Disruptive Innovation in Education: Open Learning, Online Learning, MOOCs and What Next?

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ABSTRACT : *Rapid advancement of information and communication technologies has brought about various changes in education and the structure of colleges and universities. The education system is undergoing dynamic changes. These dynamic changes can be explained from the perspective of theory of disruptive innovation which basically explained that existing organizations were displaced from their industries because of their inertia towards the adoption of new innovation. Recent introduction of massive open online courses (MOOCs) is seen as a strong technological force influencing the education landscape. MOOCs which are operated on a different scale and expectation have triggered existing education providers to evaluate and strategize in order to remain relevant. This study is meant to give readers, especially practitioners in education sector a way of understanding the nature of disruptive innovation and how disruptive innovation is influencing the education landscape.*

Keywords: Distance education, MOOCs, disruptive innovation, Malaysia

I. INTRODUCTION

Researchers have been interested in investigating on how to improve students' learning process. Studies range from the fields of sociology and public policy. They (Lagace, 2008). Recently, a new approach has emerged when Harvard Business School professor, Clayton M. Christensen introduced the theory of disruptive innovation.

Currently, higher education is fundamentally being disrupted by various new tools and online environment. Rapid advancement of information and communication technologies has brought about various changes in education and the structure of colleges and universities. Colleges and universities are "...moving up the quality chain and losing touch with the mainstream..." (Christensen, 2008, p. 43). Colleges and universities are undergoing a sort of "disruptive innovation and catalytic change" (Christensen, 2008, p. 43). It has been noted that "The theory of disruptive innovation has significant explanatory power in thinking through the challenges and changes confronting higher education" (Christensen, Horn, Caldera, & Soares, 2011, p. 2). It is predicted that by 2019, 50% of "high school classes will be taught over the Internet" (Trotter, 2008, p. 1).

Therefore the purposes of this study are (1) to provide a review of the theory of disruptive innovation, and (2) to examine the implications of disruptive innovation on the Malaysian distance education scene.introduction of the paper should explain the nature of the problem, previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper.

Distance Education - Definition And Theoretical Perspectives

Distance education refers to an education process where the students and the education providers are separated by time and distance. Both parties are connected through media interfaces such as printed instructional modules, recorded lectures and electronics and telecommunications media.

There are several theories and models explaining distance education. Independent learning theory was introduced by Wedemeyer in 1973 emphasized two concepts of freedom and distance in learning (Wedemeyer, 1973). Holmberg suggested guided didactic conversation technique in distance education teaching and learning process (B. Holmberg, 1977; Borje Holmberg, 1983). Moore differentiates distance education and conventional education in his transactional distance theory (Moore, 1972). In the Iowa model of distance education, Simonson and Schlosser emphasized the use of technology that provides a two-way interactive audio and video communication (Moore, 1972).

Universities are now faced with government funding cuts driving the higher education sector to seek innovative ways of managing costs and adding value to education offerings which has traditionally been administered through entry scores dictating the selection process for accepting prospective students into business courses. Current technologies such as the internet have allowed greater access to attending university through online education and increasing student enrollments.

Disruptive innovation - a brief introduction

Theory of disruptive innovation explained that existing organizations were displaced from their industries because of their inertia towards the adoption of new innovation (Christensen, 1997). The term disruptive innovation was extended from the term 'disruptive technology' which was first introduced by Bower and Christensen in 1995 (Bower & Christensen, 1995). Disruptive technology is defined as "...simple, convenient-to-use innovations that initially are used only by unsophisticated customers at the low end of markets..." (Christensen & Armstrong, 1998, p. 1). Another definition of disruptive innovation is "...an innovation that makes a complicated and expensive product simpler and cheaper and thereby attracts a new set of customers." (Christensen, 2008, p. 43). Disruptive innovation also "... attack an existing business, and offer great opportunities for new profit growth." (Assink, 2006, p. 217). Disruptive innovation is also defined as something that changes social practices, the way we live, work and learns.

There are two key elements of disruptive innovation which are important to the education sector. The elements are (1) technology enabler, and (2) business model innovation (Christensen et al., 2011). Online learning constitutes is considered as a technology driver that is capable of disruptively change the business model of universities.

II.   MOOCS - A DISRUPTIVE FORCE?

Technology strongly influences how quickly the education landscape is changing. SDE has been successful in reinventing itself by riding the wave of new technology. However, the latest trend in distance education, massive open online courses (MOOCs), might be the disruptive innovation that will jeopardize the existence of SDE. MOOCs are freely available, encourage peer to peer learning and award certificates. Furthermore, MOOCs has made possible for anybody from anywhere in the world to learn from the best professors from top universities.

Massive Open Online Courses (MOOCs)

Recently, massive open online courses (MOOCs) started to gain attraction. However, the concept of MOOCs is nothing new. Open access online learning was already available years ago, albeit unsuccessfully due to various weaknesses. MOOCs overcome those weaknesses and repackage previous open access online courses into free courses which provide certificates upon completion. Recently MOOCs has been hailed as "...the most important education technology in 2000 years" (Mol & Dam, 2013).

The introduction of 'massive open online courses' appears to be a major shift in the development and internationalization of higher education. MOOCs have been introduced with flexibility in mind. Most of all MOOCs are offered free of charge. Moreover, it is designed to cater for classes with large numbers of concurrent students. MOOCs encourage collaboration among students. Upon completion, MOOCs award certificates as compared to conventional academic course credit.

Initially, institutions of higher education provide online delivery of courses which incorporate automated assessment, peer interaction and forums. MOOCs improved upon the existing offerings of institution of higher education by shifting the costs from students back to the institutions. MOOCs also shift the costs from students to employers. In addition to that, MOOCs is also capable of providing job matching services, and examination services worldwide.

MOOCs become a disruptive force in education with the introduction of an online course in Stanford in autumn 2011. A free online course on artificial intelligence was offered by Peter Norvig and Sebastian Thrun. The course attracted more than 160,000 students from all over the world except North Korea. From 160,000 students who enrolled, 23,000 students completed the course (Hyman, 2012).

Since that first offering from Stanford, there has been an additional online learning platform introduced. These newly introduced platforms reflect the dynamic changes in the education landscape. However, MOOCs as what is available today is not entirely new. There have been various attempts to introduce similar platforms in the past. Nevertheless, many of the early online initiatives have not been successful.

Previously, most of higher education institutions were cautious of ruining their brands. Such caution somehow restricted their implementation of online learning. The scenario has eventually improved with the inclusion of top institutions of higher education. Universities are queuing up to work collaboratively. For example, two MOOCs provider, Coursera and edX have been signing up more and more institutions of higher education. Conversely, Udacity embarked on a different strategy. Udacity who are interested to teach as many students who would be interested in learning through courses delivered online.

Financially, MOOCs operate differently as compared to existing institutions of higher education. Institutions of higher education depend on collecting a high fee from a smaller pool of students as compared to MOOCs which depend on a small amount of fee from a large pool of students. Even though MOOCs is currently facing a low completion rate, the cost is easily recoverable due to the scale of students' enrolment. For example, if only ten percent of the enrolled students complete a particular course, imposing a $100 completion

certificate fee on a course with 50,000 enrolled students will brings in $500,000. According to Udacity co-founder and CEO David Stavens, "…overheads on a course with 160,000 students are covered by charging $1 per student…" (Saunila, 2012, p. 8).

Financially, MOOCs operate on a different financial expectation. While the traditional education institution such as SDE charges expensive fees from a limited pool of students, MOOCs is charging a minimum fee to hundreds of thousands of students. Table I compares the possible collection of fees between conventional education institution and MOOCs. Even though conventional institution is shown to collect three times the fees, they also incur higher cost of maintain buildings and salary of faculties.

Table 1: Comparison of Fees Collection

Institution	Number of Student (intake)	Fee per Student	Fees Collected
Conventional	1000	RM1,500	RM1,500,000
MOOCs	50000*	RM100	RM500,000

*Assuming 1 in 10 students complete a course, there will be 5000 students charged with RM100 completion certificate fee.

According to Professor Clayton Christensen "...universities don't consider themselves in competition with these new entrants, but in the process of retreating from them they risk becoming more and more out of touch with the mainstream..." (Christensen, 2008, p. 43).

Apart from the benefits, MOOCs is having issues that need to be addressed for it to progress further. The issues are (Hyman, 2012); (1) business models, (2) students evaluations, and (3) certifications. In addition to that, cheating, retention rates, completion rates and cost model are list of ongoing issues on MOOCs (Skiba, 2012). There are also technology-related issues such as obtaining credit for course completion, course customization for companies, tracking course completion in learning management systems and dealing with resistance toward using external open-source systems (Mol & Dam, 2013). MOOCs' business model is still unclear. As for student evaluations, technology still needs to catch up with issues such as grading of lab activities, writing essays and students projects. By completing an online course, what do students get? Most of them will be getting a certificate. Will that certificate be treated similar as the one obtained by completing course on campus?

III.   DISTANCE EDUCATION PIONEER IN MALAYSIA - SCHOOL OF DISTANCE EDUCATION, UNIVERSITI SAINS MALAYSIA

The School of Distance Education (SDE), Universiti Sains Malaysia (USM) has been providing distance education programs in Malaysia since 1971 and recently celebrated its forty-year anniversary. In the last four decades, the distance education program has evolved from just a unit under the School of Humanities, to becoming a centre administrating programmes offered by other schools in USM and finally developed into a full-fledged school offering its own undergraduate and postgraduate programmes. Until 2010, 16,321 students have graduated with their first degree. In addition to that, hundreds have graduated with their Master's and PhD's. Being a truly distance education institution, about 6000 of SDE current students are scattered all over Malaysia. They attend classes from the comfort of their homes or from anywhere in the world where Internet connection is available. Four decades of educating Malaysians through the distance, SDE has evolved from just providing notes prepared by lecturers (1971), transmission of recorded lectures through the radio wave (1979), distributing pre-recorded audio & video cassettes (1983), live audio conference (1988), live audio graphic (audio and electronic board) conference (1991), live video conference (1993), online learning portal (2003) until the current live video streaming through the Internet (since 2008).

Several disruptive innovations such as new online institution (Christensen & Eyring, 2011), modularization of education (Christensen, 2008), commoditization (Christensen, 2008), open learning, online learning and MOOCs are impacting the School of Distance Education. In addition to disruptive innovations, changes such as changes in accreditation standards are giving strength to those new innovations.

Recently, the "1 Malaysia Development Board" (1MDB), a government agency, has signed an agreement with Khan Academy, a non-profit educational website providing free world class education, to translate educational videos into Bahasa Malaysia (1MDB, 2013; "More online videos in BM," 2013). The effort by Khan Academy will make free education accessible to more people especially from Malaysia in local language.

IV.   DISCUSSION AND CONCLUSION

There have been changes in the education landscape in Malaysia. These changes have been spark further with the disruptive nature of distance education delivery methods. This study is meant to give readers especially practitioner in Malaysian education sector a way of understanding the nature of disruptive innovation and how disruptive innovation is influencing the education landscape.

Christensen and Armstrong strongly suggested that "... unless leading providers of continuing medical education at medical schools aggressively begin offering courses that are customized to the need of specific health care providers, in formats and venues that are conveniently accessible, they will increasingly be displaced by new providers ..." (Christensen & Armstrong, 1998, p. 69). The same suggestion is very much applicable to education organization in Malaysia. Malaysian colleges and universities should seriously consider offering customized courses in formats and venues that are convenient to the respective students.

MOOCs are also undergoing transformation. MOOCs started off as massive open online courses but are now morphing into massive open offline courses. Why should students be restricted to studying only online, especially when the technology is capable of delivering the courses offline.

Will MOOCs seriously threaten the existence of online or distance education provider such as SDE or other existing institutions? MOOCs might not be a serious threat to SDE or any other institutions, especially institutions with an established brand. Such institutions will continue to be an attractive education provider for the time being. However, long term strategies must include MOOCs for the institutions to remain relevance in the future education marketplace.

There are many possibilities for institutions of higher education to incorporate MOOCs into their existing business model. MOOCs can be utilized to serve disadvantaged groups or high school leavers with subpar results.

Massive Open Online Courses (MOOCs)

There will always be new disruptive threats emerging. Education institutions need to be aware of any disruptive threats and must be able to respond to those threats successfully. It is possible to assess those threats in just three steps (Christensen & Armstrong, 1998). First step is to ask the right questions about the importance of disruptive approaches to their institution. A second step is to draw a trajectories map as sample depicted in Figure 1. By looking at the trajectory map, it is possible to judge the quality and content of disruptive programs in an institution.
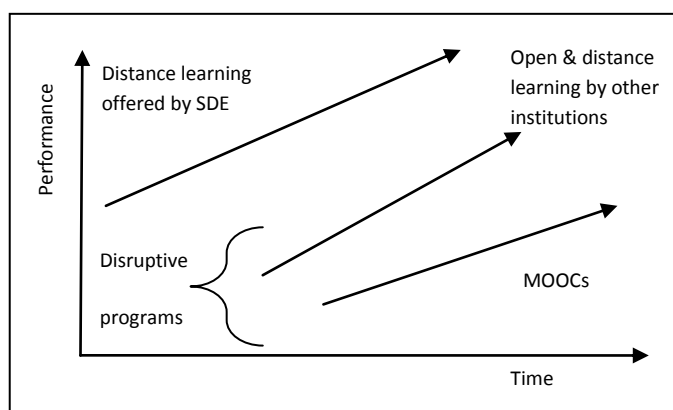

Figure 1: Disruptive Approaches Related to School of Distance Education

Third and final step, administrators of the institution need face decide if disruptive technology is beginning to penetrate the mainstream market, would they be willing to kill their own existing programs with disruptive programs of our own or should others kill their programs?

Changes are bound to take place. How and when those changes will take place is still unknown. The best is for the changes to be initiated through internal forces rather than through external pressure from competitors. As one of the best example, Harvard University, doesn't derive its world-leading reputation from endowment or gifted faculty but through its tradition of change (Christensen & Eyring, 2012). That tradition of change is what other institution should emulate.

However, changing or transforming an institution is not an easy task. Such process requires high level of commitment from all individuals within the institution.

As for external stakeholder such as policy makers, several recommendations will ensure education institutions to remain innovative and competitive. The recommendation are (Christensen et al., 2011):
 i. Eliminate barriers blocking disruptive innovations
 ii. Remove barriers that judging institution based on seat time, credit hours, student-faculty ratio.
iii. Not focus on degree attainment as the sole measure of success
iv. Fund higher education with the aim of increasing quality and decreasing cost
 v. Recognize the continued important of research institutions

Technology liberalizes education by providing flexibility and accessibility. Education institution must embrace changes bring about by technological advancement or risk being eliminated or replace by newer and nimbler institutions.

So far suggestion and recommendation mentioned above seems to be too theoretical. An additional action need to be taken is to look for "nonconsumption" or unattractive area to the industry incumbent (Lagace, 2008). Such nonconsumption can be covered by online learning, distance learning and MOOCs. Furthermore, businesspeople should be utilizing their business acumen and expertise in school improvement programs and initiatives.

In conclusion, it is important to recognize the nature of disruptive innovation in education. According to the person who developed the theory of disruptive innovation, professor Clayton Christensen, "...disruption are now occurring in the world of education..." (Lagace, 2008, p. 1) and "...school as they are now...cannot do it..' (Trotter, 2008, p. 1). Furthermore, school should "... create the new architecture for the curriculum in a new space..." so that "...the school can truly transform itself..." (Trotter, 2008, p. 4). Thus, a challenge for educators and researchers is to always observe and identify innovation or invention that might disrupt the education landscape.

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