserved" button near the work. This button will link back to the Commons Deed, so that the world can be notified of the license terms. Such prevention allows the author to have legal grounds to sue under copyright break, in such case, like she happens to the rest of licenses; the author will be able to sue the violator by contractual breach and infringement of the intellectual property.

The Creative Commons licenses are settle down to perpetuity, is to say grant protection to the work during all their existence. Nevertheless such licenses are not of exclusive character, that is to say, the author has the right to grant other licenses on the same work and to explode, at any time such work under anyone of the licenses that have chosen, also the author is totally free to retire the work or to modify it.

Finally it is necessary to indicate that the original Creative Commons licenses are based on the legislation on Intellectual Property of the United States, that although is harmonized with the legislation of the rest of the world through treaties of the World Intellectual Property Organization (WIPO), presents, with the European legislation, certain differences, sometimes subtle, sometimes considerable. Therefore the licenses are adapted specifically by local lawyers to the regulation of each country.

Once outlined the terms and general characteristics of the Creative Commons license, turns out advisable to analyze a special type of license elaborated by this organization denominated “Developing Nations” license. The reason of dedicating some lines to this specific type of creative commons licenses is that the configuration of its content offers almost limitless possibilities to universalize the education to nations whose citizens lack the enough economic resources to accede to educational resources under traditional licenses that demand the payment of economic rights. Indeed the fundamental aspect of such license is that it allows that the payments for author’s copyrights by the use of their works are only demanded in the first world developed countries, whereas the same ones are offered of open and free in the “developing nations”. Of this form such licenses are an important legal instrument for the diffusion of educational resources in opened form, because its free character, allow the incorporation to the educative dynamics of sectors of the world-wide population that of another form would be excluded.

In addition to “Developing Nations” license, Creative Commons organizations contemplates other specific types of also interesting licenses in the educational scope: the “Sampling License” that allows to unite fragments from different work to form a new work, the “Public Domain” License, a type of license specially thought for the United States that allows to the author to decide if its work will be of public dominion completely, thus resigning to the term of protection that the law grants to the authors, or finally the “Founders Copyright” License, similar to the previous license, nevertheless the work does not become immediately to public dominion, but after 14 or 28 years from its publication.

Really and beyond the concrete analysis of a kind of licenses, it can be indicated that the open educational field is, in legal terms, supported in a new type of licenses, generally called open licenses that taking as started point the benefits from the interactivity creative [6], such licenses, on the one hand, are currently offering legal security in the digital interchange of such educative contents, and on the other hand are allowing its universalization by means of its diffusion through electronic and digital media and tools as Internet.

5. Conclusions

This paper has introduced the new concept of Open Educational Resources (OER), dealing with its socioeconomical, technical and legal aspects. The main objective of the paper has been to show how the OER can change our vision of the educational contents as we know it. More possibilities are been opened for more people in many countries in the world. We hope that this paper could act for reader how a first step to know the OER movement and in the future participate in some of one of its initiatives.

6. References

- [1] Wiley, d. (2006). On the sustainability of open educational resource initiatives in Higher Education [online].OECD.
- [2] Sicilia, m.a. (2006). «Semantic learning designs: recording assumptions and guidelines». British Journal of Educational Technology, Vol. 37, n.º 3, pág. 331-350.
- [3] Kalakota, R.; Robinson, M. (2001). E-Business 2.0, roadmap to success, Boston MA, Addison-Wesley, 2001

- [4] McCracken, R: (2006). Cultural responses to open licences and the accessibility and usability of open educational resources.
http://www.oecd.org/document/32/0,2340,en_2649_33723_36224352_1_1_1_1,00.html
- [5] GADD, E.; OPPENHEIM, C.; PROBETS, S. (2003). How academics want to protect their open-access research papers. En: RoMEO Studies 2. Department of Information Science, Loughborough University.
<http://www.lboro.ac.uk/departments/ls/disresearch/romeo/RoMEO%20Studies%202.pdf>
- [6] <http://creativecommons.org/>