USE OF DISRUPTIVE TECHNOLOGIES IN HIGHER EDUCATION

Dr. Amit Kauts[1] & Gifty Arora[2]

Professor & Head[1] & Research Scholar[2]

Department of Education[1]

Guru Nanak Dev University, Amritsar, India[1]

Abstract: Nowadays, after every year, new disruptive technologies are emerging day-by-day. These disruptive technologies have fundamentally changed the way we used to do things. Internet, mobile phones and Virtual Learning Environments (VLEs) are all the examples of disruptive technologies. With the advent of Internet, institutions have changed their way of communication from paper memos to email. Mobile phones have made usage of landlines redundant; and they are not only used for making simple calls rather used for many other things like teleconferencing, video conferencing, connecting people on social networking sites etc. Virtual Learning Environments (VLEs) have made the institutions realise that technologies are an essential part of education. VLEs deliver the learning material to the students over the web. This enables the institutions to teach those students who cannot regularly visit the campus and where teachers upload content over the web and enable the students to communicate and collaborate via tools such as blogs, wikis and forums etc. The latest technology in the line of disruptive technologies is Massive Open Online Courses (MOOCs). The MOOCs are small private online courses in higher education where the learning content is provided to the students online and there is no limit on the attendance.

Index Terms: Online learning, Virtual Learning Environment, Mobile Learning, MOOCs.

Introduction

Education has been a way for students to improve their lives. But the costs of education are rising day by day and it becomes a barrier for many students upward mobility. For a revolution to take place in education, changes will have to occur that will disrupt the status quo. Education is that segment which needs disruptive innovation. The key to revolutionise the higher education is that how technology will be introduced rather than not just by adding technology. The future educational institutions must be student centric because students have different types of intelligences, interests and abilities. Learning should be both personalised and customised so as to accommodate all the students effectively. Under the contemporary education system, customising education is expensive but the introduction of disruptive technologies is less expensive. One example of disruptive innovation in education that Christensen, Horn and Johnson support online learning. Online learning is the beginning to change the old ways for doing things in higher education. Online education is not bound by time or location constraints. Today, the scenario has been changed; many educational institutions serve the courses virtually rather than in classrooms. As technology is improving so now the students are interested in taking the online courses alongside regular face to face classes.

Concept of Disruptive technologies

The term 'Disruptive technology' is derived from Clayton Christensen's (1997) book, 'The Innovator's Dilemma.' The term is used to denote technologies that are not designed to support learning and teaching but are used by students and lecturers, having found a market and a use value. Disruptive technology follows four key criterias identified by Christensen in 1997; they are smaller, cheaper, simpler, and convenient.

Disruptive technologies often start with a small number of users but growing over time to extent that they replace the previously dominant and incumbent technology. Christensen and Raynor (2003) consequently changed the term 'Disruptive technology' to 'Disruptive Innovation', arguing that the disruption is not a

fundamental feature of technology, but develop through practice. Disruptive Innovation caters to the needs of those who cannot attend college because of finances, work conflicts, or family obligations. There are amazing disruptive innovators in the world like in social media; Larry Page of Google, Mark Zuckerberg of Facebook, Jack Dorsy of Twitter etc.

Disruption is one of the most overused catchwords in education today. Mobile technologies, Open Educational Resources (OER), MOOC's (Massive Open Online Course), Cloud computing and Analytics (big data) have now become part of education at all levels.

Disruptive Technologies in Higher Education
The personal computer (PC) supersedes the typewriter and totally changed the way we work.
Email forever transformed the way we communicate, supersedes letter-writing and disrupting the greeting cards and postal industries.
Cell phones enabled the people to call anywhere and disrupted the telecom industry.
The laptop computer and Mobile computing replaced desktops in many industries and organisations. Laptops made it possible for people to collaborate from anywhere in the world.
Smartphones replaced cell phones and PDAs (Personal Digital Assistance) because of having different functions, smartphones disrupted pocket cameras, MP3 players, calculators and GPS devices.
Cloud computing has been an enormously disruptive technology in the industrial world. It is the combination of hardware and software to deliver the content over the internet. We can access the content and files from any device that can access the internet.
Social networking has disrupted landlines, cell phones, email, instant messaging etc. It has changed the way we communicate with others.
Campus wi-fi: with the campus WiFi, students can study effectively. They can collectively share notes and prepare for their exams. One of the basic uses of WiFi on campus is for students to keep up-to-date of their assigned work. They can log in to their portfolio thereby can monitor their own grades and keep themselves updated.
Small Private Online Courses (SPOCs): MOOCs are free and useful. The main aim of the MOOCs is to have unlimited participation and open access via web. There are no restrictions on the attendance; students can access the content any time during the day, week or month. But the main thing is to complete the hours limit given by particular course. These are widely researched in distance education and appeared as popular mode of learning in 2012.
YouTube: Now almost every university has its own YouTube channel. The content of the course is uploaded in the form of educational videos on you tube channel of particular department or university.
E-books: E-books have displaced the printed books thereby students can access to the books over the web. Earlier the students purchase the books from the market but now they can read it online.

Examples of disruptive technologies in India

There are five companies in India trying to disrupt the quality of education in India. These are as follows:

Name	Focus	Why it is disrupted	Chosen medium
Hippocampus	Rural pre-schools.	The company has used a community-centric learning	Offline

		model to provide the concept of urban pre-school to rural areas of the country at cheaper cost.	
Labinapp	Making science mobile.	Simulates a 3D environment to schools that have no proper lab facilities to practice science experiments.	Mobile
Curiositi	Making science education better and more activity-based.	It offers a customised program to schools that integrates with curriculum of science and transforms the subject into activity-based learning.	Activity boxes
Eckovation	Mobile-based social learning platform.	It makes the communication effective among parents, teachers and students. It uses technology to bridge the gap and run a feedback and conversation channel.	Mobile
Sesame Workshop	Life skills through cartoons.	It focuses on the use of fun-based learning to engage the kids and develop life skills among them.	Television and radio

MOOCs as disruptive technology

Nowadays, the disruptive technology that has become the topic of interest to society is Massive Open Online Courses (MOOCs). MOOCs are simple, free and convenient to use. They are flexible online learning which is aimed for unlimited participation. There is no formal academic credit is available. There are no fees or entry requirements in MOOCs. We can access to the course material free of cost. It provides certificate at the completion of the course at a cost. Some MOOCs provides certificate at free of cost. MOOCs have attracted the attention of both the media and the educational community because there are differences in teacher/student ratio. But most importantly MOOCs have entered the education system at that time when education, specifically at university level, is required to make changes to meet the demands of the society. It makes the education accessible to all at any stage of their life. MOOC is an online course aimed at mass participation and open access via the web. MOOCs provide interactive user forums for the students, professors, and Teaching Assistants. Moreover, it provides traditional course materials such as videos, readings, and assignments etc.

According to Educause (2014), a massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. MOOC integrates both the traditional and modern course materials for learning such as videos, readings, projects, assignments and many more.

The major MOOC platform providers are Coursera, edX, Canvas and FutureLearn and in addition to these platforms, there are small MOOC platforms. Each platform has its own technical infrastructure, for example; some platforms align themselves with institutions, whereas others allow more freedom to individual educators.

Websites that offer MOOCs

MOOCs provider	Websites
Coursera	https://www.coursera.org/
Iversity	https://iversity.org/
EdX	https://www.edx.org/
ALISON	http://alison.com/
CanvasNetwork	http://www.instructure.com/
Open Learning	https://www.openlearning.com/
Academic Earth	http://academicearth.org/
Future Learn	https://www.futurelearn.com/
Peer to Peer University	https://p2pu.org/en/
Saylor. Org	http://www.saylor.org/
Udemy	https://www.udemy.com/

Types of MOOCs

xMOOCs: An xMOOC transfer the knowledge didactically — i.e., it is fairly close to the traditional pedagogical model used in lecture halls. In an xMOOC, learning content is offered in small units which are easy to understand usually 12–20 minutes duration. The medium to transfer the content is video instead of text. Other means are online tests, exercises and games. Under this short videos and exercises go side by side. Moreover, forums and wiki pages are used to give social learning experience to participants.

cMOOCs: A cMOOC is a connectivist course. This highlights the interactive nature of the learning experience. Under this, knowledge is partly self-generated and the coherence of the course constructed by the participants. In a connectivist MOOC, the discussions and interactions between all participants are important rather than content and activities. cMOOCs provide opportunities for disrupting traditional forms of teaching and provides learner-centred pedagogy so that students can learn from each other (Dron & Anderson, 2014).

Role of MOOCs in higher education

The MOOC movement plays a fundamental role in transforming the quality of higher education. MOOC courses are designed for large numbers of users. These courses can be accessed online without entry requirements and limit on attendance. It provides complete course experience for free of cost (OpenupEd 2015). The impact of MOOC is dubious due to long history of revolutionary potential in Open Distance Learning as expressed by the "hope, hype and disappointment" (Gouseti, 2010). As more and more initiatives are taken by millions of people to participate in MOOCs through a small but growing diversity of courses; and they attract a lot of people from various educational institutions, politicians, policy-makers and media houses. The main point is stakeholders have quite different reasons for encouraging MOOCs and therefore the opening up of education agenda must be seen alongside powerful forces that view online learning as a means of intellectual development, enhancement in self-esteem, increasing competition between institutions, introducing new business models with reduced public funding for universities, and the creation of a global higher education digital marketplace (Brown et al., 2015).

However, MOOCs have potential to meet the growing demand for higher education, mainly in developing countries where it is not possible for traditional institutions to cope up with the large number of potential students. Daniel (2012) advocated that the MOOC movement is really a game changer, as it has potential for life-long learning, address main gaps in skill development, and eventually enhance the quality of life for millions of people. In India, there is some hope that the MOOCs may be able to close the inequality gap of literacy and reduce the unemployment of youth. The national institutes of India like IIMs and IITs also have started MOOCs. The Government of India has also decided to start 350 online courses through SWAYAM (Budget 2017-18). There is a need to create a firm systematic structure for the validation and recognition of

the courses from online sources as Coursera, Edx and SWAYAM, UGC, and other educational authorities which seeks cooperation between these institutions.

Conclusion

The use of disruptive technologies has implications for higher education; students can access learning material by means other than through their university. Moreover, free access to learning materials made available through disruptive technologies poses a great threat to the high-fees offering universities. Now the big challenge for the universities is to understand and manage the disruptive technologies not only to safeguard academic standards but also to make disruptive use of ICTs to enhance learning.

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