

Palimpmedia: mass-collaborative media creation and sharing through crowdsourcing and its implications to Courseware and Open Educational Resources

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ABSTRACT

The spread of Internet and the evolution of its technologies have made possible the construction of huge knowledge bases by means of mass collaboration, with thousands of volunteers contributing simultaneously. This brand new way of creating and delivering content has implications on a wide range of human activities, among them the Education. This paper explores the current trends of media creation and sharing and analyzes potentialities of its application on Open Educational Resources.

Categories and Subject Descriptors

H.5.3 [information interfaces and presentation]: Group and Organization Interfaces – *collaborative computing, computer-supported cooperative work, web-based interaction.*

General Terms

Design, Experimentation, Human Factors.

Keywords

Mass-collaboration, crowdsourcing, OERs, Learning Objects

1. INTRODUCTION

As stated by [1], "mass collaboration systems enlist a multitude of humans to help solve a wide variety of problems". In this perspective, those systems would allow the creation and sharing of content in a collaborative, open way. These systems are already part of the quotidian of XXI century connected citizens, which have access to a multitude of wikis, user-led videos and podcasts, for instance. People use – consume – at the same time that they produce the media that is available on the Internet. They are "prosumers" (producers+consumers) [3] collaborating in a variety of crowdsourcing-based systems [6].

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In spite of all new terms created and new ways of thinking about media delivery, global markets and content production process, there are some crystallized, well-established processes that, still today, remain indistinguishable from years ago, when the world was immerse in a Web 1.0 era. Educational resources, for instance, are not usually created under such perspective; instead, instructional design-based techniques are the standard mantra for the process of creating educational resources. A multidisciplinary team of experts, including linguists, programmers, educators, media and content experts are involved in a huge effort of creating resources that are designed for use in formal and non-formal educational situations. This is still the current way to design and implement educational resources.

The usage of collaborative means to develop and share content in a collaborative, open way brings new challenges. Hypermedia content, for instance, has inherently its own pits and pitfalls, considering different multimedia supporting formats nowadays existent in the market, over the internet and in Academia. Figure 1 below depicts the situation for multimedia content, classifying them according to the variety of multimedia support (x-axis) versus the feasibility of its editing/mixing (y-axis).

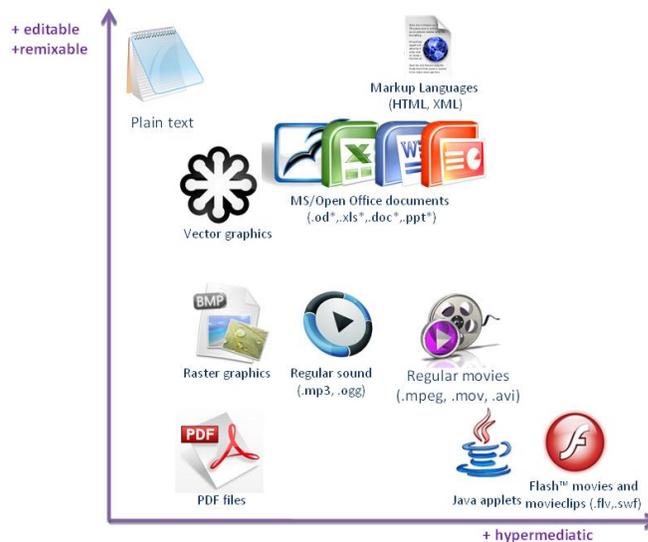


Figure 1. Some multimedia formats, arranged according the easiness for edit and remix versus the “hypermediatic” feature – a measure of how many different hypermedia content are directly supported by a resource under this format.

While text (de)composition, edition and mixing is an easier task to be performed, strictly from the technical point of view, the sharing, editing, mixing and reuse of multimedia content brings some challenges besides those proposed by plain texts.

This paper discusses some of these concepts and presents some ways of applying them to the processes of educational content creation.

2. MASS-COLLABORATION AND PALIMPEDIA

People already has been using Web 2.0 as “prosumers” - a term formed by contracting either the word producer with the word consumer, first proposed by Toffler [3], regarding the previous work of McLuhan & Nevit [4], which forecasted relevant changes in society due to all advances electric technology provided at that time. This term was already explored by Tapscott and Williams [5], together with the term “Wikiconomics”, about mass collaboration and based over four principles: Openness, Peering, Sharing, and Acting Globally.

Regarding to mass collaboration, Howe [6] coined another term, “crowdsourcing”, which stands for a production model that uses collective intelligence and knowledge carried by volunteers across the Internet to solve problems, and give solutions for content creation or development of new technologies. These concepts, together with the “long tail” concept (which points out that the the aggregate value of an almost unlimited set of low-demand undervalued elements usually is higher than the sum of values of a limited set of high-demand most valued elements) are leveraging a brand new manner to deal with things apparently distinct (like goods being sold by an e-commerce website and content being delivered through the Internet), but that, in fact, share the same essence.

In mass collaboration-based systems, four questions immediately arise, as pointed out by Doan [1]: How to recruit and retain users? What contributions can users make? How to combine user contributions to solve the target problem? And how to evaluate users and their contributions?

In this sense, Davidson [2] had coined the term “palimptext” as a derivation of palimpsest – which means any manuscript, typically of papyrus, parchment or tablet, that has been written on more than once, after earlier writing has been incompletely erased, usually with diverse layers apparent beneath the surface. In this sense, a “palimptext” describes a text that could be written in a non-finished manner, thus allowing collaborative work to be performed over it. Extending this main idea to hypermedia content – and thus coining the portmanteau “palimpmedia”, there are numerous possibilities provided by today’s Web-based tools for editing, publishing and sharing content in a palimpsestic way: instead of planning a hypermedia product as an amalgam of statically-planned content, new pieces of information are meant to be constantly added, as well as any content inside such an aggregation is likely to be modified, updated, deprecated, substituted or even removed.

All the presented approaches are currently applied in some knowledge fields. Nonetheless, they are not perceived in Education. Distinct teaching and learning scenarios, suffers from the same problem: they are based over static curricula, which often leads to the creation of syllabi-centered static educational content. Inherently, it constitutes a static, almost immutable

process to conduce educational media creation. Even the so-called OERs (Open Educational Resources) [9] [11] [12] are not really open if they use proprietary formats or if they are planned in a way that do not easily “mashup” with other resources [13]. The process involved in e-Learning content production requires a multidisciplinary group (Subject Matter Experts, Instructional Designers, Graphic Designers, Programmers, and so on) Often, the whole responsibility about the content being created usually lays over these multidisciplinary teams – and no guarantees about it being the most suitable content that could be offered to each specific learning / teaching situation. Figure 2, extracted from [19], shows the regular interaction among teacher, students and educational resources:

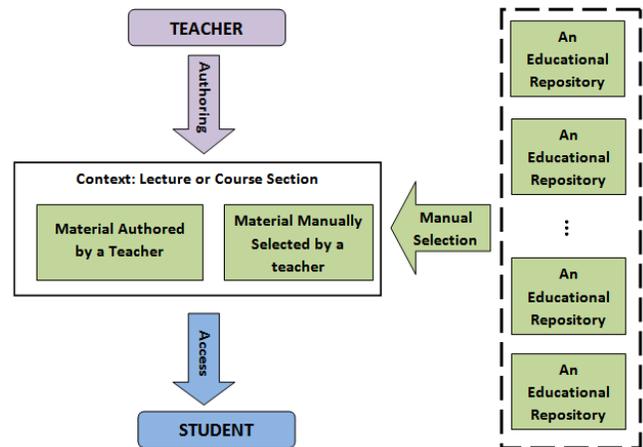


Figure 2. Regular teacher-led creation and organization of educational contents (extracted from [19])

It must be noted the isolated work of teacher and the passive role played by students in the whole process - students’ skills are often underestimated in this task. Mass collaboration could help in the sense of improving adequateness of created content. By taking into account all media students are able to create or harvest, sharing them with their colleagues, the long tail of educational elements is already formed; it consists in a diverse, rich material mined by students and that could be used by course designers. At that point, the thin layer that separates teachers and learners collapse to bring a new educational agent – the “tearner”, using a term suggested by Hodgins [8] which mix teachers and learners together in an unique, interchangeable role as “prosumers” of the educational process.

This approach leads to a brand new set of issues that must be addressed: which strategies of harvesting must be applied in a long tail full of low-demand content to grab the most significant ones; how to combine all user-led dynamic content with static objects; how to organize all this “mashup” in a learning environment – if any; which kinds of evaluation could be performed over new content aggregated to a palimpmedia – which would determine the quality of collaboration some media gives to a courseware; and many others questions.

3. COLLABORATIVE OPEN EDUCATIONAL RESOURCES

An initial definition for OER was “the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community

of users for non-commercial purposes” [10]. Nowadays, he definition of OER now most often used is: “open educational resources are digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research” [11].

Open Educational Resources (OER) [9] offer benefits in education and training, since they allow to reduce time and costs of establishing educational programs, through their adaptation, reuse and remixing.

Conceptualize them involves a brief review of its origins, and thus the predecessor theory, regarding to Learning Objects (LO) [7]. David Wiley, using the term “learning object” coined in 1994 by Wayne Hodgins, helped to popularize the whole idea of design and reuse digital elements to use them in different teaching and learning situations and contexts. According to [11], also David Wiley used the term “open content”, inspired in open source philosophy, to refer to learning objects that could be freely available and openly adapted, edited and remixed [7].

Ferran et al. [16] conceptualized the term OER about features that should meet the resource, in terms of cost and availability, including:

- Access to open content (including metadata) should be available free of charge for educational institutions, content services and end users such as teachers and students;
- The content is meant to have a free license for reuse in education, with no restrictions which could be preventing users to modify, combine and direct content to other purposes, and consequently, the content should be designed for easy reuse of content standards and open formats;
- Open Source software and free Application Programming Interfaces (APIs) must be used, as well as authorizations to reuse services and Web-based resources.
- There are a very demanding set of principles, which in many cases, the repositories of educational resources more relevant nowadays in fact do not fully comply with.

According to [11] and [12], an OER should include:

- **Learning content:** full courses, courseware, content modules, collections and publications.
- **Tools:** software to develop, use, reuse, and deliver learning content including searching and organization of content, content management systems and training, content development tools and online educational communities.
- **Implementation Resources:** Intellectual property licenses to promote open publishing of materials, design principles of good practice and translation of content.

The main challenge lies over the necessity of implementing all these features in order to support collaborative creation of OER. Some guidelines could be extracted from [18], which points out four principles of successful “produsage”:

- **Community-Based** – the whole community can contribute more than closed, isolated teams of producers.
- **Fluid “Heterarcy”** – “prodsumers” participate on the project phases according to the appropriateness to their personal skills, interests, and knowledge, and may form loosely-hierarchy sub-groups to focus on specific issues, topics, or problems
- **Unfinished Artifacts** – projects are infinitely under development, and therefore they remain always unfinished;

their development follows evolutionary, iterative, palimpsestic paths.

- **Common Property, Individual Rewards** – producers permit the community to use, to adapt, and to evolve their intellectual property, and they could be rewarded by the status capital they gain through this whole process.

A proposal of a software architecture will be shown in the next section.

4. ARCHITECTURE PROPOSAL FOR COLLABORATIVE OER

Several authors have proposed solutions for live and/or collaborative edition and mixing of multimedia content. As examples, there is the work of Shaw and Schmitz [13], which provides a framework to collaborative video edition and mixing; in a similar way, Engström et al. [14] proposes an application for live video production and mixing, but directed to VJs. In fact, the subject has been focus of study since digital video became a popular reality – as is proven by the seminal work in [15].

One of the possible architectures for user-led collaborative content creation is presented in [17], which can be seen in Figure 3 below.

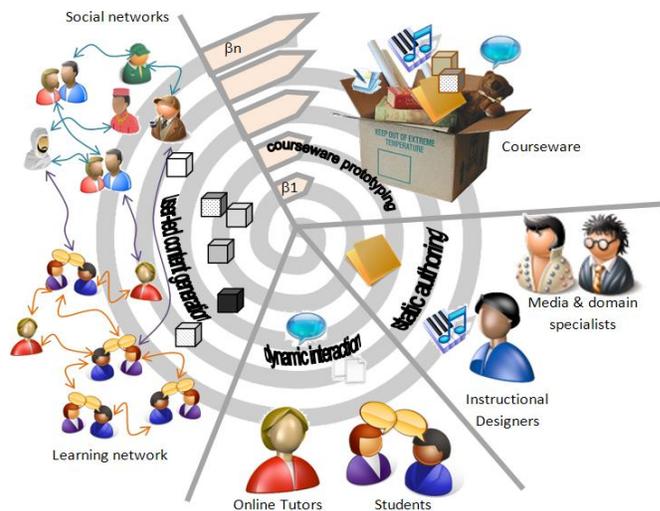


Figure 3. Hybrid collaborative content creation process

The process depicted in Figure 3 is divided in four main phases.

- **Static authoring**, referring to the commonly used process to establish courses and learning objects, involving instructional designers, media and subject matter specialists;
- **Dynamic interaction** refers to synchronous and asynchronous interactions meant to occur among students and tutors, possibly in learning environments;
- **User-led content generation**, the part of the process that is directly influenced by learning and social networks, involving practice communities and Web 2.0-based tools. The content that is retrieved, recommended, appointed, grouped, and so on, is a contender to being integrated as part of future versions of the course. Such content is often “created” in a non-intentional, palimpsestic way.

- **Courseware Prototyping**, the phase where a course version is done and ready to be evaluated by the same team of specialists that are responsible for the first stage. They will make a decision about the integration of student-generated content into the next version of the course.

5. FINAL CONSIDERATIONS

The roles in the content production, delivery and sharing processes must be rethought when facing the new possibilities brought by Web 2.0 and social software technologies. The dynamic way to deal with courseware is the key point to understand the palimpsestic nature of collaboratively-created educational content: instead of planning a course as an amalgam of statically-planned content, new pieces of information are meant to be constantly added, edited and mixed as well as any content inside such an aggregation is likely to be modified, updated, deprecated, substituted or even removed.

This paper presented some discussions over the philosophical foundations of this concept, providing a proposal for a supporting computational architecture. Further works involve the implementation of the proposed recommender system architecture and the monitoring of some real-world courses taken under this approach. This would create real-world data about the efficacy of such a proposal, as well as the ability to increase and enrich the e-learning process. Another work in progress consists on the application of the concepts here detailed for creating open collaborative text-based resources in the context of Latin America higher education. Also, support for a recommendation network is being developed for this proposal.

6. REFERENCES

- [1] Doan, A., Ramakrishnan and Halevy, A. Y. Mass Collaboration Systems on the World-Wide Web
- [2] Davidson, M. (1989). "Palimpsests: Postmodern Poetry and the Material Text". Postmodern Genres. Marjorie Perloff, ed. Norman, OK: University of Oklahoma Press.
- [3] Toffler, A. (1980). "The third wave". Bantam Books.
- [4] McLuhan, M. & Nevitt, B. (1972) "Take Today: The Executive as Drop Out". Longman Canada Limited, Harcourt Brace Jovanovitch, Inc.
- [5] Tapscott, D. & Williams, A. D. (2006). "Wikinomics: How Mass Collaboration Changes Everything". Portfolio Hardcover.
- [6] Howe, J. (2006). The rise of crowdsourcing. Wired, v. 14.06.
- [7] Wiley, D. A. (2000). "Learning object design and sequencing theory". Unpublished doctoral dissertation, Brigham Young University. Available: <http://davidwiley.com/papers/dissertation/dissertation.pdf>
- [8] Hodgins, W. (2010). Infinitely Scalable Teaching = Limitless Learning. Off course-on target. Unpublished. Available: <http://waynehodgins.typepad.com/ontarget/travel/>
- [9] UNESCO. (2002). Open Educational Resources Open Content for Higher Education – Final Forum Report. http://portal.unesco.org/ci/en/files/21713/11438000259OER_Forum_Final_Report.pdf/OER%2BForum%2BFinal%2BReport.pdf
- [10] Johnstone, M. and R. Poulin (2002), "What is Opencourseware and why does it Matter?" in Change, Vol. 34(4), July/August.
- [11] CERI (2007) Giving knowledge for free: the emergence of Open Educational Resources.
- [12] Hylén, J. (2006) Open educational resources: Opportunities and challenges, OECD-CERI, http://www.knowledgeall.com/files/Additional_Readings-Consolidated.pdf
- [13] Shaw, R. and Schmitz, P. (2006) "Community Annotation and Remix: a Research Platform and Pilot Deployment" HCM'06: Proceedings of the 1st ACM international workshop on Human-centered multimedia. Santa Barbara, CA, USA — October 23 – 27. DOI= <http://dx.doi.org/10.1145/1178745.1178761>
- [14] Engström, A., Esbjörnsson, M., Juhlin, O (2008) Mobile Collaborative Live Video Mixing. Proceedings of MobileHCI'08 — 10th international conference on Human computer interaction with mobile devices and services. New York, USA. DOI= <http://dx.doi.org/10.1145/1409240.1409258>
- [15] Vladimir, P. and Deok-Ho, K. "Task oriented non-linear method for interactive hypervideo media editing systems". Proceedings of MULTIMEDIA'02 – 10th ACM international conference on Multimedia. New York, USA. DOI= <http://dx.doi.org/10.1145/641007.641048>
- [16] Ferran, N., Pascual, M., Córcoles, C. y Minguillón, J. (2007). El software social como catalizador de las prácticas y recursos educativos abiertos. IV Simposio Pluridisciplinar sobre Diseño, Evaluación y Desarrollo de Contenidos Educativos Reutilizables (SPDECE07). REDAOPA. ISBN: 978-84-8373-992-1. Bilbao, España.
- [17] Mustaro, P. N., Pimentel, E. P. and Silveira, I. F. (2010) "A Learning Network Recommendation Approach for Palimpsestic User-Led Open Educational Resources". In: In: J. Burton Browning. (Org.). Open-Source Solutions in Education: Theory and Practice. : Informing Science Press.
- [18] Bruns, A. (2008). Blogs, Wikipedia, Second Life, and Beyond: From Production to Produsage. New York: Lang.
- [19] Brusilovsky, P. & Nijhavan, H. (2002). A Framework for Adaptive E-Learning Based on Distributed Re-usable Learning Activities, In *Proceedings of World Conference on E-Learning, E-Learn 2002*.