

Open Courseware Initiatives – After 10 Years

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Abstract—In this paper we overview the state-of-the-art in open courseware initiatives worldwide. First, the MIT OpenCourseWare project is surveyed, as it has been the real starting point of the OCW movement. Generally, open courseware refers to a free and open digital publication of high quality university-level educational materials that are organized as courses, and include course planning materials, evaluation tools, and thematic content, under a Creative Commons license. OCW is free and openly licensed, accessible to anyone, anywhere, anytime via the Internet. The OCW initiative started in 2002, and since then many more projects that offer open access to courseware have been initiated: Carnegie Mellon Open Learning Initiative, Harvard Medical School's MyCourses, Webcast.Berkeley, Rice University's Connexions, OpenCourseWare Consortium, Open Education Resources Commons, and The Saylor Foundation's Free Education Initiative, along with open courseware projects worldwide. All these endeavors boost and contribute to the emerging open educational models.

Keywords: *open courseware, MIT OpenCourseWare, OCW Consortium, Open Educational Resources Commons, Free Education Initiative, Creative Commons license*

I. INTRODUCTION

In this paper we overview the state-of-the-art in open courseware initiatives worldwide. Generally, open courseware refers to a free and open digital publication of high quality university-level educational materials that are organized as courses, and include course planning materials, evaluation tools, and thematic content, under a Creative Commons license. First, the MIT OpenCourseWare project is surveyed, as it has been the real starting point of the OCW movement. OCW is free and openly licensed, accessible to anyone, anywhere, anytime via the Internet. On 4th of April, MIT celebrated the 10th anniversary of OpenCourseWare's announcement and the completion of the first decade of open sharing. Back then, MIT announced a ten year initiative on open courseware, called OpenCourseWare (OCW), which was the largest such venture at that time, and that was intended to both create public Web sites for about 2000 courses and to make available also lecture notes, syllabuses, exams, simulations, video lectures, etc. The main goal of the OCW initiative has been to disseminate as broadly as possible one of the main intellectual assets of the university, i.e. the content developed by its Professors, leaving behind the commercial benefits of a distance learning enterprise. Thus, the MIT plan has not included the possibility to provide full-fledged, for-credit courses online. The course materials have been thought as support instructional materials to be studied as such, or to be

combined with student-teacher interaction wherever. The OpenCourseWare initiative has been thought in the larger context of open systems, learning from the experience that opening of the software infrastructure has unleashed the creativity of software developers in unimagined ways, and thinking that something very similar can happen to education [1]. In addition, there are other programs that offer open access to some of their courses, which have been developing in parallel with MIT's OCW: Stanford Engineering Everywhere, Carnegie Mellon Open Learning Initiative, Harvard University Extension School Open Learning Initiative and Harvard Medical School's MyCourses – Open Courseware Initiative, Open Yale Courses, Webcast.Berkeley, Rice University's Connexions, Open University's OpenLearn, and so on. Moreover, besides universities' initiatives, major repositories for open courseware are available like OpenCourseWare Consortium, Open Education Resources Commons, and The Saylor Foundation's Free Education Initiative. All these endeavors boost and contribute to the development of the emerging open educational models.

Many of these initiatives are supported by The William and Flora Hewlett Foundation, which has had a very important steering role in initiating and sustaining these initiatives. The Foundation, through its Open Educational Resources (OER) initiative, launched in 2001, *seeks to use information technology to help equalize access to knowledge and educational opportunities across the world. The initiative supports the development and dissemination of high quality content, innovative approaches to remove barriers to the creation, use, re-use and sharing of high quality content, and projects that seek to improve understanding of the demand for openly available content* [2].

Ten years later, we may have a look to see how many of the initial objectives have been reached, what is the current stage of the open courseware projects around the world, what are the challenges of such endeavors, and which are the expectations for future progress of the open courseware movement.

The structure of the paper is as follows: the second section presents in detail the MIT's OpenCourseWare initiative, along with a brief outline of its history, use, and statistical data, followed by a discussion about the past and the future ten years of OCW. The next section is dedicated to The OpenCourseWare Consortium, while the fourth section presents other major open educational resource initiatives worldwide, and the last section concludes the paper.

II. MIT OPENCOURSEWARE

MIT OpenCourseWare is a web-based free publication of virtually all MIT course content. OCW is open and available to the world and it is a permanent MIT activity [3]. The course materials reflect almost all the undergraduate and graduate subjects taught at MIT. However, OCW does not stand for a formal MIT education, and does not grant university degrees or certificates. Moreover, the course materials may not mirror the entire content of a course. Courses may be browsed by department. Each course may provide (selected) lecture notes, projects with or without examples, image galleries, multimedia content, assignments with or without solutions, exams with or without solutions, study group, and online textbooks. Automatic notifications of course updates and news are also possible. From the OCW home page, a selection of the *most visited 20 courses*, based on the site traffic, is available. Top three of this list includes the courses *Introduction to Computer Science and Programming*, *Linear Algebra and Physics I: Classical Mechanics*. Another useful selection consists of the *new courses* published by OCW within the last 6 months, i.e. 119 courses in February 2011. Following a link from the main page, *OCW Scholar* courses can be reached. These courses are designed for independent learners who benefit from very few additional resources, and they are significantly more complete than typical OCW courses and include new custom-created content and materials repurposed from MIT classrooms. These materials are ordered in logical sequences and include multimedia content such as video and simulations. *Editor's picks* are also available for learners who are not yet decided what OCW course to study. A selection of courses that include substantial video and/or audio content is also reachable from the home page by following the link on *Audio/Video courses*. This content may consist of simulations, applets, visualizations, etc.

Another useful OCW resource consists of the *translated courses* that have been produced in collaboration with five partner organizations that translate OCW course materials into languages as Spanish, Portuguese, Simplified Chinese, Traditional Chinese, Thai, Turkish, and Persian. Other translations of the OCW materials are also possible, under the Creative Commons license, that *states that the user provides attribution of the materials they choose to adapt; that the use of the materials be a non-commercial activity; and that the user shares the derivative work openly as OCW is free and open, or "share alike."* [3]. Since September 2002, when the OCW pilot phase became public, the OCW materials have been translated to other languages as well: French, German, Vietnamese, Ukrainian, and so on.

The OCW project has its roots in the MIT Faculty decision, taken in 1999, with respect to the use of the Internet to better accomplish the MIT's mission to *advance knowledge and educate students*. This decision was concretized with the proposal of the OpenCourseWare initiative in 2000. The first proof-of-concept site was published in 2002 and contained 50 courses. Spanish and Portuguese translations were added also in the same year. Along with the official launch in 2003, 450 more courses were added, and the Chinese translation became available. In 2005, besides reaching the level of 1250 published courses, OCW began to update the previously

published courses. Moreover, the OCW Consortium formed also that year. By November 2007, the initial publication of almost the entire curriculum has been completed (1800 courses in 33 academic disciplines). From that point forward, the OCW project has grown both in the direction of updating the existing courses and adding new content and services.

By 2009, 1950 courses were already published, virtually all MIT courses, the program Highlights for High School was started, and the Thai translation became available. Starting with 2008, audio and video content has been uploaded regularly to YouTube and iTunesU, and image content to flickr. In 2009, 225 mirror sites around the world were reported, and in 2010, 2000 courses were already available on the OCW site. The number of visitors increased dramatically, from reported 2 million in 2007, to 50 million in 2008 and 100 million in 2010 [4]. Currently, more than 250 other universities and associated organizations around the world have joined MIT, and have been publishing their course materials freely and openly for more than 13,000 courses in 20 languages [5, 6].

Currently the OCW site reports 110 million visits from 78 million learners from almost every country. The most of the visitors come from North America (44%), and Eurasia (46%). On average, MIT OpenCourseWare gathers 1 million visits monthly, with the translations receiving 500,000 more [7]. Most visitors are very satisfied with the site's breadth (95%), depth (89%), quality (92%) and currency of the materials (94%). Most MIT faculty contributes to the OCW project (78%), and the majority of them have published two or more courses. The OCW site is used heavily inside the MIT community as well, thus 86% of students, 73% of faculty, and 46% of alumni and staff use the site, while those that have already used it, 92% of students, 87% of alumni and 78% of faculty, consider it valuable. The impact of OCW is seen as extremely positive or positive by 80% of the visitors, while 96% of the visitors would recommend this site. It is reported that 100 institutions worldwide openly published their courses and that 150 more have similar projects underway. More than 13,000 courses have been published globally, and 85% of them come from other institutions than MIT [8].

Ten years later, Shigeru Miyagawa, a member of the original Lifelong Learning Committee that has proposed the initiative, is confident that OCW has exceeded every expectation they had at the beginning, by any considered measure: number of courses, number of visitors, amount of public attention, benefit to MIT faculty (nearly 1,400 MIT professors and teaching staff) and students (around 1400 as well). He says that *OCW is a collective act of intellectual philanthropy that truly reflects the MIT community's commitment to the dissemination of knowledge for the public good*. Prof. Miyagawa considers that besides the raw numbers mentioned above, which are impressive by themselves, the real stories of how the site is changing lives around the world make the OCW initiative worthwhile [5].

OCW has started with the vision of matching the human potential with the opportunity of giving free access to the teaching tools of the world's top learning institutions, having this way a huge impact on people and communities globally. The goal for the next decade is to reach a billion minds, and to

help motivated people everywhere to improve their lives and the world we live in. To achieve this goal, the depth and the quality of the course materials will be improved, along with the site itself. Four focus directions of action have been identified: (1) *placing OCW everywhere*, i.e. making the OCW content easy to find and distribute via ubiquitous devices, including reaching underserved populations; (2) *reaching key audiences* by customizing OCW materials to better meet the needs of people across a broad spectrum of backgrounds and cultures; (3) *creating communities of open learning*, by providing for an open learning ecosystem that enables more than access to the content, namely that boost collaborative learning; (4) *empowering educators worldwide* by providing them with the right tools they need to be able to share OCW content with their students [9].

III. OCW CONSORTIUM

The OpenCourseWare Consortium (OCWC) is a collaboration of higher education institutions and associated organizations from around the world creating a broad and deep body of open educational content using a shared model [10]. Currently, The Consortium includes hundreds of universities and associated organizations that are committed to advance OpenCourseWare and its impact on global education, and it acts threefold: as a supporting resource for starting and sustaining OCW projects, as a coordinator for the OCW movement globally, and as a forum for exchanging ideas and planning the OCW's future. Most of the OCWC's members come from USA (52 members), Spain (40 members), Japan (27), Taiwan (19) and South Korea (12). Each of the other 45 participating countries is represented by less than 10 members.

The OCWC site is very community oriented, and offers various possibilities for interested users to become aware of other people experiences when using opencourseware. First, there is a blog, where one may keep up to date with the latest announcements and communications from the staff and board of the OCW Consortium. To host the activities and discussions around communities of interest, which fall outside of the specific focus of Consortium, a dedicated website has been created. Communities of Interest are discussion forums organized according to particular topics of interest within the OCW movement. The Project Showcase is a commonplace where one can learn about members' projects, both old and new. A very interesting part is the OCW Toolkit Initiative that aims to gather in one place a portable kit of resources that have proven to be useful in starting OCW projects elsewhere.

Besides all the above appealing features, the most interesting for the individual user seems to be the possibility to search within a large variety of high quality university-level educational materials. Currently, the search index contains 5,415 courses from 59 sources available in 10 languages (English, French, Spanish, Japanese, Chinese, Hebrew, Polish, Portuguese, Catalan, and Russian). These materials are organized as courses on specific subjects, and are published by OCWC's members in various formats and languages. Often, they include course planning materials and evaluation tools, aside from the thematic content. The available OCW may be found in different ways: by searching, by using a specialized search engine amongst all the OCWC members that are

publishing currently a course feed, or by browsing by language, or by source. As not all the OCW sites publish courses in a format that is compatible with OCWC search index, users may access the OCW websites directly, via the list available on the OCWC site, where the courses are grouped by the language

While the Consortium provides numerous benefits for both members and non-members, its members may take supplementary advantages from using dedicated tools, from consultation with and support from Consortium's network of experts, from collaboration with peers within working groups and communities of interest, but also by increasing their international visibility and recognition, and by participating in a joint international effort that ensures that open sharing of educational resources has a sustainable future [10].

OCW Consortia may be also found around the world. Universia is a network with members from 23 countries from Latin America, Spain and Portugal that promotes and facilitates the integration and development of its members in the knowledge and information society, as well as in the telecommunications sector, aiming to create a common forum for higher education through training, culture, research, and collaboration with the business world. Universia includes 1,056 universities and institutions of higher education, which represents approximately 10 million students [11]. Japan Opencourseware Consortium (JOCW) is the consortium of Japanese Universities which have been providing OCW in JAPAN since 2004. The number of course materials available online has been growing from 96 courses in Japanese and 57 courses in English in 2005, to 1285 courses in Japanese and 212 courses in English in 2010. The number of visits to JOCW has been reported as more than 400,000 per month in December, 2009 [12].

Taiwan OpenCourseWare Consortium includes 24 universities and 24 schools, From the TOCWC website are reachable instructional materials related with 394 courses in a large range, from mathematics and physics, to advanced painting, philosophy, and literature, some of them being available both in Chinese and English [13]. What is attention-grabbing is the fact that this self-learning can lead to official certification from the university, even for external students, after passing a certification exam, which is also free of any charge [14]. Korea OpenCourseWare Consortium was formed in 2008 with five universities and it includes now 12 universities [14, 15]. Educational materials in English related to 32 courses are reachable via the OCWC site; the courses are supported with study groups as well. More seem to be available via the KOCWC website, but unfortunately these are only in Korean. China Open Resources for Education (CORE) is a consortium that was founded in 2003, and it includes 26 universities and 44 China Radio and TV Universities (higher education through radio and television), with a total enrollment of 5 million students. For the time being only instructional materials related to 26 courses are available. Unlike TOCWC, CORE do not grant credits or degrees, and does not provide access to faculty [16].

IV. OTHER OPEN COURSEWARE INITIATIVES WORLDWIDE

Besides the many spin-off OCW projects around the world, there are some other relevant initiatives that offer course materials and other instructional resources freely and openly. First such initiative is *Stanford Engineering Everywhere (SEE)*, which makes freely available to students and educators around the world few of its most popular engineering classes. SEE provides for viewing syllabi and lecture videos, for accessing reading lists, homework assignments, and other course handouts, for taking quizzes, tests or exams (for which both questions and solutions are generally available), as well as for communicating with other SEE students [17]. A similar project is *Harvard University Extension School Open Learning Initiatives* with 8 courses offered freely online [18]. A more consistent endeavor is *MyCourses – Open Courseware Initiative*, at Harvard Medical School, which offers freely instructional materials related to 108 courses (as pdf file, ppt file, websites, images, handouts, exams etc.) [19].

Carnegie Mellon Open Learning Initiative is concerned with using intelligent tutoring systems, virtual laboratories, simulations, and frequent opportunities for assessment and feedback. Thus, The Open Learning Initiative (OLI) builds courses *that are intended to enact instruction - or, more precisely, to enact the kind of dynamic, flexible, and responsive instruction that fosters learning* [20]. What is worth to be mentioned as being special is that OLI, while delivering instruction materials, it uses technology for collecting real-time interaction level data of usage by students, and it utilizes this data to improve and refine further versions of the instructional materials. *Open Yale Courses* provides free and open access to 25 selected introductory courses taught by teachers and scholars at Yale University [21]. Each course material includes a full set of class video lectures, along with syllabi, suggested readings, and problem sets (with solutions). The lectures are available both as downloadable videos and as audio-only versions. Moreover, searchable transcript of each lecture is also provided. They may download, redistribute, and remix the course materials. Furthermore, users' feedback is collected via a survey. Ten more introductory undergraduate courses and associated instructional materials were to be added to the website in spring 2011. Video and audio elements from Open Yale Courses are now also available at YouTube and iTunes.

Another interesting endeavor of offering open educational resources is *Webcast.Berkeley – University of California at Berkeley Video and Podcasts for Courses and Events*, which makes available both webcasts and podcasts for a range of their courses, offering today a number of 40-50 courses per semester and hundreds of events [22]. The *webcast.berkeley/courses* is an "opt-in" program available to lecturers who are scheduled to teach in classrooms with installed video and/or podcast capture technology. The lecturers are invited to participate in *webcast.berkeley* for the coming semester by signing up to have their course video and/or audio podcast in bSpace. The output from a computer or document camera, along with the related audio narration, become automatically available by screencasting them to *webcast.berkeley*, iTunesU and YouTube, with no extra cost to the department.

A very consistent repository for open instructional resources is *Open Education Resources (OER) Commons* [23] which is a project created by The Institute for the Study of Knowledge Management in Education (ISKME), which is an independent, non-profit research institute, established in 2002, and focused on knowledge sharing and educational innovations. OER are teaching and learning materials that are freely available online for everyone to use: instructors, students, or self-learners, such as full courses, course modules, syllabi, lectures, homework assignments, quizzes, lab and classroom activities, pedagogical materials, games, simulations, etc. Furthermore, OER Commons provides also for a process of engaging with the materials, which involves sharing materials that one has created, either individually or in groups with other teachers and/or learners; using and adapting others' materials for one's use; and sharing back modifications or comments with respect to others' materials in order that future users may benefit.

The OER Commons website provides access to a database of links to a large number (over 35,000) high-quality resources located on other websites, which can be searched, browsed, evaluated or discussed within OER communities. The materials that are included in the database are either selected in their daily searches by the OER team members or recommended by the site's visitors (some being created by them). The resources that comply with the OER Commons criteria regarding quality and authenticity are included in the database. The OER materials are diverse, going from full university courses (readings, lectures' videos, lecture notes, homework assignments) or interactive mini-lessons and simulations on a specific topic, to electronic textbooks, adaptations of existing open works and K-12 lesson plans, worksheets, and activities. The media format of each item could be audio, downloadable document, graphics/photos, text/html, video, and so on. Course-related materials include full courses and learning modules, while libraries contain collections of primary sources, teaching and learning strategies, or other types of instructional materials. Moreover, the website provides for engaging with the educational resources by social bookmarking, tagging, rating, and reviewing. Thus, OER Commons has established partnerships with over 120 major content partners to provide a unique access point through which educators and learners can search across collections to access the available instructional resources, to both find and provide descriptive information about each resource, and to retrieve the needed ones.

Other major open educational resource provider is Connexions [24]. The Connexions project is a non-profit start-up launched at Rice University in 1999 that provides both an open source platform and an open access repository for open education resources, which enables creating, sharing, modifying, and vetting of open educational material that are accessible online to anyone, anywhere, and anytime. Connexions provides a growing gathering of open scholarly materials, along with a set of free software tools to help authors develop small knowledge chunks, called modules, which correspond to a single idea or topic, and that can later be organized as courses, books, reports, etc. A collection refers to a group of modules arranged in a specific order and labeled by the author, editor or instructor building the collection, which

can be a course, a textbook, a report, a survey, a journal, etc. In each module, the collection developer can add links to supplemental, prerequisite, or example material to help learners understand the material.

The architecture and the software tools provided in Connexions have been designed to support the smooth remixing of the content. As Connexions has been envisaged as collaborative since it started, the authors are encouraged both to develop each module to stand on its own, facilitating this way the re-use in various collections and contexts, and to collaborate with peers through author's feedback and shared work areas. As for the reviewing of the content, Connexions offers some post-publication review methods that are powered by the content viewers, the most powerful being *the lenses*, which enable users to give their stamps of approval to the content in the repository, providing for user-driven quality control of both modules and collections. Via the lenses, users can add their own comments and tags for the items in the repository, and, furthermore, they may use some sort of bookmarking within the repository to keep track of related or otherwise interesting content. Users may rate individual modules for quality on a five-star rating system

Currently, 17792 reusable modules woven into 1085 collections are available. Arts, business, humanities, mathematics and statistics, science and technology, and social sciences are the subjects of the materials available in Connexions. Materials can be viewed over the Internet, or be easily downloaded to almost any mobile device (as ebooks), being used by over 2 million people per month. Moreover, schools can also order low cost hard copy sets of the materials (textbooks). Connexions resources are available in many languages including English, Chinese, Spanish, Japanese, Vietnamese, Italian, French, Portuguese, and Thai.

The Open University (OU) is a major distance teaching and learning university that opened in 1971 for 25,000 students with a choice of four multi-disciplinary foundation courses in the arts, social sciences, science or mathematics [25]. Nowadays it has more than 250,000 students worldwide, who study arts, business, education, languages, health, law, mathematics, computing and technology, science, social science, knowledge media etc. In 2006, OU launched OpenLearn, which allows free online education, open to anyone, anywhere in the world, and it is reported to have since reached 8 million people. OpenLearn includes thousands of study hours of learning materials from the OU courses (8000 hours reported in 2008). Moreover, those learning materials may be accessed, studied, discussed with others, etc. by using free learning tools for collaboration within OU's Learning Space [26]. Extracts from OU's broadcasts and teaching materials can be viewed on iTunes University and YouTube. More than 15,000 research publications are now freely available to access and consult via Open Research Online, which is The Open University's repository of research publications and other research outputs [27].

One particular initiative is special, as it is one person's vision come true, and as it aims to become a free online university. Michael J. Saylor, an American entrepreneur, inventor, benefactor, and visionary, has launched Saylor.org in

2009, through The Saylor Foundation, as a free online university [28]. The saylor.org is seen as a zero-cost alternative to those who lack the resources to attend traditional brick-and-mortar institutions, and as a complement to mainstream education providers that will both motivate people around the world to pursue personal growth and career ambitions, and lead to institutional change amongst education providers. The Foundation's goal is based on the belief that harnessing technology provide for driving the cost of education down to zero, while offering to many individuals the opportunity to overcome the barriers of attending mainstream college education: fixed class schedule, physical distance to a campus, rising costs related to tuition, fee, and textbooks etc.

The main directions of action regard identification, development, solicitation, organization and dissemination of free online academic materials, in a structured and intuitive format. For now, the effort goes to the appropriate content delivery that a student needs to know in order to earn the equivalent of a degree in any of the top majors in the United States, aiming for producing high quality courses and program completion rates. In the future, the focus will expand to include primary, secondary, and post-graduate levels. For the time being, there are available course materials for majoring in Biology, Business Administration, Chemistry, Computer Science, Economics, English, History, Mathematics, Mechanical Engineering, Political Science, and Psychology, along with those for the General Education Program. Despite that the materials may be used in numerous ways, The Saylor Foundation invites its learners to proceed through the materials aiming to simulate the traditional four-year higher education experience, i. e., to select a major, to fulfill its requirements, and to complete the General Education Program. The courses taken in order to satisfy the requirements of the chosen major build on and reinforce what one learns in this particular program, which seeks to support learners in skill development and knowledge enhancement.

The description of the General Education Program is thoughtful and visionary, as the program's purpose is to educate the learners about what human beings know about themselves (namely history, culture, religion, physical make-ups and environments, communication, and personal economical support). The curriculum has been designed to boost learners' abilities to think analytically using quantitative and qualitative information and to consider ethical questions, and to help them be reflective, confident, and productive citizens of their local, national, and global communities, while they perceive the importance of continuous and reflective learning in the knowledge-based society. The structure of the program's webpage includes the requirements with respect to the necessary courses for a given amount of credits, some stipulations to guide the student among their course choices, the learning outcomes for each module, and the list of the needed courses, both mandatory and optional.

Each major on a given subject is articulated from a short but meaningful description, followed by the list of the mandatory (included in the Core Program), optional and electives courses. Then, the requirements that are necessary to be fulfilled in order to major in that subject are enlisted, namely how many courses, and what is each course's type. A course

completeness legend follows, and it describes that a course may fall in one of three classes: not yet developed, partially developed, or completed. Afterward, the list of links to each course's page is provided, the courses being grouped according to their type (core, optional, or elective). For each course, a visual image of the degree of completeness is available. A 100% complete course includes the units of learning, and for each unit, its objectives, content, time advisory (number of hours per each sub-unit) and learning outcomes. Some courses include also the final exam. A sub-unit may include video lectures, some related readings, specific assignments, etc. The recommended materials have very different sources, from Wikipedia materials to MIT Professor's lectures.

The current status of the completeness per major is as follows: Biology – 65%, Business Administration – 31%, Chemistry – 38%, Computer Science – 27%, Economics – 78%, English – 94%, History – 62%, Mathematics – 24%, Mechanical Engineering – 54%, Political Science – 29%, and Psychology – 52%.

V. CONCLUSIONS

Nowadays, following the demographic trends corroborated with the emerging universal aspiration for participating within higher education programs, there is a huge demand for high level educational resources that are available online both freely and openly. Moreover, the lifelong personal evolution in the knowledge and information society is thoroughly supported by the opportunity that anyone have access to such resources from anywhere at any time via the Internet. Seeing the world's knowledge as a public good that can be accessed, shared, used and reused, etc. mediated by technology, especially ICT, is powerful idea and may have an influential impact on teaching and learning within our society. A decade of development of initiatives that offer open courseware and open educational resources has passed, and all the related projects have contributed to the provision of free and open high quality university-level digital educational materials.

Most of the open courseware initiatives presented in this paper have strongly committed to participation in joint international efforts that work energetically and persistently to guarantee the future sustainability of the paradigm of open sharing of educational resources. Moreover, these programs contribute significantly to the development and evolution of open educational models that may finally lead to the construction of a global reflective educational infrastructure, which will be able to fulfill the learning needs of people, both individually and collaboratively, supporting them and their communities on their quest for (socially constructed) knowledge throughout their life.

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