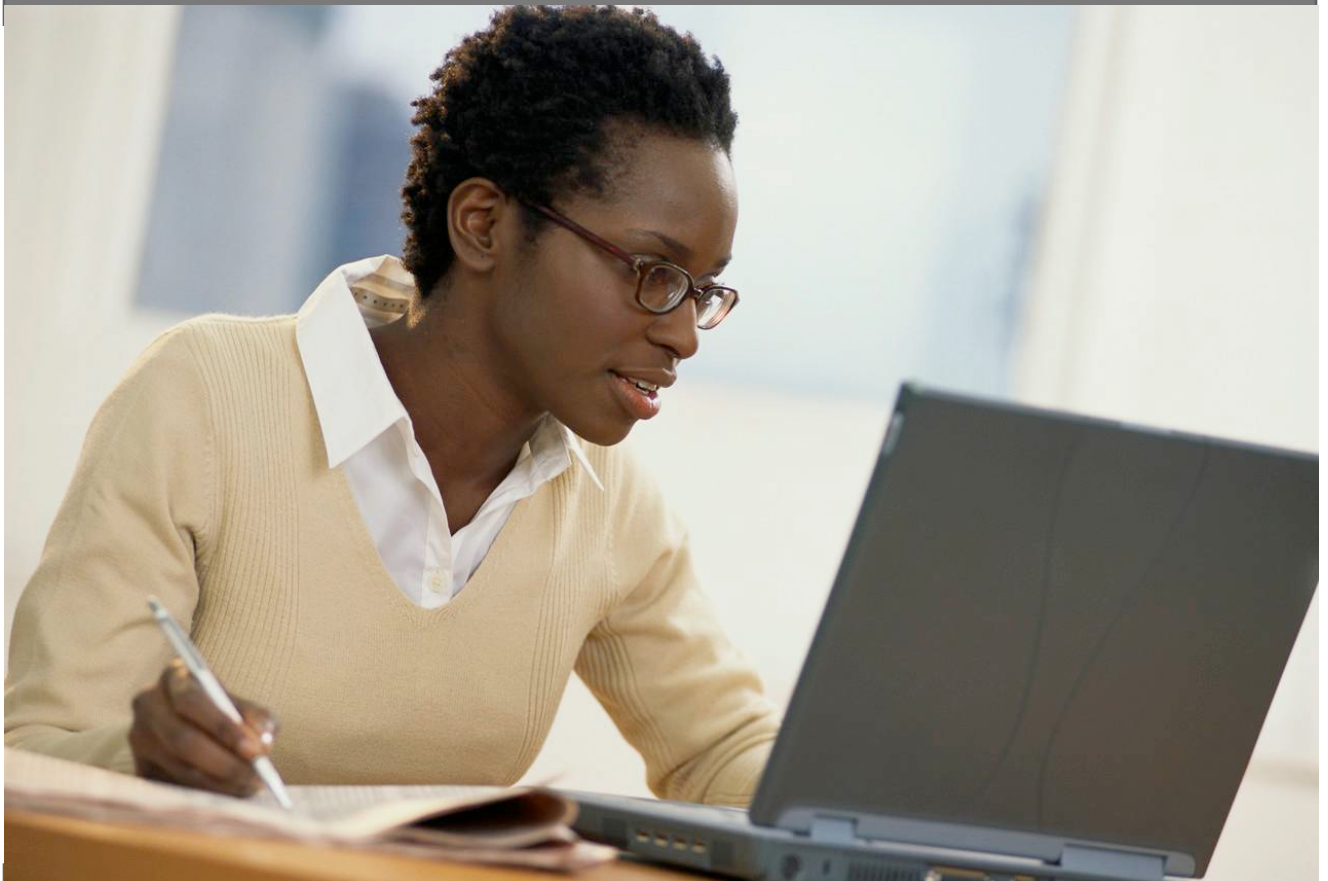


A New Model for EdX : Balancing IP Protection and Freedom of Access in Africa



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ABSTRACT

Education is the key to developing the third world. Many universities and institutions are starting to support online education to have a larger audience. The African market for eLearning products is the fastest growing globally. The growth rate for self-paced eLearning in Africa is 15.2% which is higher than all other continental growth rates. Revenues reached \$250.9 million in 2011 and are projected to more than double to \$512.7million by 2016²². This is, however, the tip of the iceberg seeing as internet penetration in Africa is currently only about 15%²³. Our research focuses on how edX can take a leading role in supporting development globally, especially in Africa, by providing easier access to the educational material they offer. Our initial proposal is to have edX invest in the development of SPOCs(Small Private Online Courses) that can be downloaded onto eGranary Digital Libraries and shared with schools in low internet areas of the developing world. These digital libraries would be covered under the TEACH Act¹² and meet a need that would otherwise go unfilled.

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EXECUTIVE SUMMARY

Africa needs individuals with the impetus, inspiration, and training to create solutions to the challenges that face the continent. No one else understands these challenges more intimately or benefits more directly from the solutions than Africans themselves. However, the education currently available on the continent is outdated, lacks modern academic facilities, has under qualified faculty and fails to create critical problem solvers. Building traditional universities and training African faculty across the continent is a very expensive endeavor that does not scale well to address the current need. Online learning is a solution that is both relatively inexpensive and infinitely scalable. Massive Open Online Courses(MOOCs) such as edX are a great solution to the African education problem.

In May of 2012, Harvard University and the Massachusetts Institute of Technology founded edX as a non-profit, an open-source, collaborative platform providing free courses and content online for anyone to use. The courses and content hosted by edX are provided by the XConsortium, which as of August 2013 boasts 29 of the world's leading educational institutions, including Harvard, MIT, CalTech, Wellesley, Berkeley, Cornell, Kyoto University, and more³. edX frames their motivations for participating in XConsortium as a reflection of their "dedication to quality education both on campus and online"². Some of these institutions also enable edX users to earn an XSeries Certificate in specific subjects with varying requirements when completed and passed³. edX is an intermediary. The courses are the intellectual property of the professors and the universities that create them, as opposed to the intellectual property of edX.

edX was started to provide world class material and content to people that could not otherwise have access to universities like MIT and Harvard due to time, proximity or financial reasons. These organizations are attempting to educate the world online. This is a great strategy for North America and Europe where the internet usage rate is 78.6% and 63.2% of the total population but the rest of the world, which is where most of the need lies, has a much lower internet usage rate. On a continent of more than a billion people¹³, Africa only has an internet penetration rate of 15%. This creates a significant challenge for people that want to access online education in Africa.

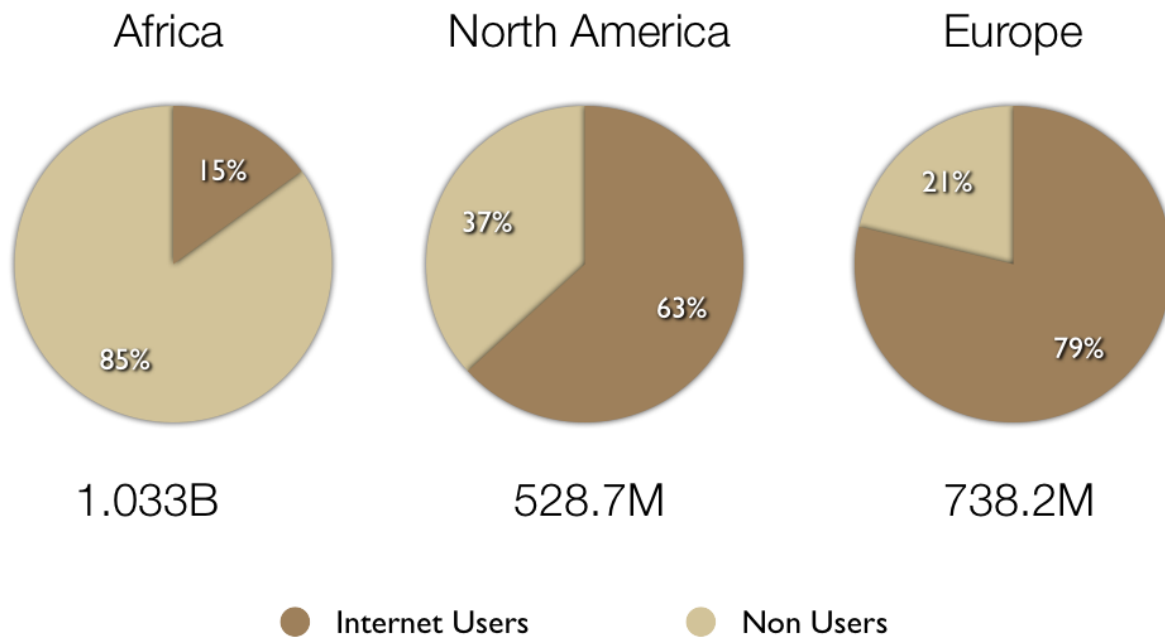


Figure 1: Internet Penetration ratios. The figure above shows the internet usage as a percentage of the total population of Africa, North America and Europe. The total population of each region is shown below the respective chart.

Our research explores the problem of no to low access to MOOCs content by learners in Africa to find a solution that is timely, low-cost and does not infringe on the copyrights of third-party members' content. We explored three solutions to the problem: 1. Copyright restructuring around online courses; 2. edX content

overhaul to remove copyrighted material and 3. provide eGranary Libraries with SPOC (Small Private Online Courses) versions of the courses on edX to educators and learners in Africa. SPOCs are for-credit courses in which educational organizations license MOOCs content to be used as a major part of the course materials and are enrolled in by a specific number of learners. We weighed these various options and find that the third option fits our criteria for the solution.

THE AFRICAN CONTEXT

OVERVIEW

In a recent research paper published by the Center for Universal Education (CUE), “Too little access” and “not enough learning” were described as Africa’s twin deficits in Education⁸. According to the people, the majority of African youth will not have access to institutions of learning and those that have access will not learn much due to the low quality of material taught. The paper goes on to say that “61 million African children will reach adolescence lacking even the most basic literacy and numeracy skills.” Education systems across Africa currently need reform. Key reforms would target “quality, relevance and finance” in African universities⁹.

Taking Nigeria as a case study, for every 1.7 million qualified high school students that graduate each year, there are only 400,000 university spots in the country⁸. The unemployment rate among college graduates in Nigeria is currently 70%. These universities have under qualified faculty and insufficient equipment to produce world class graduates that will shape and create solutions for Africa’s various challenges. Traditional brick and mortar universities cannot support the market for higher education anymore and the funds to build and develop new ones are staggering and not scalable. The solution that governments, private institution and NGOs are turning to is eLearning. eLearning provides the faculty with current and relevant material that they could not have developed by themselves and it also scales the reach of traditional brick and mortar universities.

In the last few years, a number of online universities have sprung up across the continent. The first virtual university in Senegal, Campus Numerique Francophone de Dakar, was launched in 2009. In May 2011, the Indira Gandhi National Open University announced the launch of a pan-African virtual university branch with headquarters in Ethiopia. Innorero University in Kenya and The Virtual University of Uganda (VUU) were started in 2012 with strong support from their respective governments⁶. These institutions are introducing a much needed alternative. However, they lack trained professional faculty to curate relevant material coupled with the lack of internet penetration also limits the benefits of virtual university initiatives.

CURRENT INITIATIVES

The main underlying problems facing education of youths in most African countries are well-curated, relevant course material and access. Many private companies have seen this gap in the market and have found packaged MOOCs (Massive Online Open Courses), self-paced solutions to be the solution. Some of the first movers in using MOOCs to address the higher education challenges in Africa are Kepler and Fora.

Kepler is a nonprofit university program based in Rwanda. It currently enrolls 50 students from a selection pool of about 2700 in their pilot year (2012-2013). Kepler is using content from Southern New Hampshire University, Khan Academy, edX and Coursera to deliver a core curriculum that is both relevant to the local market and is of world class quality. Kepler has the facilities and ability to acquire licenses for all the material they provide the 50 students.

Fora is a startup started by a team of Nigerian youths at Waterloo University in Canada to bridge the education divide in the West African nation. The Fora team

understands the lack of constant internet access and therefore introduced the 'Fora in a stick' flash drive that contains videos, quizzes and reference materials that learners can use offline. The material mostly comes from qualified professors offering it directly on the platform and from MOOCs. This innovative approach helps students and professionals seeking to increase their skill set in Nigeria have access to world class material even without internet access.

These initiatives are providing quality education to youths in Africa but their reach is minimal. To have distribution rights to MOOCs' material requires the knowledge of the licensing process, the funds and constant internet access to contact the relevant organizations and get adequate permissions. This is a process that the African-based eLearning initiatives go through. However, to scale the reach of the free content, any educator or any group of learners should have distribution rights to the material on websites such as Coursera, edX, OCW and Treehouse especially in areas with low to no internet penetration.

Given the potential for MOOCs to meet the needs for access to quality education in Africa, the research questions we are addressing in the following section are as follows: (i) what are the intellectual property challenges of MOOCs and how do they affect the various stakeholders involved? (ii) what are the intellectual property challenges specific to edX?

THE EDX INITIATIVE

EDX CURRENT TERMS OF USE

Once an institution has joined the XConsortium, their university's course content is hosted on the edX platform. Although edX strongly encourages member universities to provide content with open license terms, edX is not involved in creating intellectual property agreements with the university's faculty members who create the course content. Rather, edX allows that to be handled between each institution and its faculty members so that they can set their own licensing terms for the content that is hosted.

To gain access to this content, users may register for a personal edX account online by providing a name and verified email account as well as agreeing to the edX Terms of Service. Once registered, users are instantly given online access to courses and content in a range of topics from law, history, social science, and business to engineering, computer science, artificial intelligence, and public health. edX currently does not have full support for mobile device access. Courses that contain YouTube video components provide free downloads of their video files, which opens access for users in geographic locations where YouTube is blocked.

The edX Terms of Service contains a section that informs edX users of their right to use content that is hosted on the site:

"Unless indicated as being in the public domain, the content on the Site is protected by United States and foreign copyright laws.

Unless otherwise expressly stated on the Site, the texts, exams, video, images and other instructional materials provided with the courses offered on this Site are for your personal use in connection with those courses only. We aim to make much of the edX course content available under more open license terms that will help create a vibrant ecosystem of contributors and further edX's goal of making education accessible and affordable to the world.

Certain reference documents, digital textbooks, articles and other information on the Site are used with the permission of third parties, and use of that information is subject to certain rules and conditions, which will be posted along with the information. By using this Site you agree to abide by all such rules and conditions. You agree to retain all copyright and other notices on any content you obtain from the Site. All rights in the Site and its content, if not expressly granted, are reserved.”⁴

Because content is restricted to registered users, edX is currently unable to have a large-scale, direct impact on users without internet. As we discussed earlier, this means that the African educational landscape cannot benefit from edX because internet penetration is so low. Furthermore, because each XConsortium member institution sets its own content licensing terms, edX content consequently has mosaic-like intellectual property model which makes general content distribution extremely complex. However, edX has recently begun experimenting with the creation of localized instances of their MOOCs in the form of small private online courses (SPOCs) with limited enrollment on partner universities' campuses.

THE SPOC MODEL

While MOOCs provide content to an unlimited number of students who have access to the platform, SPOCs are enabled through the licensing of MOOC content at some cost to a limited number of students at an educational institution¹⁹:

“The same material you or I would see if we enrolled in a MOOC class (such as the lecture videos, quizzes and assignments associated with Michael Sandel’s HarvardX [Justice course](#)) would be given to professors who would be free to pick it apart and put it back together in order to customize their own classes in a way that represented their preferred combination of their own teaching resources and third-party materials.”²⁰

Consequently, SPOCs can be packaged as courses that are offered to the institutions who license the MOOC content or as a collection of content and resources that institutions can provide to professors to use as components in their traditional courses²¹. SPOCs are typically implemented with the “flipped classroom”¹⁵ model, in which lectures are treated like homework and classroom time is used to apply knowledge in projects and assignments.

In Fall 2012, edX partnered with San Jose State University (SJSU) to create an experimental hybrid of a traditional classroom and online version of Circuits and Electronics. Although this was a provisional arrangement, edX essentially licensed their MOOC for this course to SJSU to be used as a SPOC. There was a great deal of backlash from SJSU faculty members who derided the use of SPOCS on their campus as an overextension of the President’s power in the shared governance of university affairs¹⁶. Much of the backlash was over the outrage of faculty members concerned with seeking out “technology that might eventually help the university teach more students for less money” and “the

notion of "one-size-fits-all vendor-designed" courses"¹⁶. In spite of the controversy, the pass rate for this SJSU course went from 59% with a traditional lecture format to 91% using the edX material¹⁷. While SPOCs can be used in this way to improve course quality, they have also been praised as an "approach [that] has allowed instructors and students to tackle high-level material that they might not have attempted otherwise"¹⁸. Since edX President Anant Agarwal has identified SPOCs as being a potentially viable revenue model for their organization, it is anticipated that this will be a trend that will continue to grow for edX and other MOOC providers.

COPYRIGHT LAW AND EDUCATION

OVERVIEW

In Section §106 of United States Copyright Law, creators are granted exclusive rights over their original works. These exclusive rights include reproduction, production of derivative works, and distribution of copies to the public, as well as performance, display, and transmission of the work. Following the granting of these exclusive rights, however, Section §107 presents the exemptions to these rights on the grounds of fair use. This exception explicitly differentiates fair use from an infringement of copyright and presents four factors that are used to determine whether or not a specific use of copyrighted work is in fact protected by the clause. The four factors include:

- “(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;*
- (2) the nature of the copyrighted work;*
- (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and*
- (4) the effect of the use upon the potential market for or value of the copyrighted work.”⁵*

Section §110 and §112 present further limitations on the exclusive rights granted in Section §106 by granting exemptions to certain performances and displays and ephemeral recordings, which are created to facilitate transmissions. Section §110 protects the “performance or display of a work by instructors or pupils in the course of face-to-face teaching activities of a nonprofit educational institution, in a classroom or similar place devoted to

instruction” except for works specifically created or marketed as digital instructional content. It is clear from the language used in this section that there was a need to reflect how traditional classroom education has evolved through the use of technology, which was addressed in 2002 with the Technology, Education, and Copyright Harmonization (TEACH) Act.

The TEACH Act extends the limitations presented in Section §110 and §112 to include protection over the performance or display of copyrighted works within distance education environments, rather than just in face-to-face learning environments. This act does not replace existing digital license agreements nor the fair use clause. The use of copyrighted material, however, and the institutions involved must meet specific criteria to be protected under the Act. These criteria include⁶:

- *The institution using the material must be accredited, non-profit, and educational*
- *Only “reasonable and limited” portions may be used*
- *The institution must inform students of copyright restrictions over online material and provide some technological means to protect copyright restrictions from being violated*
- *The use of the material must be part of instructional activities during live or asynchronous class sessions*
- *The use must not include transmitting materials typically acquired or bought by students and it must be limited to the enrolled students in a specific class*
- *Materials that are developed specifically as digital instructional material cannot be used*

Instructional course materials created by teachers may often be a combination of original work as well as third-party content, such as photographs, diagrams, readings, and media clippings. As is delimited by the ambiguous language used

in U.S. Copyright Law, there are no hard-and-fast rules for whether or not something constitutes fair use within the educational setting. There are also no set rules about whether or not publishers will grant permission for institutions to use content over which they hold the exclusive rights granted in Section §106. However, there are guides⁷ for educational institutions that offer information on the likelihood of positive outcomes in cases when the TEACH Act is used as a defense, which is important to distinguish from a right. Generally, cases that do not require permission from copyright owners are those in which minor excerpts (e.g.: short quotes from texts) are incorporated into original instructional material.

However, as the amount of the copyrighted work that is used increases, so does the likelihood that explicit third-party permission is needed for use. When third-party authorization of use is needed, it is more likely that permission will be granted if instructors are using content while making the recommendation to students to purchase the original work.

MOOCs AND COPYRIGHT CHALLENGES

Traditionally, faculty members of an institution develop their course content and will typically have ownership and rights over that content, although in some scenarios institutions will claim ownership of all content placed on digital platforms. This makes ownership claim cases in which faculty members leave the institution where they created the content more straightforward. This content may contain third-party material. It is traditionally the responsibility of faculty members to ensure their use of third-party content is protected by fair use or obtain third-party copyright clearance. However, given that the creation of MOOCs often require a greater degree of institutional support, they disrupt this traditional model.

The support provided by the institution for faculty to create MOOC content may include “significant infrastructure and production investments ... instructional design, material development, videography, and additional teaching assistants, to name just a few”¹. The General Counsel for the American Council on Education says that “the law considers the extent to which an institution's resources contributed to a faculty member's output; because of the greater degree of reliance on these resources in the MOOC context, an institution may have a greater claim to the course and its content”¹. This has the potential to introduce substantial ambiguity over the question of whether or not faculty members have ownership rights over their course content. Additionally, while fair use, licensing agreements, and third-party copyright clearances may have previously applied in traditional institutional setting, they may not apply to a course once it has been “MOOCed.” This third-party negotiation can pose a significant challenge for MOOC providers and users.

Critics of the application of fair use in this context say that exceptions previously granted by the fair use clause in a traditional classroom setting will have a reduced effect for MOOCs. This, they say, will cause instructors to feel compelled to seek out licensing agreements with third-party copyright owners, change their syllabi, and obtain open educational resource replacements for copyrighted material. In addition to being a time-consuming process, this could potentially result in lesson plans that are lacking significantly in content and information. Additionally, because of the worldwide reach of the internet and therefore MOOC content, some say third-party copyright owners are less likely to want to grant “global rights”¹ to use their material in the MOOCs with the concern that would be prone to lose profits from potential customers of their educational resources.

A NEW MODEL

OVERVIEW

After learning about the copyright laws that govern hosting and distribution of copyrighted material in the education sector and specifically on MOOCs, we are in a position to offer solutions to the educational problems in Africa that can be alleviated by edX and other third parties without copyright infringement. We have learned that all the material on edX is free and open to one person per account. This means that all African students that want access to edX material ought to have a computer, good internet access and an account on edX. This is currently not possible as internet is not currently accessible to 85% of Africans. The three main components of barrier of access to online learning in Africa are:

1. There aren't enough computers on the continent to service all students.
2. For those that have the hardware, there is very limited internet access in Africa due to high costs of internet subscription and lack of reliable electricity.
3. Courses on edX use third party materials in their lectures, which means that the edX courses cannot simply be downloaded onto a hard drive and shared by the few Africans that have access to the internet.

The first problem on our list above can not be legally or otherwise technically addressed by edX. To increase the number of computers available to students, the middle class in Africa must grow and subsequently begin to purchase more

computers or a third party could supply computers to schools and other centers where they might be used for educational purposes. Our solution will aim to maximize the learning capabilities of the current computers on the continent. Our solution to address these problems is two fold : 1. Provide eGranary Digital Libraries that are local instances of edX and 2. Provide these libraries in a freely licensed SPOC version to areas with low to no internet connection and as actual edX proxies to areas with expensive internet access.

SOLUTIONS

CHALLENGES	eGranary Digital Libraries	African SPOC Model
Internet Access	✓	
Computer Access		
Copyright Concerns		✓

Figure 2: Challenges and Solutions to edX usage in African countries.

eGRANARY DIGITAL LIBRARIES

There is a company called eGranary that has created a hardware solution for communities with low internet access. It is a hard-drive like technology that can store a local instance of a website and has the capability of creating an intranet for people to access the information it storing on various computers. In the past, this technology has been used to store critical information needed by medical

personal at hospitals in areas with slow to no internet connections¹⁰. We propose to use these digital libraries to go around the problem of expensive or no internet connection.

If we created an “internet in a box” using eGranary’s Digital Library system, we would be able to supply a local instance of edX to specific schools in Africa that have computers but no internet access, which would act as a mini internet source of educational material. In this way, even with Africa’s low rate of internet



Figure 3: An image of an eGranary Digital Library. These boxes are inexpensive and come store entire web domain contents.

penetration, the much needed materials could still make it to the various schools. In extreme conditions where there might be very few computers, we propose giving access to the teachers first and foremost so they can learn sufficiently to share the knowledge with their students.

In addition to sending these boxes to the schools, we could also set up these boxes at different locations across Africa for public access. Africa already has internet cafes and internet kiosks in urban areas. These are the places that the vast public goes to access the internet. These facilities are, however, expensive due to the high internet costs incurred by these establishments (sometimes 100 times the rate of American access²³) and electricity used to power them. Most people, due to the high prices, usually use these internet cafes for brief communication purposes and not for education or business purposes²³. If we

provided them with the eGranary Digital Libraries, these Internet Cafes could have some offline computers dedicated to the intranet from the digital libraries which would considerably bring down the cost of access and encourage more people to educate themselves from the edX material. There is the potential to make exclusive “edX cafes” as well that centrally focus on providing MOOCs content through the eGranary technology but this would have to be done through partnerships with non-profit educational organizations, government projects and NGOs. The existing internet cafe system in Africa is, however, a key target of this proposal to increase access to educational content to the masses.

Major cities in Africa; Accra, Lagos, Nairobi and Cape Town boast thousands of internet cafes. These cafes are traditionally used for long distance communication with friends and family. These centers can be turned into new educational ecosystems with eGranary Digital Libraries that would reduce the cost of browsing and encourage learners to seek material online at a much cheaper cost as they don't run on a local internet subscription plan.

AFRICAN SPOC MODEL

The most tricky challenge perhaps is the legal copyright infringement implications of these local libraries of edX. edX classes contain various samples of material from third parties. Most teachers, when teaching classes, will use graphs and pictures from various copyrighted sources. This use in the classroom is covered by the Fair Use Clause of Copyright Law, which states that small bits of copyrighted materials can be used in the classroom setting for the purpose of education.

The difficult part comes in with the transition to the online classroom. Now, the classes are no longer being taught in a classroom environment, which means that the Fair Use Clause may not apply. The way that edX gets around this is by getting permission from the third parties that have content used in edX classes. These third parties give permission to edX to host the material online with restrictions. edX is allowed to host the material online but not provide it for download and distribution to its users. For normal use, this agreement works perfectly well for edX. Unfortunately, since there is very limited internet in Africa, our solution calls for the downloading of materials onto a hard drive, which is not as straight forward as just hosting the content on the internet.

For the rest of our plan, we are going to model our solution on the agreement edX had with San Jose State University. edX authorized some of the existing MOOCs on their website to be used as SPOCs (Small Private Online Courses) in an experimental new course. This license, granted to SJSU by edX, allowed SJSU to have much more control over the material that was used in the course.

The reason that this use was allowed comes down to two main components. First of all, there is the fact that the explicit license was granted, which basically forces anyone using the edX material to explicitly agree to a terms of use. This allows edX to have a strong legal hold on the content that was being distributed. In addition, limiting enrollment (creating a SPOC instead of a MOOC), which means knowing exactly how many people are taking a given course at a given establishment at any given point in time, makes this digital classroom fall under the protection of the TEACH act. The TEACH act is very similar to the Fair Use Clause of copyright law except that it covers digital classes as well. One of the requirements of the TEACH act is that the material presented must be limited only to the students that are officially enrolled in the class. MOOCs cannot have official enrollment because the enrollment is not limited in any way. SPOCs on

the other hand, can have official enrollment and therefore can fall under the protection of the TEACH act.

We now want to create a situation that is as much like the San Jose licensing agreement as possible. One thing we note is that the San Jose State University class, like all in person classes, had a finite known number of students enrolled in it. The materials used in the course were shared freely with the members of the class, but were not allowed to be downloaded or shared outside of the class.

We have to recreate a situation close to the SJSU in both situation discussed earlier: 1. African Schools and 2. Internet Cafes.

1. In schools that have no internet connection, the way to mimic this to have edX create a series of limited enrollment online courses for the African teachers and students at that school. These courses would not be exactly like SPOCs because SPOCs contain an in person component, but they would be close. The creation of these limited enrollment classes would be very easy because, content-wise, they would be exactly the same as the already existing online MOOCs. The only difference would be to create a way to know exactly how many teachers and students are enrolled so that there would still exist some control over who could view the material. Such a way would be to outfit the library with a finite number of login accounts proportional to how many people will be accessing it in that given school. In this way, edX could satisfy the third parties that are worried about having control over their content, while still providing much needed education to teachers and students in Africa schools.
2. In the case of the internet cafes, we propose that the eGranary Digital Libraries function much like the normal edX in that the library can be outfitted

with technology that updates edX of newly registered members a few times a month when the library is connected to the internet.

In both cases, we note that we are not simply downloading all edX material and sharing it with everybody without any restrictions which would be against the current terms of use of edX copyrighted material.

IMPLEMENTATION DETAILS

By combining each of these solutions together, we get a single cohesive plan to promote education in Africa that can be enacted either by edX or the various charity organizations looking to improve education in Africa. An example of such an endeavor is by the British Council which has partnered with notable companies such as Microsoft, Airtel to set up 170 “Digital Hubs” across sixteen African countries ²⁴. Each Digital Hub has about 20 Internet connected terminals and a full catalog of various educational content available online. To reduce the costs of maintaining the internet connection and therefore preserve the sustainability of these facilities, such organizations can invest in eGranary Digital Libraries to go along with such initiatives.

Specific implementation details would require either edX or the third party to communicate with specific schools and interested Internet cafe establishments across Africa to determine which courses are wanted and how many learners wish to learn the material. edX would then create a specific licensing agreement with the establishment or school in question. In the case of the school where there is no internet and the number of students and teachers is known, a SPOC version would be formed for that school. In the case of the internet cafe establishment that wishes to provide the edX courses at lower prices through the eGranary Library, a local instance of edX would be prepared provided the

establishment agrees to connect the library to edX regularly so that the local users of edX are registered and abide by the terms of use.

There will also be additional safeties put in place to ensure that the content on the digital library cannot be downloaded or mass printed both in the school and internet cafe instances of this proposal.

COST BENEFIT ANALYSIS

Benefits

While they increase access to the student body, the school instances would be targeted at teachers are schools with few computers. There are many benefits to this particular solution that we have created. First of all is the fact that full edX courses with all of the materials can be shared with educators in Africa. By using the courses to educate teachers several benefits arise. The material taught in schools becomes more appropriate and relevant. There is the fact that the knowledge spreads faster as teachers can teach students that don't have access to the hardware due to limited computers. Also as educators learn and tech multiple times, they get very well versed with the material and become better teachers and motivators to their students.

With the limiting resource to this plan being computers, it is great to be able to have one full run of a course (a teacher completes a class) create the potential for multiple students to learn the material (from the teacher). Another benefit is that this solution is directly improving the African educational systems as opposed to trying to work around it. Teaching the teachers is a more efficient use of time and resources when said resources are limited.

In addition to building on already existing educational structures, our proposal also builds on already existing hardware solutions. Specifically, eGranary's Digital Library (or a similar setup) is a valid way to overcome the low internet penetration rate found in Africa. Again, by building upon already existing solutions we save both time and money. Our solution relies heavily upon already existing structures and technologies, which allows us to implement it quickly. It also combines all of these legislations and technologies in a new way, which allows us to serve a need that would otherwise go unfilled. While we are using this solution specifically to fill the educational needs of Africa, this idea can easily be modified to serve the educational needs of many different countries with similar conditions.

edx and various other parties that would like to partner with MOOCs in this endeavor would receive favorable publicity and develop their ties to the developing world. The next market frontier is the developing world. With 1.033 billion people and an ever growing middle class, investing in the education of African youth and increasing brand awareness could be less of a charity project and more of a forward thinking business strategy to the parties involved.

Costs

There are two main costs associated with our educational solution. The first is the fact that edX would have to spend the time to modify the way theses courses are stored for use in the digital library. Investments would have to be made into creating login capabilities on these eGranary Digital Libraries. This cost, however, is very limited as edX would be, as stated before, basically created a single layer to go around already existing material and code. The majority of the materials needed for this solution already exist, so this cost is fairly low. Not only that, but after this solution is implemented for the first time,

the structure for the protected enrollment portion can be used over and over again for different schools and internet cafes, which means that the cost of implementing this a second time is even smaller than the first time.

The second cost is the time, money, and energy that would be needed to enact this plan. A party would need to contact the schools and internet cafes in Africa and make plans for them to get the digital library. The flexibility of our plan makes it such that edX doesn't have to do the ground work for this solution. If edX wished to contribute to this by contacting the schools and internet cafes and getting all of that information, then that works out well, but if edX is too busy maintaining the full edX website to do this, another group can easily obtain this information. There are many charity groups out there that would most likely be willing to obtain this information and handle all of the communication with the schools and internet cafes in Africa. This way, edX can save resources, but still help to make a difference in African education.

ALTERNATIVE SOLUTIONS

There are many alternate proposals that were considered for this problem. This section contains a brief explanation of them along with the reasons that they were rejected.

THE OCW MODEL

The first alternate proposal was based on how MIT OpenCourseWare (OCW) deals with copyright materials. Specifically, OCW does not use any copyrighted materials on their site. Whenever OCW receives a class plan, slides, or a video, a team scans through the material in question meticulously. If that class material contains any copyrighted materials, OCW first tries to obtain permission to use the material in question from the third party to which it belongs. If that is unsuccessful, the materials are replaced with open source materials whenever possible. If there is no corresponding open source material to replace the copyrighted material, the copyrighted material is simply removed.

The problem with this plan is that it leads to incomplete classes. Sometimes the third party companies do not wish to allow for a wider use of their materials and OCW cannot find a suitable copyright free replacement. This leads to some gaps in the classes, which is less than ideal.

Another problem here is that this thorough scan of all OCW materials takes a lot of time. It means that courses do not get put online as fast as they could be and that many of the OCW employees must spend their time scanning the material for copyrighted components. This solution requires a lot of effort and time,

perhaps more than edX is willing to expend. Plus, the final product could very well be several incomplete courses.

COPYRIGHT LAW MODIFICATION

A second avenue that was explored was attempting to change Copyright Law to allow for something like this to be implemented. The idea of an online classroom is just barely beginning to take shape within Copyright Law and other legislation. There are several different changes that could be made to support a project such as this.

Removing Inactive Copyrights

The first change to Copyright Law that could be made is to find some way to force the holder of a copyright to give up their copyright after they are no longer actively using it, which would make more copyright free materials be available for use in online classes. Copyrighted materials can stay copyrighted for a very long time. Even after a book has been out of print for several years, it can still be copyrighted. An idea here was to impose a tax on the owner of any copyright where the copyrighted material is no longer on the market. Unfortunately, in this digital age, all a copyright owner would have to do to avoid this tax would be to constantly offer to sell an online version of the material in question. Knowing this, most copyright holders would opt to do this as opposed to pay the tax or give up the copyright on these materials. The idea here is that if more materials are available in the common domain, it would be easier to create complete classes for the implementation above. (The one where all copyrighted materials that are used without permission are replaced)

Shortening the Copyright Period

Another option considered was to simply change Copyright Law to make a copyright shorter. This is again moving towards the goal of having more material in the common domain. Unfortunately, this does not seem like a very practical idea. It would be exceedingly difficult, if not downright impossible to change Copyright Law in a way that hurts those holding the copyrights. Even if this was successful, all this would mean was that edX would have slightly more materials in the common domain to replace the copyrighted material. What's worse is that the material available to edX would all be old and potentially out of date. For all of the effort we would have to put into making this solution come about, the return is not as large.

Creating a Specific Copyright Exception

The final change to Copyright Law that we considered is the idea of modifying the TEACH Act to allow for uses of copyrighted material in this specific setting. The problem there is that either we would have to be very specific, and this solution would only help this one specific case this one specific time, or we would be fairly vague and the new exception could be used in other unintended ways, such as movie piracy or other such things.

In addition to all of the setbacks mentioned specifically to each legal modification, there is one other problem; changing the law is a very long and difficult process. When considering the amount of time and effort needed to make a change to our governing laws compared to the actual benefit received from implementing these specific solutions, it is clear that the reward from these situations is simply not worth the trouble it would cause to implement them.

CONCLUSION

Education in the third world is being stalled by low access to high quality , relevant material. A third of the world's population is under 15, and most of them live in the developing world²⁵. At current enrollment rates, universities would have to find a place for nearly 100 million new students when this generation reaches adulthood²⁵. To do that, four 30,000-student universities would have to open each week for the next 15 years²⁵. This is an impractical endeavor and we quickly realized that online education is key in reducing the lack of access to education. Another key problem in higher education in Africa was the quality of the available institutions. Material taught is outdated and fails to prepare the youth to become critical problem solvers. Our solution aimed to increase access and deliver better quality education to learners in Africa.

The solution of eLearning would increase access and quality of education, however, there is very low internet penetration in Africa. A very small subset of Africans have access to the internet and an even smaller one to computers as most people use mobile devices for their connectivity needs. Material found on MOOCS, specifically on edX requires certain restrictions to the kinds of possible uses because it includes third party copyrighted work. Simply allowing educators from low-bandwidth areas of the world access to copy and download the material for their students was not going to be a possible solution due to the legal liabilities. Our solution had to fulfill three criteria: 1. Increase accessibility in places with low internet penetration in a timely manner, 2. Not provide an opportunity for infringement on copyrighted material. No liabilities for edX as a provider, 3. Provide economic and social benefits for all parties involved

The solution our research has enabled us to recommend is dispensing edX's content through SPOCs that would be provided directly to local African faculty and student groups through eGranary Digital Library technology. This technology would increase access of quality education to faculty and students in universities alike under the TEACH Act.

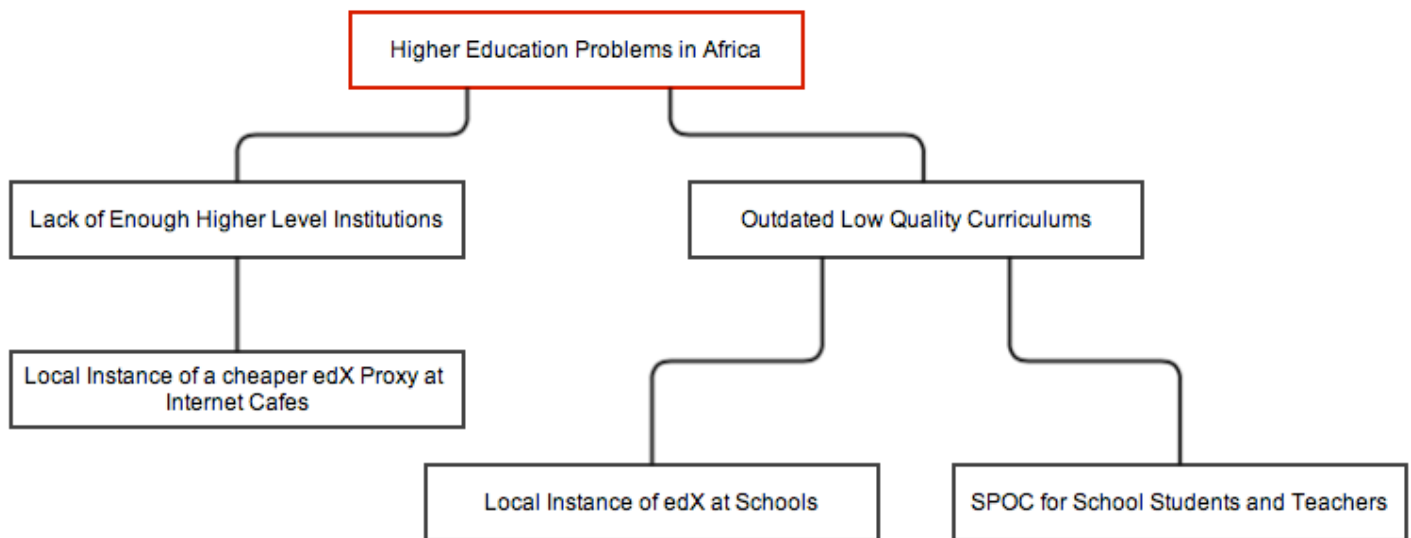


Figure 4: A flow chart illustrating our proposal for the problems facing African education. Special consideration was made to ensure this proposal does not infringe on copyrights of various third parties.

We also propose supplying these digital libraries to internet cafes to help with wider access to those not able to attend formal learning institutions. Internet cafes are rather expensive due to the high costs of internet subscription. We propose fitting them with eGranary Digital Libraries that would supply an intranet with edX content. This approach will not need internet subscription for the duration of learning and would greatly reduce the cost of the internet sessions.

This proposal definitely requires time and monetary investments on edX's part but we believe that the social impact and positive publicity such an endeavor would produce would help establish edX as a global leader on the education frontier.

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