

A Comparative Study on the Development of K-MOOC Platform

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Abstract

The common concept of OCW and MOOC can be said as sharing through openness. The purpose of openness of this services is to create a support system overcoming geographical, financial, time constraints to enable more people to receive higher education and lifelong education. This paper after analyzing the edX of open analysis MOOC platform, and afterwards the Korean MOOC platform suggests the strategic direction on development. Especially since lecture contents for higher education are distributed through the MOOC platform, the platform development and management strategy is very important, and the results of this paper can be utilized in the establishment of platform concept and development strategy.

Keywords: OCW, MOOC, Openness, Platform, E-Learning

1. Introduction

The common concept of OCW and MOOC can be said as sharing through openness [1,5]. The purpose of openness this software is to create a support system overcoming geographical, financial, time constraints to enable more people to receive higher education and lifelong education [2,4]. Although our country is already in the generalizing stages, there are still students excluded from opportunities in higher education, and qualitative differences in education between capital regions and provinces, and the gap between the school curriculum and the capabilities that companies demand still exist. In situations where students can not freely choose the major and classes they want, which is also the reason why Steve Jobs dropped out from college, we can not assume that sufficient amount of equal opportunities in education are being provided. In addition, the already employed also want to take courses in graduate school, and acquire basic knowledge in other majors and the latest technology for self-improvement and supplement in expertise, but it is hard for them to have learning opportunities due to constraints in terms of time, space, and cost. The Korean MOOC platform should be developed following a strategy that can respond and when necessary cooperate with the reality of Korean education and the global education environment such as advanced, developing, and underdeveloped countries. Especially since lecture contents for higher education are distributed through platform, the platform development and management strategy is very important, thus it is necessary to establish the platform concept and development strategy.

2. Related Works

2.1 Platform Concept

A platform was formerly used to mean a space for getting on and off trains, or a stage used by lecturers, music conductors, and athletes, but as the meaning expanded it became used as a term

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Received: Feb. 3, 2016, Revised Mar. 11, 2016, Accepted: Mar. 26, 2016

referring to a framework or structure that becomes the basic components of certain device or systems, and is being used in various fields such as computer system and automobile. Formed in the 16th century, the term 'platform' has been used in daily life or in fields such as art and business [3]. But today the term has come to be widely used, expanded into a general concept that can be applied to various fields. Considering this, the details and definitions of platform are also diverse. A basic structure commonly used in selling or for sales of various products, a infrastructure that can trade products or develop application programs, a main space or structure of repetitive work, or political/social/cultural consensus or regulation are the examples of this. However when you analyze the properties of platform, you can find that the basic principles are similar. Platform is able to produce additional profit from various forms of business models. It is an interesting fact that a platform that was regarded as just a space connecting transportation and passengers is producing profit from creating various business models. It is producing a considerable amount of profit from additional business models other than the main profit model, boarding fare. A platform is an environment established to enable multiple groups such as suppliers and consumers to participate and exchange values that each group requires through fair trade. The platform participants evolve through connection and interaction, and it can be said as a coexistent ecosystem that can provide new values and benefits for everyone.

Google, Apple, Amazon, EBay, Wikipedia, Facebook, Tweeter, and YouTube are examples of a representative platform. Most platform activation developed in to a business, thus the MOOC platform also should consider the role in developing into a business relationship of students as consumer and professors as supplier.

The platform strategy is increasing the utility and maximizing profit through establishing a medium of supplier and consumer, needs and profits. With the intensifying dependency of other enterprises on platform and the extension of influence, the enterprises with platform are positioning as the winner of the certain fields. MS, after occupying the operating system platform in 1980, has been leading the industry for thirty years, and even now the window business department is reaching 70% of sales profit rate. Advances in ICT such as the diversification of customer demand and intensifying competition, are accelerating the new competition order, platform, and especially since personalization/customization services are enabled by making smart, experience rather than function, and expandable platform rather than a single product are becoming necessary. Successful enterprises of the 21th century are all concentrating on innovation through opening up and collaborating, and are trying to take initiative by establishing a platform to do this. The key to the success of world leading enterprises such as Google, Apple, Amazon, E-bay, Wikipedia, Facebook, Tweeter, and YouTube is platform strategy.

In the success of platform strategy, it is critical to open up the enterprises' core assets and create an ecosystem where other enterprises in the new industry field spontaneously participate and cooperate. In other words, platform strategy is a platform where anyone can participate and create a new product or value, that is a strategy that creates a new open ecosystem by providing a forum and producing network effects. Platform can be divided into three types; product, customer, and infrastructure. Apple's iTunes is a type of platform that can be referred to as an example of establishing MOOC platform, which creates business with learners by making lecture contents public in the internet. The features of each platform type are shown in Table 1.

Table 1. Platform Type Features

<i>Type</i>	<i>Product Platform</i>	<i>Customer Platform</i>	<i>Business Platform</i>
Definition	A common section utilized in producing various final products	The major customer group that enterprises aim for	Infrastructure that creates business relationships with external producers
Utilization purpose	Reduce cost (Additional model development and drop in production cost)	Increase profit (sales increase due to diversification in sale items)	Lead the industry (customer fixation, expand influence through cooperative relations)

Example	Nokia (about 10 usages of platform such C, E, N, X series, about 80 models, production of 4 30,000,000 mobile phones in 2009)	Woong Jin Coway (Established a visiting service network, in introducing water purifier rental service in 1998)	Apple (Utilize the iTunes store in securing 14 million soundtracks and 300 thousand apps from external content enterprises)
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2.2 MOOC Concept and Current Status

Massive open online courses are based on a campaign in 2008 called OER(Open Educational Resources). The term Massive open online course was named in the "Connectivity and Connective Knowledge" seminar in 2008, and this seminar was first presented in an education major course at the University of Manitoba [4]. At the time, 25 college students and 2,300 students enrolled in free online courses were present in the seminar, and all the course contents were able to seen again through the RSS feed. The discussion topic were Moodle (Remote Education System), Blog Posting, Second Life, and Online Real-time Meeting [7]. The term 'Massive Open online course (MOOC)' in this period was named by Dave Cormir from the University of Prince Edward Island and Bryan Alexander, a senior researcher in the National Institute for Technology in Liberal Education, and was approved by George siemes from the Athabasca University and Stephan Downes from the National Research Council. Soon afterwards other online open classes started to appear, and Jim Groom from Mary Washington University and Branson Smith from York University are servicing open online class technology and course programs in connection with several universities. The early open one classes were mostly consisted of informal online discussion boards. The appearance of the present open online classes were made possible by the efforts from renowned professors for the public good and the support from many enrolled students (such as Podcast listeners).

In the fall of 2011, Stanford University opened three courses online, and each course turned out with a remarkable outcome of about 100 thousand students enrolling. The first course, as an "Introduction to Artificial Intelligence" class in the Computer Engineering field, had about 160,000 enrolled students. Stanford University in that week opened two additional free online courses, and were successful in achieving public awareness and high enrollment rates. The professor of the Artificial Intelligence Class, Sebastian Thrun, afterwards created udacity, and Daphne Koller and Andrew Ng, whom were the professors of two courses, since then created Coursera. Coursera is currently expanding the exchange with other universities, and is in agreement with the University of Pennsylvania, Princeton University, Stanford University, and the University of Michigan.

The MOOC platform is a platform that enables business online regarding university's open lecture contents between university's professors, the producer, and students, the consumers. As a representative MOOC platform, there are foreign open source platforms (edX, moodle)[7], free foreign sites (Udemy, Coursesites, Versal)[8], and foreign charged solutions (BlackBoard)[9].

3. Analysis on edX of Educational MOOC Platform

3.1. edX Platform Overview

The edX Platform was one of the university platforms that Harvard and MIT provided a course for over 100 thousand students. It was first presented in open source at the March of 2013, and the initial purpose was to design it to enable all professors and students to use it like a word processor, and permitted the use of plug-ins to let users voluntarily add more functions[5]. Through this, it is expanding and developing with the object of increasing higher education access opportunities, improving the quality of teaching and learning in lecture rooms, and studying student's learning processes. The advantage of an edX platform is that it is fast, modern, and able to accommodate large scale of student enrollments. Especially, it is suitable for universities and institutes that prefer modern, flexible, and stable course management platforms. Over 2 million students use it in 47 universities. However, although it is open

source software, expenses are generated in installation and partial maintenances. edX platform includes LMS, authoring tool, and studio, and it is connected with repositories that store numerous lecture data. This platform is also called XBlock SDK, includes various XModules, and has referenced the Amazon's Cloud Formation template [10]. Since it can be utilized by anyone with the open source license called Affeo GPL, John Mitchell who is the vice president of Stanford has mentioned that this kind of platform is "becoming the Linux of the online learning industry". XBlock is component architecture standard for creating courses, and open edX courses are Xblock's learning components. XBlock can be created by the 3rd Party for the function expansion of other learning platforms and open edX. There are ones including the core code for the implementation of xBlock, and SDK tools to create xBlock. edX-ora2(openresponseassessor) for assesment, as a self grading and peer grading tool on the answers to long questions, also provides example-based artificial intelligence grading functions. CS(Comments Service), as an independent commenting system that provides the interpretation of votes and overlapped comments, is independently providing instructor assurances to debate for educational purposes. Besides this, it is including additional tools such as CodeJail, XQueue, XServer, notifier, Analytics Dashboard, Analytics Pipeline. The architecture of the edX platform is presented in figure 1.

In this section, a predictive analytics approach is discussed. This approach incorporates artificial neural network and fuzzy logic to generate optimal configuration of storage resources. It provides the intelligence for the storage resource management of Federator and is comprised of four main modules: traffic monitor, analytics, fuzzy inference, and adaptive control (see Figure 1). The generated configuration is especially suitable for optimizing hybrid storages in a multi-tenant and multi-workload environment.

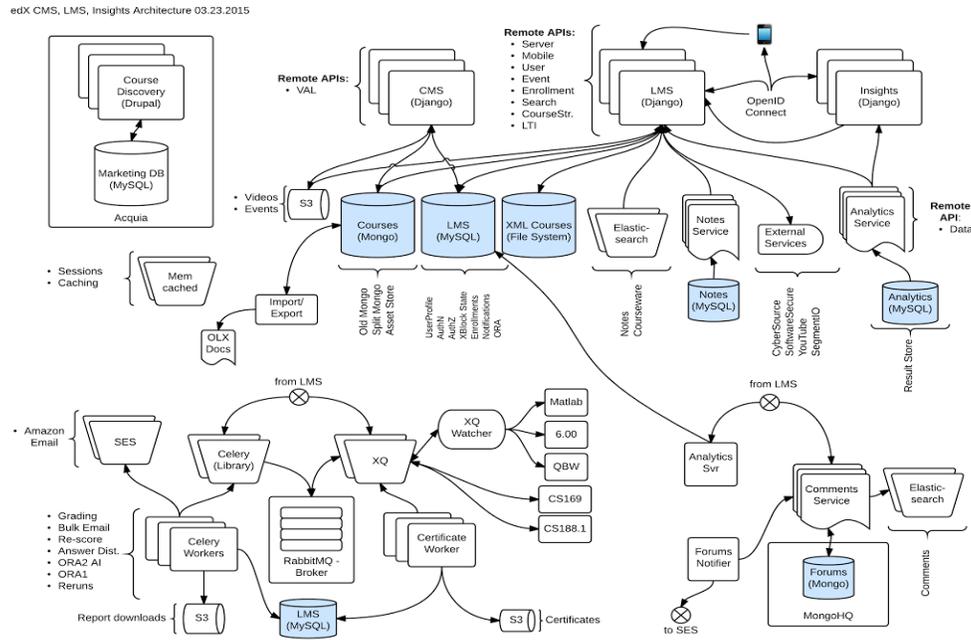


Figure 1. edX Platform Architecture

3.2. edX Platform Development Principle - UDL

The development principle that is the basis of developing the edX platform, is the UDL (Universal Design for Learning) well known as the teaching and learning design principle for universal learners [6]. The term UDL was influenced by the idea of Universal Design (UD) that resulted from the universal design concept in developing the 1980s architecture products. The UDL principle introduced into architecture not only removes the barrier that the disabled face in physical environments, but as if in careful consideration for everyone to not face any discomfort in using it, UDL also removes the cognitive and psychological barrier that can be faced in all learning environments including the curriculum and

educational materials, to provide a "flexible learning environment adjusted in acceptance to all individual learners' requests" other than a "single fixed curriculum and learners adjusted to the learning environment frame". UDL is based on a cognitive and scientific approach that as all humans' DNA and fingerprints are different, learning methods also should be prescribed differently depending on different learners' brain network structures, and it is generating basic learning principles from each network attributes which is categorized into Recognition, Strategic, and Affective Networks. Firstly, a Recognition Network is a network related to how the cognition identifies and classifies what we see, hear, and read, in other words, it is a domain related to 'what'. To increase cognitive approachability, UDL emphasizes the need to provide a "Multiple Representation Method" enabled for learners. Secondly, a Strategic Network, as a domain regarding how our thoughts are structuralized and expressed, is a network that deals with structural work such as writing and solving mathematical problems. This is a domain related with 'how' people are learning, and for this UDL emphasizes the need to provide a "Multiple Expression Method" enabled to learners. Thirdly, an Affective Network is a network in an emotional aspect such as how learners participate and absorb in learning and gain motivation in learning, what difficulties learners face, what they are excited by and what they are interested in. This is a domain related with 'why' people are learning, and for this UDL emphasizes the need to provide a "Multiple Engagement Method" enabled to learners. The principle of UDL is that by providing all learners the access to learning, widening options such as scaffolding, and enabling flexible utilization of learning materials, maximizing the opportunity for academic achievements and raising confidence for learners.

The UDL guideline is to support anyone participating in curriculum design and education, in designing flexible curriculum designs that can lower the learning barrier students can face and meet various demands of all learners. Also it was developed not only for educators designing new curriculums but also to help in enhancing all of the current curriculum's aim, material, method, and access. The UDL guideline is not just a simple "prescription", but aiming for a function in the strategy of tearing down the barrier remaining in the existing curriculum. This guideline will become a basic guideline in providing the opportunity too choose and the flexibility required in bringing out maximal learning opportunities for all learners. The UDL guideline was composed on the basis of three major principles based on representation, expression, and engagement.

4. MOOC Platform Business Model

Foreign MOOC services are established through donation from universities or enterprises, partial profits are generated when learners pay for expenses such as the test supervisor and test expenses for necessary tests or activities in the operation of the learning process, and profits are generally generated in the process of issuing license and certificates on the curriculum when learners need or want it. The profit generation scale may be small for individual learners, but because of the features of MOOC large scale learners participate, thus with the comprehensive expense the scale could be very large. Profit can be raised by mounting advertisements on Online based managed platforms, but in the Korean MOOC service the profit through advertisement should be included in a long-term plan. In addition, considering that the government is driving it, the minimum budget required in self-management and development can be secured through giving out student vouchers in universities and generating usage fees on charged services or certificate expenses. The connectionist based cMOOC model can gain profit in processes like platform advertisements through the business model as in Table 2. As the present edX requires expenses for installation and technical advice, an independently-developed platform would be able to install in universities and institutes in need of software or even do ASP (Application Server Provider) business.

Table 2. cMOOC Business Model

<i>Infra Management</i>	<i>Product Innovation</i>	<i>Customer/User Relationship</i>
1.Potential ·Acceleration in utilization ·Provide social compensation 2.Partnership ·University ·School	1.Proposition of value ·Creation ·Autonomy ·Social network ·Social recognition ·Knowledge sharing	1.Relationship ·Global approach ·CoP development 2.Distribution route ·Internet/Web ·Social learning tool

<ul style="list-style-type: none"> ·Enterprise 3.Composition of value ·Combine with value sharing 	<ul style="list-style-type: none"> ·Unofficial learning 	<ul style="list-style-type: none"> 3.Customer ·Student ·Professional ·Colleague
Financial approach <ul style="list-style-type: none"> 1.Cost 2.Profit ·Platform construction ·Platform advertisement ·Maintenance ·Support fund 		

5. Conclusion

This paper after analyzing the edX of open analysis MOOC platform, and afterwards the Korean(K-) MOOC platform suggests the strategic direction on development. Especially, since the lecture contents for higher education are distributed through the MOOC platform, the platform development and management strategy is very important, and presents the necessity of establishing the platform concept and development strategy. The platform that enables business online with university's open lecture contents between university's professors, the producer, and students, the consumers, is the MOOC platform. Most platforms are based on business.

The most important purpose of K-MOOC service, the Korean MOOC, is the qualitative innovation of college lectures by the diffusion of good lecture models through open lectures top-level in domestic universities. In addition, it aims to realize the actual equality in opportunity by relieving the restraints of the education capacity gap through providing all the lectures free, and ultimately provides the basis of lifelong learning on college educations and contribute to the national human resource development. As the results of prior comparative analysis, finally it would be necessary to develop on basis 5 characteristics Universality• Sustainability• Interoperability• Openness• Globalization for the K-MOOC platform.

6. References

- [1] Haggard, S. (2013). The maturing of the MOOC: Literature review of Massive Open Online Courses and other forms of online distance learning. London, UK: Department for Business Innovation & Skills.
- [2] Falconer, I.; McGill, L.; Littlejohn, A. & Boursinou, E. (2013). Overview and analysis of practices with open educational resources in adult education in Europe. European Commission Joint Research Centre Institute for Prospective Technological Studies.
- [3] Baldwin, Carliss Y., and C. Jason Woodard. "The Architecture of Platforms: A Unified View." In Platforms, Markets and Innovation, edited by Annabelle Gawer. Cheltenham, U.K. and Northampton, MA: Edward Elgar Publishing, 2009.
- [4] Sledge, L. & Fishman, F. D. (2014). Reimaging Higher Education. Deloitte university press.
- [5] edX (2013). Open edX: Why we're relicensing XBlock API under Apache. Retrieved from <http://www.edX.org>
- [6] Meyer, A., Rose, D.H., & Gordon, D. (2014). Universal design for learning: Theory and Practice. Wakefield, MA: CAST Professional Publishing.
- [7] Moodle (2014). moodledocs. Retrieved from <http://docs.moodle.org>
- [8] Udemy(2014). Udemy. Retrieved from <http://www.udemy.com>
- [9] Blackborad(2014). Coursesites. Retrieved from <http://www.coursesites.com>
- [10] <https://github.com/edX/edX-platform/wiki/List-of-XBlocks>