

# Collaborative Open Textbooks for Latin America – the LATIn Project

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**Abstract—** This paper presents the Latin American Open Textbook Initiative, which aims to help to solve the problem of the high cost of textbooks for higher education in Latin America. The main goal is the creation of a supporting architecture, methodologies and policies for the dissemination of cooperative open textbooks aimed for higher education, customized specifically for the region.

*Open textbooks; collaborative content creation; mashups; crowdsourcing*

## I. INTRODUCTION

Among the most important barriers for accessing and succeeding in the Latin American Higher Education Institutions (HEI) are the costs of being a university student. Even if there is not tuition to be paid, as in the case of most public HEIs in the region, or through scholarship from the government in private HEIs, other often overlooked costs, most notably the cost of textbooks, are real impediments for low-income prospective and actual students.

Regarding this context, this paper will present the LATIn Project (Latin America open Textbook Initiative), which will address the problem of high cost of textbooks for Higher Education in Latin America. The main actions will be the creation and dissemination of a Collaborative Open Textbook Initiative for Higher Education tailored specifically for the region. This initiative will encourage and support local professors and authors to contribute with individual sections or chapters that could be assembled into customized books by the whole community. The created books will be freely available to the students in an electronic format or could be legally printed at low cost because there is no license or fees to be paid for their distribution. This solution will also contribute to the creation of customized textbooks where each professor could select the sections appropriate for their courses or could freely adapt existing sections to their needs. Also, the local professors will be the sink and source of the knowledge, contextualized to the Latin American Higher Education system.

## II. THE ACCESS TO TEXTBOOKS IN LATIN AMERICA

The cost of books in undergraduate education in Latin America is often prohibitive for most of these students, making these books inaccessible to them, and even sometimes motivating them to make illegal copies.

Table 1 below, extracted from data discussed in [1], analyzes the costs of acquisition of books for a freshman in ten different courses of the biggest Brazilian public university (Universidade de São Paulo - USP):

TABLE I. COSTS OF TEXTBOOK ACQUISITION – USP/BRAZIL

Course	Cost of books/year (€)	% of minimum wage (BR)
Information Technology	1.688,89 €	59.89%
Nature Sciences	1.570,42 €	55.69%
Tourism and Leisure	1.972,41 €	69.94%
Marketing	1.829,91 €	64.89%
Textile Techniques	1.796,38 €	63.70%
Environment Management	2.248,37 €	79.73%
Obstetrics	2.506,38 €	88.88%
Gerontology	1.905,25 €	67.56%
Physical Education	1.442,68 €	51.16%
Public Policies	2.261,45 €	80.19%

These numbers clearly show that the purchase of books used in University – as opposed to the reprographic, often illegal, copies of them, is not available for students. According to Table 1, the average yearly cost for textbooks to study a program in USP is 1,900€ [1]. That corresponds to the 67% of the Brazilian minimum wage (2.820€ per year). This makes almost impossible for low-income families to support the university study of even one of its members. Even for Argentina, whose minimum wage, the biggest of the region, is 4.092€ per year, the cost of books would represent, in average, 46% of the total family income. The situation is only worse in other Latin America countries.

This problem has been traditionally addressed through the existence of university libraries that lend copies of the textbooks for free to the students. However, university libraries do not have the budget to meet the demand from low-income students as the costs for acquiring the material is too high for the purchasing power of most families. It is not uncommon to find a ratio of 50 students per book in high-demand courses. This usually results, in the best-case scenario, with the students making illegal copies of the books or, in most common case, with the student relying only in limited class notes. This problem creates a significant difference between students that could afford to have a copy of the textbook and those who could not.

One of the roots of the high cost of the textbooks is that most of them are produced outside the Region. Brazil has the largest editorial production of Latin America, and accounts for over half of the overall books edited on the continent [2] [15], followed by México, Argentina, Colombia, Chile and Venezuela.

However, the total production of books in the region is actually lower than 10% of the entire world [3]. Besides, according to several studies, only a small part (~10-20%) of the books used in Latin American HEIs were created by Latin American authors. This root problem is not related with the lack of production capacity, but with the difficulty that local professors/authors have to publish and distribute their books.

In addition, [1] also measured the amount of recommended books whose reading is required in the disciplines, but they are not more available to purchase since they are out of print. It should be noted that just because they are out of print, the costs of these books (which come to 1/3 of the bibliographic database, in average) were not computed. In addition, the research also has shown that foreigners authors (translated or adopted directly imported) have a strong presence in courses' bibliography, being responsible from 33.8% to 64.5% of recommended books. When directly imported, even without taxes (in some countries), these books are often more expensive for shipment costs; when (often badly) translated, these books demotivate local authors to produce their own.

The problem with the foreign origin of the textbooks have several additional consequences beside their cost: most textbooks are not tailored to the context of Latin American Higher Education, the most current versions are not available in a language in which most professors and students are fluent and it creates the harmful perception among students that knowledge always comes from outside the region.

Besides economical factors, there are some other issues to be addressed: for instance, how a book totally fits to some course's goals? Undergraduate syllabi often present a set of no less than three reference books, which are meant to have some parts read in order to fulfill course's requirement. In the best situations, reference books have no more than 50% of their content covered by a course - which increases costs, since two or three are to be bought, instead of only one. This fact leads to the need of more adaptable, customized books, which are possible only with the participation of teachers in the whole process of book selection - or, more than this, its construction.

In the last years, several governments in Latin America have attacked the problem of the cost of textbooks offering free alternatives created locally. State-sanctioned books have been mass-produced and delivered to students with excellent results in some countries [4], in spite of these politics not being present in all countries of the region, as shown in [5]. This approach however, has been limited to primary and secondary education where the curriculum is centrally managed. The diversity, specialization and academic freedom make very difficult to implement a similar plan for textbooks in Higher Education.

### III. OPEN EDUCATIONAL RESOURCES AND CROWDSOURCING

A new alternative solution to improve the affordability of Higher Education textbooks, while preserving the academic freedom of each professor, has been emerging in the field of Learning Technologies. The concept of Open Educational Resources (OER) [12], which mean any educational materials that could be freely copied, modified and shared, have contributed to the creation of the concept of Open Textbooks, a sequence of OERs that are usually collaboratively created, that are licensed to be freely copied, modified, printed and distributed as traditional or electronic books – a palimpsest, in a metaphorical sense.

A palimpsest 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, Davidson [6] had coined the term “palimptext” in order to describe 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.

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 [7], regarding the previous work of McLuhan and Neveu [8], which forecasted relevant changes in society due to all advances electric technology provided at that time. This term was already better

explored by Tapscott and Williams (2006), together with the term “Wikiconomics”, about mass collaboration and based over four principles: Openness, Peering, Sharing, and Acting Globally.

Regarding to mass collaboration, Howe [9] 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 aggregate value of a quasi-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.

Despite all of these neologisms 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. Figure 1 below, extracted from [13], depicts the regular way of content creation.

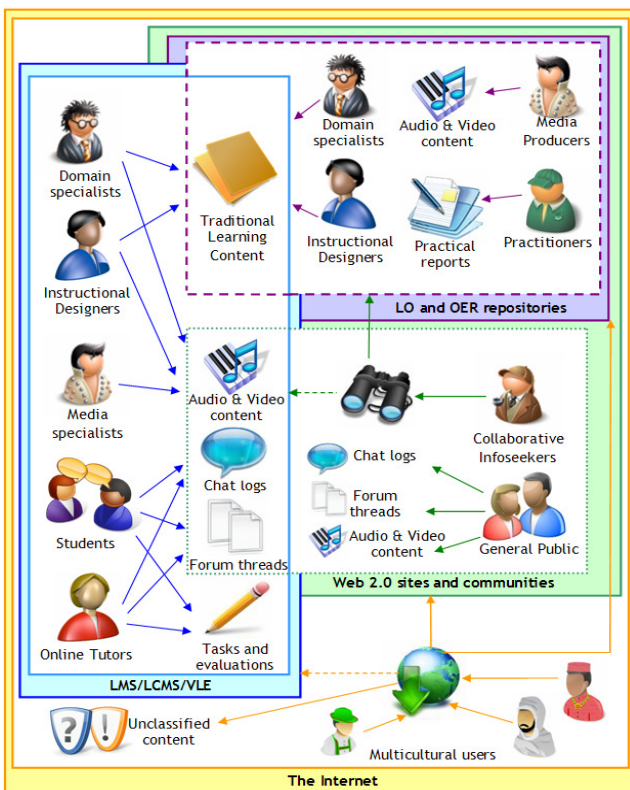


Figure 1. Traditional content creation

As seen in Figure 13, 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 Learning Objects (LOs) – as first defined by Wiley [10], even though the same author insists on the need of evolving this concept to Open Educational Resources (OERs) [12].

Such approach, in spite of being currently and regularly applied in distinct teaching and learning scenarios, suffers from the fact of inherently constituting a static, almost immutable way to conduce educational media creation. Even the so-called OERs 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. Besides, it lays over the multidisciplinary team the whole responsibility about the content being created – and no guarantees about being it the most suitable content that could be offered to each specific learning / teaching situation.

When restricting this scenario to textbook creation, professors’ skills are usually underestimated in this task. By taking into account all class materials professors are able to create or harvest, sharing them with their colleagues, the long tail of educational elements is already formed, consisting in a diverse, rich material mined by professors and that could be used by other colleagues to deliver they own, customized textbooks. This approach can be extended to non-formal, user-led content creation. At that point, the thin layer that separates teachers and learners would collapse to bring a new educational agent – the “tearner”, using a term suggested by Hodgins [11] which mix teachers and learners together in an unique, interchangeable role as prosumers of the educational process. One possible architecture for user-led content creation, adapted from [13] and [14], can be seen in Figure 2 below.

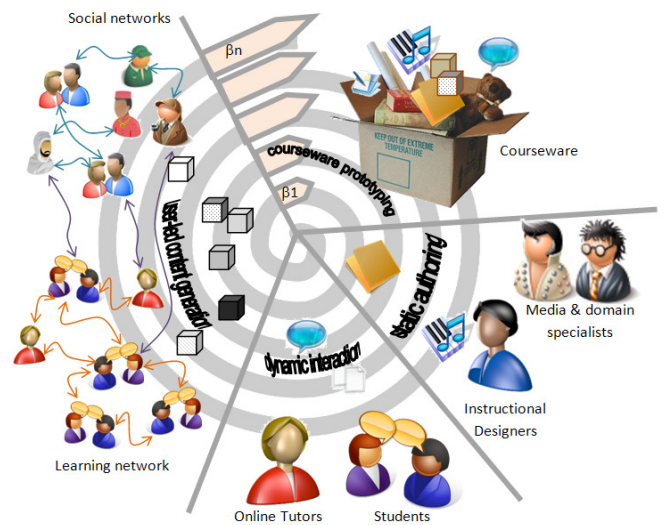


Figure 2. Mixed-role content creation

The scenario of this picture supports four different ways of authoring, according to [13]: 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, mainly 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; and 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.

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 palimpsest – which would determine the quality of collaboration some media gives to a courseware; and many others questions. But, for sake of clearness, this work will focus on the textbook collaborative creation process, involving, at this time, only professors as “prosumers”.

#### IV. THE OPEN TEXTBOOK INITIATIVE

There are several Open Textbook initiatives already running: Wikibooks, Connexions, the California Open Source Textbooks Project, etc. These initiatives have been found to reduce significantly (~80%) the cost of textbooks for the students. Some of these initiatives also include small sections of materials in Spanish or Portuguese, but participation of Latin American authors has been rather limited.

Professors and academic authors will be the main users of the proposed solution, however the low-income students will be the main beneficiaries of the freely available textbooks produced by the initiative.

During pilot implementation of the initiative that is one of the proposed actions of this project, it is expected that the solution will help 144 courses in 9 different Universities, with at total benefited population of more than 4.500 students in 6 months. The created textbooks will remain freely available to reuse, translate, adapt and remix.

This proposal is especially relevant for Latin American countries because it attacks the main problems with traditional textbooks and electronic learning materials in the region:

1. It reduces the cost of the textbooks, making them accessible, affordable and even free for low-income students;
2. It allows local professors and authors to easily produce, share and distribute the knowledge with a local view and contextualized to the Latin American cultures and languages, and

While traditional interactive digital content is only accessible to those that have access to computers, Open Textbooks could always be printed and used without the need of any technological device.

#### V. PRECONDITIONS AND RISK FACTORS

The main preconditions for this project are:

1. The Latin American HEIs are interested in solving efficiently and legally the problem of high cost of textbooks. Current solutions are insufficient (libraries), inadequate (open text books in foreign languages), too expensive (private digital libraries) or not legal (photocopies of full books);
2. Professors at HEIs have access to a computer and Internet at least during their working hours. This requirement is currently met by most mid-size to large HEIs in the region.

During the execution of the project the following assumptions will be monitored and managed:

1. There will be enough interested professors to produce the required content. The project will provide incentives to the participants in order to assure their collaboration.
2. We assume that a common methodology could be reached between the partners. If that is not the case, a set of methodologies will be provided and applied according to the case.
3. The partner Universities will accept the use of the new textbooks. To assure that this condition will be met, the partner agreement will specifically state the acceptance of this issue.

The main risk factors that have been identified will be controlled during the execution of the project, together with preventive and corrective actions are:

1. Delays in activities (Internal): There is always the risk that one or more partners fail deadlines. Continuous periodical meetings (virtual and face to face) to monitor the status of the activities mitigate this risk. In the case that the delays occur, the work in the project can continue because the work of different groups could continue even without the input from the others;
2. Partners withdraw from project (Internal): Change in policies and/or interest of the different partners could result in one or more partners to withdraw from the project. To reduce the risk of this event, the participation agreement will be made at the institutional level. To reduce the impact in the project, in case a partner retires from it, the activities are always the responsibility of 5 or more institutions.
3. Political instability / policies changes / economical issues (External): Changes in the political environment, institutional policies or funding could affect partners. These changes could generate delays or even the withdrawal from the project. In case these events happen will be managed the same as internal delays or withdrawals. There are no major physical, environmental or social risks foreseen.

After the project is completed, the main assumption to reach the overall objective is that other HEIs are attracted by

the results of the project and their faculty joins the initiative to create new Open Textbooks. The dissemination actions and the support of LACLO (Latin American Community of Learning Objects) and Europe's ARIADNE are the key to gain the support from institutions outside the project.

Other elements of the project that guarantee the sustainability of the initiative are:

1. All the textbooks produced during the project will be free to re-use, adapt and remix. They will be made publicly available through the technological platform.
2. At the end of the project, the control of the initiative will be transferred to LACLO. Their members will be responsible for the maintenance of the platform, the development of new collaboration methodologies and strategies for adoption and further dissemination of the results.

## VI. CONCLUSIONS

The overall objective of the project is to improve the accessibility to the Latin American University for low-income students, as well as to reduce the dropout rate due to financial reasons. This objective will be reached via the reduction or elimination of the cost of required textbooks that sometimes could represent a significant share of the income of a minimum-salary family. The initiative proposed in this project will result in the regional collaborative creation of textbooks that could be freely and legally copied, printed, modified and distributed to students. These books will have the additional advantages of being easy to update and being in a language that the student could easily understand.

The specific objective of the project will be the creation and dissemination of a Collaborative Open Textbook Initiative for Higher Education tailored specifically for Latin America. This initiative will encourage professors and academic authors from different HEIs in Latin America to collaborate with colleagues from other HEIs in the region to create chapters and textbooks tailored for their specific course needs that will be freely available for students to read, print and share, and to other colleagues to adapt, translate, distribute and remix. The project will address the pedagogical, technological and political issues needed for such an initiative to work successfully in Latin American countries.

There are three results that are expected from this project, in three distinct dimensions: methodological, technological and strategic.

The first result is a methodology for collaborative creation of open textbooks. Such methodology will guide the process of collaborative creation of materials, in which professors and authors will be involved. The main objectives of this methodology are: to guarantee the quality of the materials; to facilitate the collaboration process and to ensure further re-usability of individual components. This methodology will take into account the idiosyncrasies and cultural background of different Latin American countries.

As a second result, it will be implemented and tested a technological platform to support the collaborative creation,

adaptation, mixing and re-use of open textbooks. This Web-based platform will provide the functionalities needed to support the methodology for the collaborative creation of book sections and chapters. It will also provide tools to mix these sections and chapters into customized textbooks to be used in an specific course. The system will then provide tools for the users to read the books online, to download them as PDF to be printed or for off-line reading. The system will facilitate the creation of new versions of the materials (adaptations) or translations to other languages or cultures. All modules and books are also meant to be reused, sliced, joined and remixed in new modules and books, to become parts of brand new books, according to the needs. The system will also provide recommendation tools for the creation of new communities and for relevant new textbooks or chapters.

Last, strategies for implementation and adoption of this solution will be drawn. This result, arguably the most important for the success of the project, will be establishing the political and legal guidelines for the operation of this initiative, such as financing alternatives for the creation of the textbooks, the kind of open licenses that better adjust to the laws of the different countries, sharing policies and ownership/authorship of the textbooks. Also, this result will include a set of strategies for the gradual adoption of the Open Textbooks Initiative in Latin American HEIs, being just for a course, a program or for the whole University.

To validate the efficacy of the proposed pedagogical methodology, the technology platform and the implementation strategies, 144 courses (16 courses in each Latin American partner in 16 different subjects common between all the partners) will use Open Textbooks collaborative created between professors from each partner during, at least, one semester. The feedback received after this pilot will be used to improve the results (methodology, platform and strategies) before their public release.

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