

13.00.00 Pedagogical science

13.00.00 Педагогические науки

UDC 32

**OpenCourseWare and Non-Institutional Online Education Initiatives:
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Abstract. The incorporation of online learning tools as a detrimental component of the education of younger generations has yet to see an en masse standardized adoption by the public. The primary reason is the lack of an existing platform (or the inability to produce one) that can perfectly replicate the classroom experience. However, the noticeable increase in offerings of such tools and materials over the past few years from both the institutional (universities) and the non-institutional (private) side could be a sign that the technology is being created so that the concept may well be proven and adopted during the current technological revolution.

This paper introduces the most recent addition to the non-institutional part of the movement, an online education platform called The Open Academy. The website at its current state is an accumulation of online lecture videos, slides, exercises and practice exams covering various academic disciplines for college-level students. The paper covers the background and the development of the platform, its purposes and potential future benefits, further development projects currently underway and also potential problems and challenges that may lie ahead.

Keywords: OpenCourseWare; Open Education; The Open Academy; Online Education Platform; Lecture Videos; Educational Material.

1 Introduction

The introduction of OpenCourseWare (hereby abbreviated as “OCW”) as a self-regulated learning tool for university level students has seen a significant supply surge over the past ten years. Starting with MIT’s OCW platform introduced in October 2002, over 200 universities worldwide have adopted the model since (Barber, 2011) (Abelson, 2008). Most of the current material is in the form of recorded lectures as taught in the classroom as well as exercises given to students in online form. (MIT, 2004; 2008).

Online education development has not been confined to university initiatives, a phenomenon particularly apparent during the second half of the decade. Khan Academy, a non-profit educational organization created in 2006 by educator Salman Khan, hosts over 3,200 micro-lecture videos, most created by Khan himself, teaching a wide variety of disciplines from Basic Algebra to American Civics. Coursera, a relatively new venture-funded startup, is a more university-based example of an online education platform that has officially brought together

Princeton, UPenn, Michigan and Stanford, collating material from the four universities to create courses specifically designed for Internet use (Winkler, 2012). The advantage of non-institutional developments is that often decisions are much more centralized within smaller organizations and technological developments tend to occur in a much more rapid pace. (Taylor, 2007; Iiyoshi and Kumar, 2008)

On the institutional side, the highlight has been the recent announcement of the joint venture of Harvard and MIT regarding the development of edX. edX is an open source software that will integrate the two institutions' resources to expand upon their course offerings, the two institutions having jointly invested \$60M for this purpose (Velazco and Harvard, 2012). The initiative is forecasted to increase the availability and breadth of online education materials significantly over the next few years.

The Open Academy is the most recent addition to the non-institutional part of this movement. The platform currently hosts one of the largest collections of online education material accumulated from a wide variety of universities and disciplines, mainly targeted at university level students. The primary advantages of the platform are: the sheer size and diversity of the accumulated material, not limited to any one institution or discipline, the integration of different types of material, such as lecture videos, slides, exercises and practice exams to form full academic courses, a user friendly platform that creates homogeneity, especially compared to heterogeneous university platforms and the significant potential benefits that can arise from ongoing developments that include user interaction, integrated institutional partnerships, wide audience targeting and finally the concept of building a high quality multimedia-based online encyclopedia.

2 Project's overview and implementation purposes

The Open Academy has been conceived as a concept since early 2011, developed throughout the year and came live in December 2011 at the domain www.theopenacademy.com. The website is planned to go through several different development stages and is structured as a work-in-progress. The inaugural stage involved the accumulation of the course material and the website design.



Figure 1: The Open Academy Front Page, "Campus View"

Initially, university course materials available online that were accompanied by Creative Commons licenses were accumulated and categorized. The licenses allowed for the legal use and display of the materials by third parties and have been adopted by the grand majority of universities that offer courses online. The accumulation involved the mass downloading of lecture videos, slides, notes, exercises and practice quizzes and exams that formed full academic courses from university websites, open courseware platforms and other online spaces. The courses were subsequently categorized into "Subjects" – such as Biology and Algebra – and the subjects were

placed into one of the following “Departments”: Science, Mathematics, Engineering, Law, Arts, Medicine, Social Sciences and the Humanities.

The website was then designed using the Drupal platform and programmed with PHP server-side language. All material is hosted in its own servers for control purposes. This offers independence in terms of bandwidth compared to using third party embedding features and allows for a more coherent control system to be created with respect to the organization of the content. More importantly, it allows manipulation of video files such as editing, trimming and adjusting video resolution. The website’s layout was based upon the categorization previously discussed, with course pages that included lists of lecture videos as well as their corresponding materials and detailed descriptions for all items. An innovative campus-like environment is offered (see **Figure 1** for the Front Page design), serving as a graphical navigation tool, which is designed to significantly enhance the user-friendliness of the platform. **Figure 2** below illustrates the presentation of courses under a “Department”:

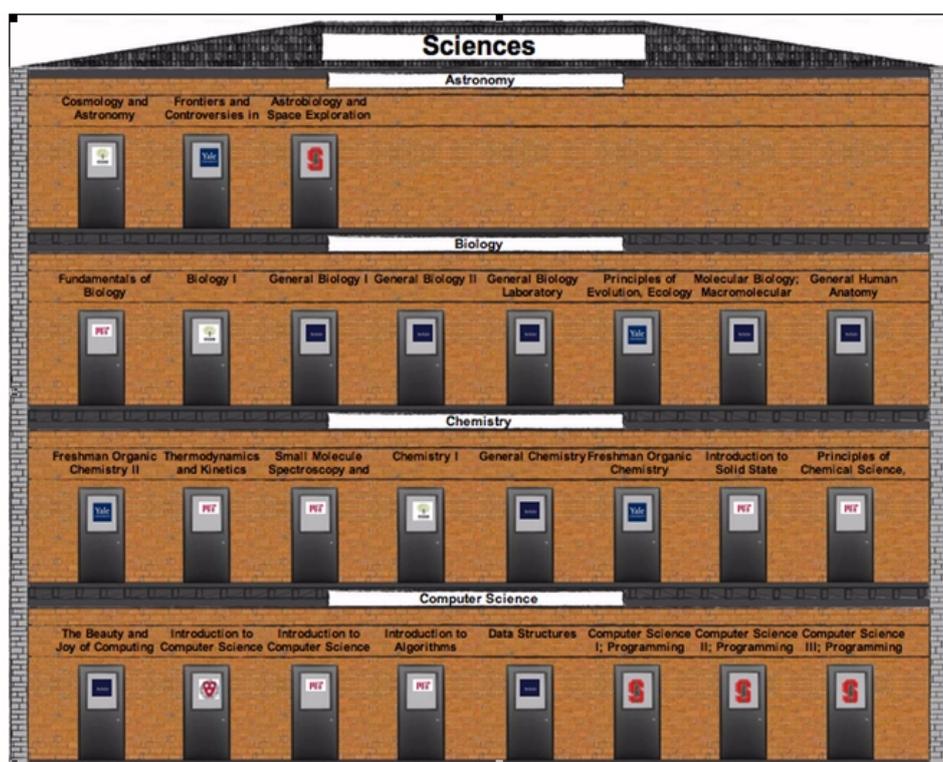


Figure 2: The “Floor Page”, Department of Sciences

The Open Academy currently hosts 6,595 lecture videos, the majority of which have accompanying lecture slides and other materials, that form 261 courses as taught by 185 instructors in 21 universities. The size of the content has been consistently growing since inception, with more courses being added exactly at the time they are uploaded in their original source. The rate of increase of the aforementioned content going forward is therefore dependent on new offerings of the universities themselves. These are forecasted to significantly increase owing firstly to the inaugural adoption of the model by institutions that haven’t had offerings before, an increase in the materials offered by the ones that recently introduced online courses such as Oxford University and John Hopkins University (Kanchanaraska et al 2009) and the rise of the offerings base of established OCW networks such as those of MIT and Harvard, through significant investments in initiatives such as edX.

The website’s viewership, owing to the sheer size of the material as the promotion stage is yet to commence, has grown to 100,000 unique monthly page views as of May 2012. The material currently uploaded has a total size of 870GB, which represents approximately 3,500 hours of lecture videos and 100GB of pdf based non-video course material.

The primary purpose of The Open Academy in its current state is to offer “a complete resource of high quality educational material to everyone, everywhere”, regardless of geography or personal circumstance.

The website aims to increase the reach of online education by virtue of content completeness. The pooling of all academic disciplines through the accumulation of a wide range of courses and subjects from different institutions in a single web space creates a much richer and more integrated resource than what is currently available. As a result, the website is targeting a much wider audience than individual university platforms. In addition to effectively accumulating different university “strengths”, this also allows for user choice and heterogeneity, as visitors can view several different lectures on, for example, multivariable calculus, all coming from top scholars in the world’s premier universities. Finally, compared to the rest of the existing non-institutional platforms, The Open Academy always has the advantage of being a collection rather than being focused on particular partnerships (such as Coursera) or restricted within particular teaching styles (such as Khan Academy). For example, Khan Academy’s entire lecture content is only a subset of The Open Academy.

The screenshot shows the Open Academy website interface. At the top, there is a navigation bar with the Open Academy logo and text: "openAcademy" and "Lecture Videos and Course Material from Top Universities and Scholars". There are links for "Student Wall", "About us", and "Log out". A search bar contains "21 Universities". Below the navigation bar are tabs for "Campus", "Subjects & Courses", "Universities", "Professors", "Forum", and "Contact us". The main content area is titled "Fundamentals of Physics" and includes the Yale University logo, the professor's name "Professor: Ramanuj Shankar", and a profile picture. There are social media sharing options for "Like" and "Tweet". A sidebar on the right lists "Course Material" options: "Course Notes", "Problem Sets", "Problem Set Solutions", "Exams", and "Exam Solutions". The main content area includes a "Course Description" and a list of "Lectures" with titles and brief descriptions.

Figure 3: The “Course Page”, Fundamentals of Physics

The website’s audience includes college level students who are looking to learn a completely new concept or subject on their own, high-school students preparing for higher level education and current students looking to complement their studies with the material. As the courses are completely stand-alone and not part of a degree, professionals and non-students are also being targeted. The size of the material therefore allows for a wider audience reach and more choices within a single web space.

The inclusion of non-video material such as exercises and practice exams along with the video lectures incorporate some of the main active learning strategies that can be implemented from an “online” classroom (Austin and Mescia, 2012). This material along with accompanying video lectures aim to create self – contained courses, allowing for both passive and active learning. This content is offered in a very simple and intuitive way: In the “Course Page” (Figure 3), the student has access to the lecture videos list while also having the rest of the course material on the sidebar. When a user views a lecture video, all the course material associated with that particular chapter or part of the course is displayed next to the video. Additionally, the user can play the video and view the exercises or other material simultaneously, which allows for a smoother learning experience. If the user wants to take part in, for instance, solving the exercise while being explained the concept he or she is trying to learn.

Finally, the homogeneity of the interface is much easier to learn and interact with compared to accessing different university websites and learning their individual platforms, which are sometimes difficult to work with. Several studies have shown that interface design significantly affects learning performance in distance education platforms (Najjar,1998 ; Hillman and Willis, 1994; Baddeley, 1992). For example, MIT's current platform has a multi-sign key in order to differentiate among courses with different types of materials (e.g. the ones that have lecture videos vs. the ones that do not), which makes it difficult to learn the platform and be able to effectively browse the courses for the inaugural user. Further, the heterogeneity in course content size and subjects among different institutions make it so that the user needs to be familiar with which universities offer the courses he/she is interested in or a more thorough search needs to be done ex-ante. The Open Academy addresses these problems by using a single interface that the user needs to get familiar with in order to access the entirety of this content, which is very intuitive and built solely for that use. Additionally, it offers the facility to create a personalized academic webpage (called the "Student Wall") with their "favorite" courses and lectures so as to tailor the content to their needs (**Figure 4**). This feature can easily be used for recording the learner's profile – preferences and could also be used as a feedback resource for the instructors indicating new learning paths or even new approaches to teach a topic.

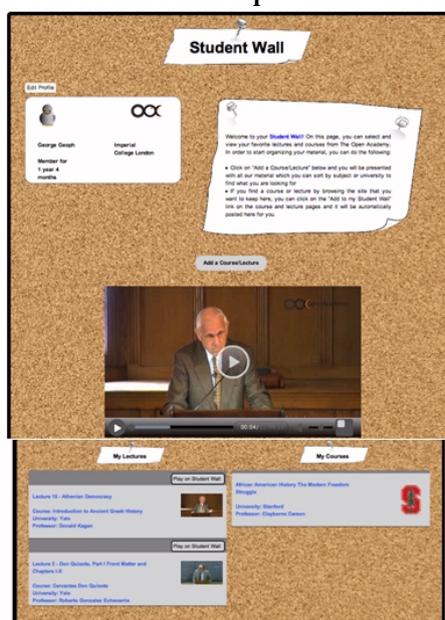


Figure 4: The "Student Wall", a Personalized Academic Webpage for Saving Favorite Courses and Lectures

3 Ongoing developments

The developments currently being undertaken in The Open Academy aim to improve significantly the functionality of the content and the user experience, increase the target audience, introduce more user interaction and expand the content base.

3.1 "Concept" Videos

One of the main identified problems with the currently available OCW content is that most lecture videos have relatively long elapsing times, with many classes running for over an hour. From the perspective of the students who want to complement their studies by understanding a particular concept - one that can be explained in 10 minutes or less within a full class – this circumstance lacks functionality.

To address this problem, observing that each class is comprised of several smaller conceptual lessons, a breakdown of all currently available lecture videos into 10-minute "concept"

videos is being undertaken. Each of these micro-lectures will have its own title and description, addressing a much more particular idea than the class as a whole. This will improve significantly search functionality, as search engines will index all this information and targeted searches will be matched much more closely with the appropriate video concepts.

The first goal of this development is to anticipate and meet the need of many online users to learn simple, shorter concepts instead of being forced to follow an entire class. The second goal is to transform the platform into eventually becoming a multimedia-based online encyclopedia. Increased specialization in the website's content will also allow monitoring learning paths in order to formulate content expansion strategies accordingly.

3.2 Pre-University Level Material

The second development will be the incorporation of pre-university level online courses into the site's content in order to target the high-school audience. In particular, the new material is planned to include A-level, Baccalaureate and SAT based lectures and exercises. For that end, the site is looking to partner with institutions and individuals that teach these student levels in order to create new content specifically designed for online use, that will include recorded videos and practice exercises. This development will widen significantly the target audience of the material by adding in the high-school cohort of students.

3.3 User Interaction

One of the site's imminent goals is to increase user interaction with both the material and with other users in order to create a more classroom-based environment.

Existing exercises and non-video material, which are currently in pdf form, will be gradually transformed into interactive exercises using proprietary software so that no pen and paper is needed to solve the problems. These could be multiple-choice questions on the material or "type the answer" questions. A grading and solution guidance system will also be adopted along with the project. This is expected to significantly increase user interaction with the material and therefore improve the learning experience.

Further, course-specific forums will be included and users will be able to read existing discussions and post their own questions and answers (Q&A) within these spaces. A Q&A structure will be promoted to ensure well-ordered concise answers based on user ratings. This will create a more "real" community of learners, who will be able to interact with each other in solving or explaining existing and new problems.

3.4 Partnerships and Expansion

Capitalizing on the current online education trend that is likely to continue, with more online materials becoming available every year, The Open Academy plans to commence a more vertically integrated approach to expanding its content base.

Following on the example of Coursera, which brought together four US universities to create new content for online use, The Open Academy is planning to attempt partnerships with both American and European universities for more courses to be designed and made available to the public through incorporating the content in its platform. The advantage of such agreements will be that the advanced technology currently available will be used in order to develop these courses to cutting edge online learning specifications and the common effort is likely to create a much larger social benefit as a result. Further, it will give the chance for European universities to develop their presence in the online learning environment, since the size of their online courses' base is relatively limited compared to their US counterparts.

Finally, instructors will be asked to join and contribute to the effort by either making their own individual courses available or by using their expertise to design cutting edge educational content.

4 A glance to the future of The Open Academy

There are several challenges lying ahead concerning the success of the platform as well as the general adoption of OCW as a significant part of education by students.

Firstly, even with the most interactive platform, online education is unlikely to replace the class-based educational system as we know it - it lacks the human interaction and the benefits derived from the tutor - student relationship. Also, non-motivated students are difficult to have the discipline required to sit through online classes without losing their attention by distractions. These are problems that have been cited several times since the introduction of OCW as a response to speculation that the latter may replace conventional teaching methods.

Secondly, the non-institutional nature of The Open Academy platform renders it unable to provide users with official recognition of their attendance, at least at the moment. It will be a challenge to create a credible system under which certifications are made and a possible examination system is set up so that this problem is mitigated and an effective incentive structure for the users is actually in place.

Finally, in order for the movement to create a significant benefit for the education of the world, an integrated approach is necessary where participants include platforms like The Open Academy, institutions, instructors and investors. The logistical complexity as well as the financial budget required to make a common effort could be a major future hurdle, which however if mitigated, could truly create the most significant revolution the education industry has seen in decades, one that may well be underway.

5 Conclusions

OpenCourseWare is a radical movement that is expected to change the learning experience in the classroom, complement student revision and promote lifelong learning (Long, 2002). The volume of material becoming available under Creative Commons licenses is increasing exponentially (Carson, 2009). The Open Academy is a platform, proposing a new approach to online education where increased flexibility is given to the user, offering an accumulation of courses to guide his or her learning. This method of learning nurtures a critical approach from the user's perspective. The collection of academic material from various institutions and professors addresses numerous academic disciplines under a unique and structured interface. Thorough analysis and subdivision of each lecture will eventually optimize information acquisition by users. Creating an interactive environment for students will closely simulate classroom experience and organically increase the amount of information for each course (Chakraborty et al 2008). Developing an efficient structure for university-level courses will enable the expansion of the platform to incorporate pre-university material, which will further widen the breadth of the target audience. The challenge is to integrate this new learning method to the conventional educational system by following aforementioned proposals, making this system a fundamental tool in every person's learning experience.

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УДК 32

Открытое образовательное программное обеспечение и невузовский онлайн образовательный проект: «Открытая академия»

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Аннотация. Внедрение онлайн обучающих средств в качестве компонента образования молодого поколения все еще принимается обществом в целом как вредоносное. Основной причиной является отсутствие сложившейся платформы (или невозможность создания таковой), способной передать атмосферу класса. Тем не менее, заметное увеличение предложений таких средств и материалов за последние несколько лет, как со стороны вузов (университетов), так и с невузовской (частной) стороны является признаком того, что технология создавалась таким образом, чтобы принцип мог быть проверен и усвоен с учетом нынешней технической революции.

В данной статье представлены самые последние дополнения к невузовской части движения, онлайн образовательная платформа под названием Открытая академия. Интернет-сайт в его нынешнем состоянии представляет собой скопление онлайн видео-лекций, слайдов, упражнений и практических экзаменов по различным научным специальностям для студентов вузов. В статье изучается содержание и развитие платформы, ее цели и потенциальные будущие выгоды, дальнейшие проекты развития, находящиеся в стадии разработки, а также потенциальные проблемы и задачи, которые еще предстоит решить.

Ключевые слова: открытое программное обеспечение для обучения; открытое обучение; Открытая академия; онлайн образовательная платформа; видео-лекции; образовательный материал.