A CONCEPTUAL FRAMEWORK TO INVESTIGATE LIBYAN STUDENTS READINESS TO LEARN CHEMISTRY SUBJECTS USING MASSIVE OPEN ONLINE COURSE (MOOC)

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Abstract

Massive Open Online Course (MOOC) is latest trend in the field of education and its popularity is growing among educators and students. Many referred to the popularity of MOOC to its ability to provide access to quality education and the creation of connected communities of practices that promotes collaborating of teaching practices via tweeting blogging and updating status. Chemistry subject is considered as one of the essential pillar of knowledge science yet, learning it has become a major challenge to many students. The aim of this paper is to discuss the advantages and challenges of MOCC and proposes a conceptual framework that could pave the way for its investigation and adoption and usages among Libyan Chemistry students.

Keywords: Massive Open Online Course, Chemistry, Connectivist Learning Theory, Conceptual framework.
1.0. Introduction

Massive Open Online Course (MOOC) is the latest trends in educational institutions in Malaysia. It is best described by McAuley (2010) as “an integrated social networking connectivity, an acknowledged expert facilitating in a field of study and a collected works of accessible online Resources that are free”. MOOCs is also viewed by some as a term referring to Open and Online Education scalability. Some see it as an instrument with political undertone and therefore should be broadly defined.

Chemistry subject is considered as one of the essential pillars of the science knowledge. However, learning a chemistry subject is challenging for a wide segment of students. This has driven educational institutions and authorities to revise its relevant and related issues. Smith (2013) finds that students achieve high performance for chemistry subject, when they spent more time learning the chemistry subjects outside the classrooms. Outside classes turn to form an interactive environment for students rather than inside classrooms. Massive Open Online Course (MOOC) is considered as an additional step into the new era of knowledge, which works to break the constraints of limited scope of course knowledge. School students are obliged to follow their teachers and books content, this sometimes forms a limitation of knowledge. Educational institutes, including primary and secondary schools need to keep improving upon their strength to enable their various constituents to keep maintaining positive perceptions, and websites provides good opportunities for them to do this (Caglar & Mentes, 2012). The importance of MOOC has received more attention during the last eight years, which is the age of MOOC concept. Researchers have shown that MOOC can contribute to student learning and improve their academic results in all areas (Chauhan, 2015; Zou, 2016; Follis, 2015).

This study explores the potential for Libyan students to learn Chemistry subjects through MOOC platforms. By learning chemistry through MOOC platforms, the students could be located from any destination around the world and the only thing they need is an access to internet (Levy & Schrire, 2015). By doing so, Libyan students and other student can reduce the costs of studying in foreign country and spend time anywhere they would like to while studying the course (Ruth, 2012).

2.0 Literature Review

MOOC Background

MOOC was a term introduced to allude to a course created by Stephen Downes and George Siemens. It was also called Connectivism and Connectivity Knowledge. (Siemens & Downes 2008). The first MOOC began in year 2008 was initiated by them with the title of the course: Connectivism and Connective Knowledge (Cheah, 2016). Their expectation was to explore the likelihood for cooperation between wide groups of members made possible through Internet and other online devices to give wealthier learning condition than the traditional approach could permit. University of Manitoba had 25 student who attended the course whilst another 2300 from around the world took part via the web. MOOC with an accentuation on cooperation and network are presently called cMOOCS.
Through MOOC, Stanford offered three courses for free in the fall of 2011. Introduction to Artificial Intelligence taught to over 160,000 registered students all over the world by Dwindle Norvig and Sebastien Thrun. More than 20,000 of the students successfully finished the course. (Johnson & Becker, 2014)

**Benefits of MOOC**

Institutions in Europe approach new students by offering MOOCs and implementing dynamic learning opportunities (Jansen & Schuwer, 2015). Moreover, the free publicity accorded to MOOCs by the media, could enable the institutions to target widen the market for students and obtain marketing gains (Jenner & Strawbridge, 2015). For many institutions MOOC could be seen as a chance to innovate a new platforms (Jenner & Strawbridge, 2015) and offer courses from different discipline (Prades et al., 2015). MOOC compels institutes to form international and local partnerships (Jenner and Strawbridge, 2015). Therefore, the quality of courses offered by relevant institutes will be strengthen (Pscheida et al., 2015).

A way to create meaning driven from learning analytics in many facets for institutes are offered by MOOC (Yousef et al., 2015a). MOOC is gaining broader support because of its ability to provide access to quality education to all (Andone et al., 2015). Connected group of people of practice oriented which promotes the distributing of best teaching practices through tweets, blogs and update of status by the instructing staff generated by MOOC (Kilgore et al., 2015).

According to Roland et al., (2015), when on campus students take up MOOC as an innovative and interactive way of being taught they gained its benefits. Docq and Ella, (2015) also noted that experimentation with pedagogy by practioners like combining it with courses taught on campus which could result in sharing discussions and opinions from round the world. Flipped classrooms makes students who are not on campus to have a feeling and pride of being part of top universities (Roland et al, 2015). ICT enables interactions in an always-connected society. With the growth smartphones and tablets popularity to access online digital resources, it is clear to see that we can see that ICT can help MOOC usage. For example 15% of Oxford’s iTunes U downloads were from smartphones, iPads, or iPods (University of Oxford, 2013).

**Challenges of MOOC**

Various factors like theories of pedagogy, relevance of active learning, methods of teaching, and the increase demand for in person learning in this digital era are what is made modern education. High dropout rate and pressure to reduce cost by education providers are two of the most pressing challenges. To ensure access to knowledge and information, MOOCs depend greatly on using state of the art technologies. Thus the need for MOCC providers to be very skilled in using ICT and digital instructions are very important. This lead to outsourcing to academicians who are external yet increasing administration personnel, thus, cost turn to increase (Houston, 2013).

Chea (2016) cautioned that uttermost attention has to be made when designing MOOC curriculum so as to meet courses learning outcome and as it also entails using video instructions to have the learners engaged and enthusiastic. Sensitivity has to be given to the content of the video audio and culture. Learners may face difficulties in following the
video lecture and facilitators happened to use accents that are different from learners own and there are no subtitles (Chiam & Abu Kassim, 2015). Videos quality and downloading speed of video players, changing and providing the important transcripts for making useful videos to students are other major issues of MOCC (Mihaescu et al., 2016).

Chea (2016) also found MOOCs to be conducted in English, this unintentionally eliminates those who cannot speak English from studying through that platform. Ho et al., (2015) and Koller et.al., (2013) found empirical evidence of higher student dropout rate among providers of MOOC. According to Colman (2013), peer to peer feedback is not popular in MOOC education and there is evidence that link it to students drop out. Morris et. al., (2015) reported that MOCC students turn to be fully working adults. Hence, it make sense to presume that learners high drop rate, is also Therefore, it is logical to assume that a high drop-out rate from learners in MOOCs is to some extent contributed by their time constraints and tight work schedule.

**MOOC Theories**

Mostly the discussions on MOOCs distinguishes between two formats under two well-defined pedagogical underpinnings; xMOOCs and cMOOCs. The cMOOCs refer to the foundation of connectivism, that emphasizes consolidation with the assigned community of matches, understanding systems, and understanding relics. Students are encouraged to utilize technology, information systems and various media to reach their individual goals, self-control their participation and knowledge are created and shared by making use of their networks.

The xMOOCs underline personal understanding via standard and lectures assessments. As renown universities usually proposes xMOOCs, they are primarily linked to the cognitive-behaviorist approach (Conole, 2013).

There continues to be a rapid rise in excitement for huge Open Online Programs (MOOCs); a variety of on-line education since 2012. A nonappearance of proper passageway pre-requisites describes MOOCs, co-operation, content that was free expressed entirely on-line for supporting a lot of students, as well as a strategy went.

MOOCs investigation provided by 66 institutions in America recognized six goals that were common: These goals were; (i) creating range of corporation and accessibility to education; (ii) building and looking after business name; (iii) improving fiscal features (iv) improving MOOC members instructional results (v) progress in training and understanding and (vi) top assessment on learning and training.

The expression of these six goals of MOOCs motives are for various reasons. Since most MOOC members were at that that time were deeply educated, and fruition charges were also reduced there is this argument that MOOCs were missing the mark regarding "democratizing" education. Not one of the 66 businesses matched without a doubt only 5% of foundations advocated this was a sensible goal, and had created wage from MOOCs. It was similarly clear that problem was obstructing progress in using MOOCs to improve studying and instructing in using the phase info and lack of clearness with regard to the members as well as their advice to managements substance. The report also remarked that MOOCs are not currently contributing fundamentally to the development of adaptable and
personalized learning. As an example, the consequence of MOOCs on school brand was impractical to study due to an absence of measures qualified around there. Moreover, in mild of the truth that the true effect on instructional consequences and growth wasn't being noted in just about any comprehensive design, as a rule it absolutely was indistinct whether these goals were achieved (Jordan, 2015).

The Theory of Connectivist Learning

Siemens (2005), defined connectivism learning as the process of linking sources of information or specialized nodes. Learning is an operation that occurs within indefinite feelings of transferring center elements, which are not wholly beneath the observation of a person.

The introduction of the theory of connectivism by Siemens and aimed to mean a combination of principles accessed by self-organization theories that are complex. Because of this, the initial MOOCs were known as cMOOCs to match the main aim of principles of connectivist educational that emphasis on connecting and networking others by sharing differing opinions around the globe digital platforms like social media, wikis and blogs wikis to link with communities of learners and content to develop knowledge. The assumption is that learner will learn more within a course if he/she is more engaged in the course.

Learning is concentrated on linking advice groups that are specific, as well as the links that enable us to understand more are vital than our present degree of knowledge. The comprehension manages connectivism that resolutions are about the idea of rapidly changing essentials. New info is often started bought.

The Proposed Conceptual Framework

Based on studies like Bozkurt (2016) and others, that examined the readiness of individuals for the MOOC. The four dimensions of readiness assigned to be tested are as follow:

![Conceptual framework](image_url)

**Figure 1: Conceptual framework**
Explanations of Variables within the Framework

Internet discussion
According to Drake et al., (2015) may have high bandwidth Internet connections, many still work with low bandwidth connections. Students may prefer various methods of presenting content or suffer from a variety of disabilities. It is impossible to address all the variations, nor is it recommended, but placing an emphasis on Internet accessibility is necessary for satisfying truly massive numbers of students.

The professionals have examined distinct stages of participation in on-line and also distance learning classes, integrating the characteristics of on-line students (Noel Levitz, 2011). Several studies use unsystematic instances that are tracked to assess the impacts of numerous approaches to learning that is online. The adaptability of discoveries from on-line and also distance learning classes to MOOCs is obscure, supplied the several distinctions in goals and class framework. In contradistinction to conventional on-line MOOCs and distance learning classes are not planned to participate substantial amounts of students or most probably to students transferring in and from a class many times. Findings could be required from creating study on MOOCs. Initially, although participating in a large number of registrants, MOOCs are categorized by achievement standings that are really low. Determinations of achievement and disagreement may vary, on the mixture of both the divisor as well as the counter.

Numerous reports indicate that achievement standings generally vary between 1-2% to 5% of registrants (Ho et al., 2014). In 2012 and 2013 the evaluation of 17 MOOCs proposed by Harvard and Massachusetts Institute of Technology, that 5% of more than 840,000 of registered learners with constant Internet access, successfully completed their courses and received their certificates of achievement (Ho et al. 2014).

Technology Access
According to Tharindu et al., (2015), the rapid and unexpected flow of change at the moment, has tremendously led to the creation of technologies, impacted globalization and has made critical knowledge economical and easy to access this in turn has led to the growth of competition among industries all over the world. Knowledge has turn to be an important commodity in this range, particularly inside the international labor market, the economic advantage that is “will originate in the states in which adequacy is gained by the public in training it in function and managing information into information. The predetermined place of work in today's world of work wants new ways of operating, depending on a significant degree on high-skills and specialist knowledge (Brown et al., 2001).

Technology skills
Hoy (2014) shows that MOOCs can an agreeable and temperate approach of endless medicinal instruction, specifically gave the diminishing business financing to proficient preparing. MOOCs can a best strategy to every now and again update one’s skill set. For example, a product architect may have try in using some programming dialect yet for the coming task picking up capacities to program in a different dialect might be required. For this situation, a MOOC could be gainful technique to quickly take in the new programming dialect. Additionally a helpful authority may longing to work with a couple of imaging
information for which he or she could utilize a MOOC like Factual Investigation of fMRI Information proposed by Johns Hopkins College on Coursera to get the required new limits. Of course, due to MOOCs are free for the people and have no fines for non-satisfaction, they ensure anyone possessed with carrying a course with a demonstrating ground.

Despite the fact that use of MOOCs could facilitate the progress of such versatility in grown-up major skills learners, depends on how one implement MOOC. Estimated depicted, MOOCs could intertwine any information sharing and learning structure.

**Motivation**

Poelmans at al., (2016) and several other researchers found motivation to be very important in MOOC success. Motivation is a critical key that empowers and keeps up learning conduct (Gagné, 1985). At present, the reservation scope of MOOCs is extensively low. It is accounted for that the medium Monstrous Open Online Courses achievement range is beneath 7%. Breslow et al. (2013) said that 154,763 learners selected for their 6.002x Circuits and Gadgets course, yet just around 5% of them achieved the course and picked up a declaration. It is critical to grasp learners' inspiration degree in e-getting the hang of setting. Thusly, instructors can then practice the required measurements to create understudy contribution and learning. All things considered, there is an inadequacy of experiential review on surveying understudies' inspiration degree in MOOC settings.

**The Use of MOOC in Chemistry**

Chemistry has been and will remain important to everything encompassing us. Be that as it may, chemistry is significantly more essential in our advanced innovative age where we venture on brakes with clay composite brake cushions, look through lightweight glasses with polycarbonate focal points, play tennis with carbon-fiber racquets, and assembling organic protein-based drugs. We are notwithstanding beginning to make lab-developed meat. This focuses on the foundational idea of chemistry, which covers the physical building squares of "stuff", regardless of whether it is inorganic or natural.

MOOCs are a recent and widely researched development in distance education, which was first, introduced in 2006 and emerged as a popular mode of learning in 2012. This is how MOOC is very useful and helpful for students to learn more and more Chemistry.

**Conclusion**

Instructor leverage, student mastery, student throughput, student engagement, the opportunity offers to students to learn important disciplines, facilitating coaching of concepts and tools and serving as bridging subjects are some of the advantages chemistry students using MOOC could benefit. The variables discussed under the conceptual frameworks would enable scholars to investigate thoroughly the readiness of MOOC among students of any subject. This framework could researchers to conduct thorough investigations, and provide empirical evidence regarding the phenomenon of high drop-out rate of students learning via MOOCs.
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