Article

# Advancement in Massive Open Online Courses (MOOCs) to Revolutionize Disruptive Technology in Education: A Case of Pakistan

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## Abstract

*Massive Open Online Courses (MOOCs) is a relatively recent advancement in the distance learning and online education. With the strategic collaboration of the founders of MOOC (MIT and Harvard University), many universities and institutions across the world offer a variety of courses in numerous domains. MOOCs have disrupted the global education sector by providing free to subsidized inclusive education. These include state-of-the-art pedagogies, assessment tools and interactive cum engaging learning sessions. This article aims to discover the opportunities and inclinations of adult students in Pakistan toward MOOC, especially their awareness, perceptions, peer and mentor advice and self-motivation and commitment to do such courses. The study deployed in-depth interviews under phenomenology approach using Delphi method for this study. Twenty-four students from management sciences department of a leading university in Karachi were selected: 12 who had done courses through MOOC and 12 who had never done any course on MOOC. Ten experts on distance education and online education were selected through snowball sampling method for the study. The findings uncovered that the inclination of the students towards MOOC is at its inception stage.*

**Keywords:** disruptive technology, inclusive education, massive open online courses (MOOC), online education

## Introduction

Online education as a modern form of distance education has become a popular term in the field of education especially over the last decade. These extensions of former education system were added by universities to facilitate their part-time students. The lectures are recorded and later made available to the students as and when needed. Its purpose is also to facilitate the faculty members

in keeping a record of the knowledge delivered. Over the last decade, online education has evolved in several forms, all with the objective to make the student-teacher interaction more convenient and flexible. It also promises delivering quality education as does any physical setting of a classroom. Researchers worldwide have cross compared merits and demerits of physical, distance and online education systems.

One of the newly emerged forms of online education platform is MOOC (Massive Open Online Courses), which emerged as a consequence of strategic collaboration between Harvard and MIT (Ho, Reich, Nesterko, Seaton, Mullaney, Waldo & Chuang, 2014) and later on, many other universities across the world joined hands. Coursera, edX, Udacity, and Udemy are the most popular MOOC platforms. Coursera and Udacity are for-profit companies, while edX and Udemy are non-profit organizations (Yuan & Powell, 2013).

The problem in nexus with this probe is that a big chunk of the Pakistani student population is deprived of quality higher education, due to the unaffordable fee structure of private sector institutions. Moreover, female population of the sub urban areas due to cultural myths and family restrictions, is not allowed to pursue higher education (Qureshi, 2016). Many immigrants and expatriates who travel abroad in search of job opportunities lag behind in terms of quality education of international standards. That gap can be fulfilled if a candidate has some job-specific certification courses from a well-reputed international university. These unserved or struggling masses can avail the opportunity from MOOC to study online at affordable rates and at the same time get the privilege to be certified from a reputable institute(s). Hence, this probe is undertaken to learn about local developments in an under-researched area, which corroborates a research gap for MOOCs. Moreover, there is a dearth of scholarly work in the indigenous domestic context of Pakistan regarding MOOCs. Initially, few authors such as Iqbal, Naeem and Nayyar (2016) and Qureshi (2016) explored this innovation in Pakistan.

The purpose of this research was to find out various dynamics, opportunities, learners' experiences and inclinations of adult students in Pakistan (inclusive of professional executives) toward MOOC, especially their awareness, perceptions, peer advice, self-motivation and commitment to do such courses. Further, it aims to inquire about the features of traditional on-site education, distance learning, online

learning and MOOC; and to discover the ways to avail MOOC opportunity for revolutionizing the education system in Pakistan, since it can help them in learning and making a better career and future. Moreover, the students, faculty, as well as other working professionals can take substantial benefit out of it by regularly upgrading their skill set in a swiftly changing world that requires new skills time after time.

## Literature Review

Distance education dates back to the use of mail/postal services used to deliver study material to the students and for submission of assignments by the students (Annabi & Muller, 2015). Developments in distance education have evolved with the emergence of each new communication technology. Many higher education providers have adopted the recent development of the mobile Internet. In the late 90s, recording devices were used to record lectures delivered in the class and the same were added to the institute's digital library that collected records of lectures conducted under its own jurisdiction. Students could access the lectures as and when required. Sometimes, with the help of the state, the lectures were telecasted on education-related TV channels. With the development of online media and video conferencing tools, the concept of online education emerged and virtual universities were established. Lectures were conducted in the physical classroom setting with students in the class; however, distant candidates could be an active part of the lecture using video conferencing packages. This innovation opened room for cost effective education for both the education provider and the learner, as the administrative costs were reduced or economized. It also provided access to learners in far flung areas where physical delivery of education was otherwise not feasible. In the evolution of online education, Khan Academy takes the lead. It started free tuition class rooms to teach school and college students. The lectures were recorded and shared on YouTube. Now it serves millions of students worldwide. Many universities avail hybrid approaches by offering physical or onsite education and online education (Noer, 2012; Thompson, 2011).

Some researchers conducted studies based on meta-analysis for evaluating the effectiveness of online learning courses (Jaggars & Bailey, 2010). Their views and of those of the proponents of online education were contemplated. A strong demerit shared by the proponents is that the drop out or failure rates may increase in the case of online courses. This is possible because students who are

not regular at studies or do not take their assignments seriously take them lightly, as the student-teacher physical interaction element is missing. Advocates of online education posit that it is more beneficial for the students as it provides access to education, flexible timing option, offers courses at subsidized rates (Bali, 2014; Jaggars & Bailey, 2010; Martin, 2012; Wellen, 2013) and many students appear satisfied with MOOC (Davis, Dickens, Leon, Vera, Mar, & White, 2014). It is found very effective even for undergraduate students (Dominguez-Flores & Wang, 2011). The learning outcomes for students of fully online and hybrid courses have been equal to or better than the traditional face-to-face instructional courses (Means, Toyama, Murphy, Bakia, & Jones, 2009). Success in online courses requires high levels of motivation, self-efficacy, persistence, communication skills and computer literacy at the students' end (Croxton, 2014). Therefore, the common beneficiaries are assumed to be those who are traditionally underserved or marginalized, such as low-income, rural, first-generation, or academically under-prepared students. These students may struggle with a variety of challenges that limit their ability to attend classes on campus, such as dearth of income, child care and other family responsibilities, full-time employment, ever-escalating transportation costs to reach at campus, or a time-consuming commute. Hence, it appears a major step towards inclusive education and innovative education for mitigating the education divide among privileged and underprivileged classes in the world (edX, 2019). It seems reasonable to assume that the convenience and flexibility of fully online learning will particularly benefit such socio-economic class of citizens. In nexus with pedagogical foundation of MOOC, the principle feature of MOOCs is that they take place online. The students interact with peers and instructors via social media and peers do each other's assessments too. The short video clips or recorded lectures can be viewed at any time, rewinded, forwarded and paused. Video conferencing is one of the important features of MOOC.

The prevailing argument is that online courses are at least as effective as face-to-face courses. Online learning offers flexibility of access to course materials from anywhere at any time (Kurzman, 2013; Means, Toyama, Murphy, Bakia, & Jones, 2009), which is not possible in face-to-face learning. It becomes difficult when the class strength exceeds a limit in terms of available physical room capacity or overly crowded situation. Some researchers determined that achievement in distance education for high level school students is comparable to traditional physical instructions-based education and concluded that educators should not

anticipate any significant differences in performance as a result of online learning (Glance, Forsey, & Riley, 2013). These finding were supported by comparative studies that also found no difference in academic achievement. It was found that online learning pedagogy may even be superior in the overall effect on student performance (Baglione, 2013).

Some researchers presented an analysis on the working model and teaching methodology of various courses offered by MOOC (Margaryan, Bianco, & Littlejohn, 2015). The key feature of MOOC that distinguishes it from other online education platform is that it follows the principle of connectivism and connective knowledge. The instructional elements of MOOC set the broad objectives that such courses should remain problem centered, practical, interactive and applied to work environment. Connectivity is an approach to learning whereby learning is perceived to take place through making connections to knowledge resources and people in the network. The earlier constructivist MOOC where only the instructor derived courses were taught was called the c-MOOC. When it allowed openness and creativity (open for students to do courses and comment by reviewing the creative course contents), it was renamed as x-MOOC (Rodriguez, 2013).

Since the year 2012, a number of global universities have been offering MOOC and it has created an academic discourse. Some experts have declared MOOC as a disruptive technology and serious threat to the institutions of higher education (Alraimi, Zo, & Ciganek, 2015; Boyd & Kasraie, 2013), since it optimizes the tools of machine learning, artificial intelligence (AI) and big data. It is also entertained as 'the flipped classroom' and serious to traditional education. The inherent features of MOOCs which distinguishes it from other online education platforms are its openness and reputation. Openness here refers to open for all to do a course and at times no accreditation is obtained, whereas reputation refers to the perceived image for an institution of higher education that attracts the students toward it (Abeysekera & Dawson, 2015). Some experts expressed the term MOOC as The Educational Buzzword of 2012, and conducted a systematic study on MOOC to analyze its literature from 2008-2012 and found it very effective (Liyanagunawardena, Adams, & Williams, 2013). The researchers opine that it is getting popular even in developed countries as well (Liyanagunawardena, Williams, & Adams, 2013).

Indeed, online education and particularly MOOCs tend to be a disruptive

strategy, which presents a dramatic cum paradigm shift in traditional education industry. The institutes and universities worldwide commenced offering various courses in almost every domain, with non-credit to credit hours courses (which appear acceptable to several universities, for instance on edX network), x-series concentration courses, online executive education, preview courses and one-year micro-master's degree programs to online master's degree programs. They also resumed forming country or region-specific students' group to facilitate their interaction. Many of these courses include introductory videos about global students sharing their prior experiences with a specific course or expectations, internal goals, determination, satisfaction and benefits derived by completing such courses. Surprisingly, the marginal cost (of admitting more students in a course after reaching break-even point) turns zero because of economies of scale advantage (Coursera, 2019; edX, 2019; Harvard Business School, 2019; Harvard University, 2019; Microsoft, 2019; Stanford University, 2019). MIT OpenCourseWare [OCW] is a unique repository of teaching materials, notes and resources freely available online for global faculty or learners (MIT OpenCourseWare, 2019). Thus, students around the globe have numerous choices to get better education from world class institutions and universities for free to subsidized rates, whereas they can opt for verifiable certificates too upon payment of some fee.

## Methodology

This research design applies the post-positivism research philosophy and inductive approach, which falls under qualitative investigation to explore the phenomenon of massive open online courses (MOOC) in Pakistan. Qualitative inquiry is undertaken when there is dearth of research in a domain or for discovering new insights (Bashir, Syed, & Qureshi, 2017; Saunders, 2011). It is a multi-stage, multi-technique enquiry to review the extant literature and acquire primary data from multiple sources. Purposive sampling design is availed for this study, which appears the most suitable non-probability sampling procedure for qualitative researches. Moreover, it also applies snowball sampling method to obtain data from field experts. This inquiry instrument consists of in-depth interviews to learn about MOOC from university students (many of them do job as well), who have never done such a course. Twelve students from management sciences department of a leading university in Karachi were selected randomly from a class for in-depth interviews by ensuring that they have never done a course on MOOC. Another twelve students from the same department and university were selected through

judgmental/purposive sampling method by ensuring that they have done one or more courses on MOOC. Finally, ten experts on distance education and online education were selected through snowball sampling method (Zikmund, Babin, Carr, & Griffin, 2012). This probe applies phenomenological approach by including students that did some courses in MOOC (including professional executives) to learn about their lived experiences and field experts using the Delphi technique (Okoli & Pawlowski, 2004).

For data analysis, the researchers explored categories and common themes about issues and practices and made constant comparison of data in text form. Triangulation method is applied to find any deviations in secondary data (theories, models, and notions) and the results derived through primary data from in-depth interviews under phenomenology method and Delphi technique. Triangulation also assisted in escalating the authenticity, credibility and trustworthiness of qualitative investigations (Langdridge, 2008; Okoli & Pawlowski, 2004).

## Data Analysis

The interview data were transcribed and core perceptions were extracted. The data sets obtained from various participants were constantly compared with each other. Later on, core categories and themes were identified and presented in the form of a conceptual framework.

## Findings from University Students Having No Experience with MOOC

The university students from the management sciences department of a leading institute were interviewed in-depth to extract real information as participants perceived. The data indicated that the majority of the participants' awareness about such programs was at minimum level. They had no clear perceptions of the possible benefits derived from the course like knowledge gain, skills and expertise gain, professional development, opportunities for learning and research, employability and usefulness of these skills at job, possible advantage of certificates in job and career development. Many of them were unaware of the fact that such courses were somewhat free and they could receive a verifiable certificate upon the completion of the course against the payment of a certain fee. They do believe that those interested in MOOC need to build self-motivation and self-commitment.

**Findings from University Students having Experience with MOOC**

The university students (including corporate and professional executives) who did courses in MOOC during recent years were ascertained about their pertinent experiences. They were prompted to share their experiences and personal stories about MOOC. They had basic awareness and positive perceptions of MOOC and disclosed that it was an amazing experience of doing a course via MOOC. At the outset of a course, they faced difficulties in downloading the lectures, case studies, articles, related stuff, short videos, submitting assignments and research projects and giving exams, but gradually they felt comfortable and the overall process turned convenient and user-friendly for them. The students who had done courses from MIT via edX shared that the transcripts of the short videos were also available. If a video is un-downloaded due to slow internet speed, they could view its transcript. They enjoyed exceptional learning which was very engaging, interactive and of high quality. The participants opined that those interested in MOOC need to build self-motivation, personal values, individual goals, determination, persistence, satisfaction and commitment. The students who were on-job stated that sometimes their companies also asked them to do courses related to their work via MOOC, which can help them in improving their job performance.

The participants identified that the missing factors in MOOC were that in physical classroom teaching environment, many instructors know their students in person and are encouraged and praised by the faculty, which motivate them to strive for excellence. Few students expressed:

> *"We develop personal and professional relations with our instructors, who know us in person, praise us, and identify our strengths as well as weaknesses or areas of improvements. It is the feature that is absent in MOOC."*

Secondly, as class attendance is mandatory, there is forced presence for learning. In many cases, the sessions appear very engaging. Regarding their suggestions to improve MOOC, they posited that the instructors and their aides should emphasize on providing feedback or word of appreciation to individual learners and pay attention to their weak areas. Moreover, a strong advice via word-of-mouth communication (i.e. viral marketing campaign) from reliable friends and family members cum teachers could push potential learners to consider MOOC as

a source of learning. MOOC is a blessing and splendid opportunity for the non-affording or less affording learners. At a certain age, people do not have time to do degrees and courses and they are overwhelmed as working professionals. In such situation, MOOC can be very helpful for them in building knowledge and career advancement.

One open University, being the pioneer varsity in Pakistan in the distance learning and has branches all across Pakistan to facilitate students with basic insights on their degree programs and educational system. One million students are enrolled in its various programs containing degree, diploma, and specialization certificate courses in various disciplines. The programs range from 10th and 12th grade to PhD programs. The students receive lectures, notes, videos, and other stuff. They can contact the university officials on phone, courier, or email. They submit their assignments when they fall due. The examinations and other tools of assessment are standardized. Some courses have regular classes option too at select campuses. The experts posited that they remain in touch with the students enrolled in their programs and create a loop to share information. The faculty members keep a track on monitoring the performance of individual students and notify them about their progress and overall evaluation. They endeavor to motivate students to pursue their study goals. Many of them drop out in the middle of the program. If they do so, the school/institution appears helpless, but all that it can do is to enhance their internal motivation and self-commitment to fulfill their study-related goals. The institution assists them in devising strategies for their continuous learning and development. People living in far flung territories of the country are unable to attend big universities and afford their fees cum boarding and lodging costs. Distance learning and online education are the cost effective and quality alternates to help them pursue higher education and advance their careers. These programs are also suitable for working professionals in public, private, and non-profit sectors. The courses are tailor-made and updated periodically to provide modern learning with contemporary pedagogies. Regarding MOOC, they opined that it has its own merits and demerits but the main issue is that its drop out ratio is very high. It does not offer the degree programs. The courses are usually non-credit. As the students are submitting assignments and solving exams online, so always there remains some doubt that they can involve some of their colleagues for cheating by the means of seeking their assistance.

Another university being the second biggest varsity in Pakistan in the distance learning inaugurated and pioneered online education. It also has branches all across Pakistan. One hundred thousand students are enrolled in it. Their lectures, notes, videos, and other stuff are available online and anyone can freely access that data. They charge fee against a certificate course, diploma, or degree program (ranging from undergraduate to postgraduate level) in various disciplines. Its experts claim that their system is far modern and updated than that of the market leader. Regarding MOOC, they have similar opinions (as of the market leader). There is no physical interaction and engagement is weak. At the outset, the universities offering MOOC announced free courses but later on after few years, now many of them charge a mandatory fee to register and pass to earn a certificate. Hence, the purpose of MOOC is undermined.

In comparison with the two large-scale distance and online education promoting giant universities discussed earlier, some other universities in Pakistan primarily focusing on on-site teaching also have programs of distance education. But, they have relatively small number of enrollments in their programs, and they also face the similar problems. In the matrix of Pakistan, the conventional class room-based teaching and learning are more successful than distance and online education. But the bottom line is that such models in education are the need of the era and there can be a time in future, where these platforms including MOOC may dominate the world of education, since with the advent of the Internet and globalization, planet earth is taking rapid strides in development.

The Figure 1 exhibited beneath comprises of some essential variables about MOOC, which are extracted from this qualitative enquiry. The three groups of participants identified various themes regarding MOOC, out of which some essential variables have been emerged. They comprise: awareness creation (about MOOC), developing positive perception (about its benefits), promoting peer and mentor advice (from their colleagues and teachers), and students' self-motivation and commitment (about doing such courses), and MOOC.

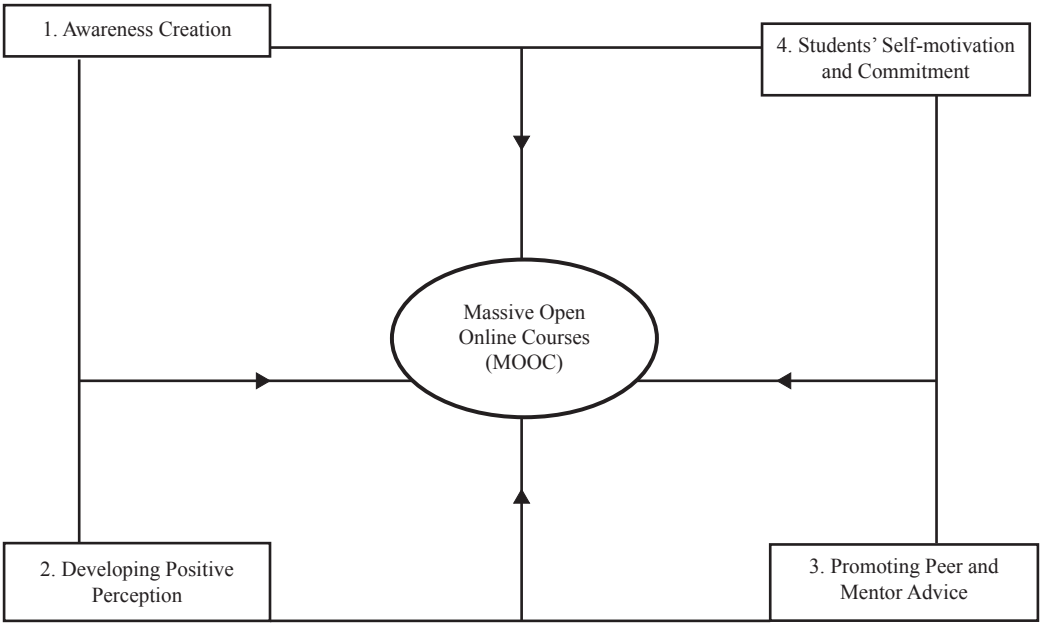


*Figure 1*. Framework of Variables to Nourish MOOC in Pakistan

## Discussion

The research problem of this probe aimed to find out various dynamics, opportunities, learners' experiences and inclination of adult students toward MOOC. By comparing the results of the data obtained from three distinct groups, it is learnt that the students who never did a course on MOOC were not familiar about it, in contrast to those who did such course(s) built its positive image cum motivation and were willing to do more such courses in future. Similar results were derived in different contexts by several authors including Abeysekera and Dawson (2015); Croxton (2014); Davis et al. (2014); Jaggars and Bailey (2010); Qureshi (2016). The academicians from distance and online education described about their models and discouraged MOOC by highlighting its high dropout ratio. Hence, there appears a dire need to develop its positive perception by highlighting its features and benefits. This can be best done by nurturing it via peer and mentor advice and the so-called viral marketing. To avoid or subside dropout ratio, it requires mentorship and encouragement mechanism, which can lead to students' self-motivation and commitment. The bottom line is that MOOC can help in revolutionizing the education

system in under-developed to developing countries including Pakistan, whereby students of all ages, sexes, ethnicities, casts, income groups and social classes can benefit. Women living in remote areas, professionals, corporate executives (from all sectors) can also have access to standardized international education, which will provide them an edge in jobs and career development domestically and abroad. Somehow, the results of this inquiry match with those of similar studies conducted from developing countries (Liyanagunawardena, Adams, & Williams, 2013; Liyanagunawardena, Williams, & Adams 2013).

## Conclusion and Recommendations

In line with the research problem, which intended to uncover various dynamics, potential opportunities, learner experiences and inclination of adult students for MOOC, it is concluded that the advantages of MOOC are marvelous and countless. When MOOC is compared with traditional on-site education, distance learning and online learning, it has substantial edges. It is the most modern form of education. It offers quality education and is either free or subsidized; hence, it squeezes the education divide among the rich and poor or under-privileged and is open for all. Thousands of students around the world are enrolled in its individual courses. They are getting state-of-the-art education from world class institutions and universities with the best pedagogies and from the team of specialists (in academics, research and industry). Above all, the class timing is flexible and interactive simultaneously. In some cases, even credits are transferable; however, on-site education has the edge of relatively decreased drop out ratio. Distance and online education have the edge of a variety of courses and program offerings inclusive of certificate courses to diplomas and degree programs. Online learning is the modern form of distance learning, whereas the e-learning tools are now applied in on-site education too.

The key proposals for the policy makers and proponents of MOOC operators and the authorities in education system of Pakistan include: the pedagogy of MOOC should be regularly updated and modernized. To enhance interactive learning on specific days of a week during the program, there should be options of student-instructor and student-to-student interaction on webcam. To assure personalized teaching, the instructors and their aides should regularly track the performance of the students, pay attention to individual learner's strengths and weaknesses, appreciate the good performers and encourage the under-performers.

In addition to the free courses, in case of fee for getting a verifiable certificate, the fee needs to be limited within the range of $25-100, otherwise the purpose of MOOC will be dead and as its name implies 'Open Courses' will be the wrong title. They can do such initiatives by offering scholarships to some deserving students, who fulfill some need cum merit based criteria.

To foster the awareness and positive perceptions of the students, peer and mentor advice is a must. To help the registered students complete their courses via MOOC and to inhibit or reduce their dropout ratio, the instructors and their team need to emphasize on their self-motivation and commitment to themselves.

By the time students are attempting to solve their exams, there can be a mandatory requirement for turning on webcam, so that at any time any course team member can check him/her (by applying random sampling technique) to ensure that he/she is not seeking any assistance of a pal to solve the questions. This is a possible preventive measure to discourage cheating. In addition, plagiarism needs to be checked for all the assignments submitted by the learners.

In the developing and under-developed countries like Pakistan, the Higher Education Commission (HEC) Pakistan should publicly recognize MOOC in terms of the features of providing free, modern and standardized education to the world to eradicate the education divide. HEC must appreciate its role in knowledge gain, cultural integration of the global online community and the benefits of these courses in skills and expertise development, which provide an edge in the job market. In addition, employers of several large-scale companies need to be convinced to appreciate candidates with such international certifications and qualifications.

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