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Research paper

Massive open online courses (MOOCS): systematic literature review in Malaysian higher education

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Abstract

This study provided a systematic and organized review of 32 studies regarding using of Massive Open Online Courses (MOOCs) in Malaysian higher education from 2012 to 2017. This paper conducted an analysis of studies dedicated of using (MOOCs) for learning on the basis of certain dimensions namely, journal, country, author, year of publication, research methods, type of respondents, the models, and the theories. The findings obtained revealed that the interest on the topic has shown an increasing trend over recent years that it has ultimately become a well-known topic for academic research in the future. Nevertheless, to boost and enhance the using (MOOCs) for learning, it is important that future studies apply considerable use of theoretical and methodological approaches like the qualitative methods to examine the factors it will encourage students to use (MOOCs).

Keywords: *Massive Open Online Courses (MOOCs); Higher Education; Systematic Literature Review*

1. Introduction

Massive Open Online Courses (MOOCs) represent a very unique add to the learning environment. This is highlighted by (Mazoue, 2014) who mentioned that these courses are the newest form of open educational resources advancement. (MOOCs) represent a very unique add to the learning environment. This is highlighted by (Mazoue, 2014) who mentioned that these courses are the newest form of open educational resources advancement. Massive Open Online Courses (MOOCs) have the advantage of being available for all and open to unlimited number of students. In the language of numbers, it is reported that 160,000 students from over 190 countries have joined these courses in a proof of their accessibility (Wildavsky, 2014). The success of MOOC is mainly determined by the interaction among participants facilitated by discussion forums. Andersen & Ponti (2014) highlighted this fact and added that interaction is determined by the knowledge of the learners on the first place. Others are more concerned with MOOC providers and their abilities to offer courses with various contents designed to meet the different motivations and purposes related to the learning environment. These various contents also need to take into consideration resources' levels of prior knowledge (Che, Luo, Wang, & Meinel, 2016). Massive open online courses (MOOCs) are merely online courses for the purpose of education they are characterized by being accessible and scalable in the sense that anyone can access to them. The University of Manitoba first offered them in 2008 for the purpose of connective information (Fini, 2009). Even though, the concept of MOOCs is not old, it has been used by many places worldwide including Malaysia since launched. In addition, the focus on social engagement extended to the small face-to-face groups that point towards a better influence on MOOCs in terms of completion (Li et al., 2014). The idea of having discussion forums is the secret of MOOCs success through the interaction among participants it offers. It is remarkable to mention that the prior knowledge of the learners being the starting points that constitutes a big challenge and determines the quality of the interaction (Andersen & Ponti, 2014). The two cases of using material and course procedures to solve problems and vital role social engagement plays in motivation are highlighted through the analyses of attrition and learning (Breslow et al., 2013). Recently, research on MOOCs has shifted focus from learning to highlight the different factors related to attrition (Wen et al., 2014; Yang et al., 2014). Also, little research is done in relation to social media in Malaysian institutions of tertiary education is still a gap (Al-rahmi et al., 2017a; Al-Rahmi et al., 2018a; Othman et al., 2017). Thus, this research aims to investigate use of social media from the perspective of Malaysian students. Social indication and discussion were proved not to be the biggest component of learners' experiences. However, work has concentrated on internal work of learners' experiences. The awareness of the limitation teaching resources have is the result of the much concentration on the smooth supply of efficient instructions as in Massive Open Online Courses (MOOCs).

2. Related work

One of the well-known advantages of MOOCs is that they offer the online learning to a great number of users. The problem is that there is a lack of research on the potential factors related to the behaviours as well as the choices of learners. Gillani & Eynon, (2014) examined the relation between participants' interaction in online discussion forums and the rates of completion. The issue of using MOOCs in the modern world as an online educational facilitator is still controversial and somewhat vague (Conole, 2013). The topic Motivation for learning in the online environments is receiving much interest by scholars and researchers in the field of teaching and learning. An example for that would be Shroff et al. (2008) who revealed that learners through who use internet for

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learning have a higher level of intrinsic motivation than traditional learners. This motivation is suggested by Cho & Heron (2015) to be related to their performance. (Cho & Heron, 2015; Al-Rahmi et al., 2015g) claim that the lack of this motivation among students may cause failure in the usage of cognitive and meta-cognitive strategies. Learning analytics in the field higher education is rapidly growing being the focus of many researchers (Siemens & Gasevic, 2012; Siemens, 2013). The reason behind this interest is the growth in the use of learning management systems (LMSs) within educational institutions including universities. Through the data recorded within, these systems can be used to improve the performance of learners (Tanes et al., 2011; Arnold & Pistilli, 2012). Moreover, social learning resource that opens up avenues for high education students to validate and carry out creative work, support peer alumni, and provide and acquire support from the school. In this regards, the factors examined in higher education are; faculty use (Al-Rahmi et al., 2014; Al-Rahmi et al., 2015a; Al-Rahmi et al., 2015b; Al-Rahmi et al., 2015f). Furthermore, continuous-time clickstream data produced by online learners who use online courses is another reason behind this growing interest (Othman et al., 2017).

3. Theoretical frameworks and reference theories

Readiness is a concept proved to be of a great importance educational environment and that was stated in change management theories. This is due to its successful implementation. Readiness for change on the one hand and readiness for Technology Enhanced Learning (TEL) are the two main types of Readiness. The former represented by the involvement possibility of organization members in change is described as a vital indictor to accept and support or refuse a change (Holt et al., 2007; Jones, 2005). Expectation Confirmation Theory (ECT) is derived from marketing and it is related to the investigation of the current study. It has been developed by Oliver (1980) and has been used heavily used by researchers since then in various field of knowledge such as sociology, social psychology, and public policy (Hossain & Quaddus, 2012). This theory is mainly used to detect and explore the consumer satisfaction and the intention of the future demand on this merchandise. This theory proposes that perceived performance is a key element in determining the future of this merchandise in terms of demand (Chiu, Hsu, Sun, Lin, & Sun, 2005). The theory uses the term 'Disconfirmation' in reference to the products' performance when it meets the expected level 'confirmation'. For MOOCs to be affective, certain components should be present mainly collaborative learning and communication through which students can learn and interact with others. A group of principles investigated and stated in chaos, network, and complexity and self-organization theories are combined together creating the theory of connectivism that forms that basis of MOOCs (Siemens, 2004; Al-rahmi et al., 2015e; Al-rahmi & Ziki 2017). Technology acceptance model (TAM) was utilized in this research for the enhancement of MOOC through highlighting the two concepts of intention to use and satisfaction. Results confirmed that students' learning performance can be influenced by MOOC which has the advantage of facilitating the learning process through offering materials and enabling the share of information. In terms of generating knowledge and providing a wide variety of data, MOOCs in the light of technology acceptance model (TAM) is considered vital to learning activities. There are several theories used in information systems researches but in this study, only theories concerning technology adoption are examined. These include the Technology Acceptance Model (TAM) by Davis (1989) and Davis et al. (1989), the Theory of Planned Behavior (TPB) by Ajzen (1991) and the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003).

4. Research method

The concept of information system (IS) and information technology (IT) continuance can be understood as a combination of three fields: IS/IT, service management and marketing. Accordingly, this study reviewed the literature on IS continuance in databases related to these three fields on the MOOCs use, including: ScienceDirect, Springer, Emerald Fulltext, Taylor & Francis, Wiley InterScience, and Ingenta Journals. The Google Scholar search engine was also used to ensure the coverage of publications in other databases. We went backward by reviewing the citations for the articles identified to find more articles. The following criteria were used to search these sources and select the papers:

- Journals papers, conference papers, doctoral dissertations, Master's theses, and unpublished working papers were excluded because academics and practitioners usually use journals to obtain information and disseminate new findings. Then, journals represent the highest level of research;
- Information systems and information technology search terms from the basis of using MOOCs were employed to search for the titles and abstracts of books and papers.

The present work primarily aims to present an extensive and systematic review of literature concerning IS/IT use from the MOOCs use. The present situation in the field is determined by identifying the lines of inquiry that is lacking investigative activity and this necessitates answering the following research questions;

1) What are the research issues that have been addressed in IS literature on the MOOCs use? Which journal, by whom, where and when was it published?
2) What are the theoretical frameworks/models/theories that have been employed in studies dedicated to the topic?
3) What are the research methods that have been utilized?

5. Findings

The findings of the review are provided in this section. First, the answers to the above research questions are answers. What are the research issues that have been addressed in IS/ IT literature on the MOOCs use? Since 1992, when Davis, et al. develop a Motivational Model (MM) to using technology, as well as the Technology Acceptance Model (TAM) (Davis 1989) and extended TAM (Venkatesh and Davis 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003), noted there has been a steady rise in research output related to the IT and IS. This search resulted in 32 related articles published between 2012 and 2017. Thus, in this research all articles were selected. The articles were analyzed by the year of publication, journal, country and author. This particular analysis provides guidelines for pursuing rigorous research on using IS/ IT from the MOOCs use. The details are presented below.

5.1. Distribution by the year of publication

The distribution of articles from 2012 to 2017 is shown in Table1. From the data, it is clear that there is an upward trend in the number of using MOOCs continuance during studies this time period. From this trend, it would appear that the attention is given to use MOOCs continuance has risen over time, and remains an important area of research. For example, it was found that more than half 86 studies (62.5%) of the studies were published in the last two years i.e., from 2016 to 2017. See Tables 1.

Table 1: Distribution by the Year of Publication

Year	Article Count	Percentage	Year	Article Count	Percentage
2017	9	28.1 %	2013	2	6.3 %
2016	11	34.4 %	2012	1	3.1 %
2015	5	15.6 %			
2014	4	12.5 %			

5.2. Distribution by journal

Table 2 shows the outcome results based on distribution of articles by the journal where authors published. The majority papers was published on ACM international conference proceeding series (3 papers), and social sciences Pakistan (2 papers). As well as other papers was published on 27 various journals see Table 2. This result and analysis depends on scope of journals.

Table 2: Distribution by Journal

Journal	No
ACM International Conference Proceeding Series	3
Social Sciences Pakistan	2
11th International Conference On Cognition And Exploratory Learning In Digital Age Celda	1
2013 IEEE Conference On E Learning E Management And E Services Ic3e 2013	1
2014 International Conference On IT Convergence And Security Icitcs	1
2014 International Conference On Web And Open Access To Learning Icwoal 2014	1
Advances In Education In Diverse Communities Research Policy And Praxis	1
Advanced Science Letters	1
Arpn Journal Of Engineering And Applied Sciences	1
Australasian Journal Of Engineering Education	1
Communications In Computer And Information Science	1
Csedu 2015 7th International Conference On Computer Supported Education Proceedings	1
Csedu 2017 Proceedings Of The 9th International Conference On Computer Supported Education	1
Development And Learning In Organizations	1
International Education Studies	1
International Journal Of Information And Communication Technology Education	1
International Journal On Advanced Science Engineering And Information Technology	1
International Review Of Research In Open And Distance Learning	1
Journal Of Theoretical And Applied Information Technology	1
Jurnal Teknologi	1
Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	1
Man In India	1
Proceedings 2016 4th International Conference On User Science And Engineering I User	1
Proceedings Sims 2016 2nd International Conference On Systems Informatics Modelling And Simulation	1
Proceedings Uksim Amss 2016 10th European Modelling Symposium On Computer Modelling And Simulation	1
Technovation	1
Turkish Online Journal Of Distance Education	1
International Conference On Research And Innovation In Information Systems Icriis	1
Iceed 2012 2012 4th International Congress On Engineering Education Improving Engineering Education Towards Sustainable Development	32

5.3. Distribution by the type

Table 3 shows that most of the studies were from conference papers with 16 percentages (50.0%), and the articles with 15 percentages (46.9%). The next review papers with 1 percentage (3.1%). Noted that high percentages of studies were conference papers and articles.

Table 3: Distribution by the Type

Document Type	Documents	Percentage	Document Type	Documents	Percentage
Conference Papers	16	50 %	Articles	15	46.9 %
Review Papers	1	3.1 %	Total	32	100.00 %

5.4. Distribution by subject area

Table 4 shows the distribution by the subject area we noted most of the studies was from computer science area 10 with percentages (31.3%), and social sciences area 7 with percentages (21.9%). the next studies from engineering area with 5 percentages (15.6%), and mathematics area 3 with percentages (9.4%). Similarly, business management and accounting area was 3 with percentages (9.4%). Moreover, agricultural and biological sciences, was 1 study with percentages (3.1%), and arts and humanities area was 1 study with percentages (3.1%). Also, energy was 1 study with percentages (3.1%), and finally environmental science area was 1 study with percentages (3.1%).

Table 4: Distribution by Subject Area

No	Subject Area	Documents	Percentage
1	Computer Science	10	31.3%
2	Social Sciences	7	21.9%
3	Engineering	5	15.6%
4	Mathematics	3	9.4%
5	Business, Management and Accounting	3	9.4%
6	Agricultural and Biological Sciences	1	3.1%
7	Arts and Humanities	1	3.1%
8	Energy	1	3.1%
9	Environmental Science	1	3.1%
	Total	32	100.0%

5.5. Empirical research

Our analysis shows that most of the studies were from quantitative research by survey with 16 percentages (50.0 %), and an interview was 7 percentages (21.9%). And finally, mixed methods approach with 9 percentages (28.1%). Thus, the total of quantitative research was a high level with 16 studies. Table 5 shows the results of our classification in empirical research.

Table 6: Empirical Research Approaches Used to Study IS Continuance Intention

Research Approach	Methods Used	Article Count	Percentage
Quantitative Research	Survey	16	50.0%
Qualitative Research	Interviews	7	21.9%
Mixed methods	Survey, Interviews	9	28.1%
Total		32	100.0%

6. Discussion and implications

Huang et al. (2014) found that MOOC has a positive influence on the forum. More detailed studies like the one by Radford et al. (2014) found that 87% found this technology as positive or very positive and 78% for education while 75% for technology and public administration. For example, (Baxter and Haycock, 2014; Mak et al., 2010) reported a negative impact of MOOC on the efficacy of learning. In particular, Baxter and Haycock (2014) reported that this negative influence might be represented by decreased student motivation and online identities. It was also found that this technology might have other negative sides on students. On the other cam, (Radford et al., 2014; Huang et al., 2014) reported a positive influence of MOOC on students who were surveyed for their opinions. Institutions and universities that offer MOOCs know exactly these advantages and that is why they keep encouraging and inviting students into these courses. Thus, this study might be important to them giving them more insights. Registration in MOOCs is free except for the few switching costs and that explains why learners cannot choose a platform over another. Moreover, social learning effect on and relation to interaction and academic achievement (Al-Rahmi et al., 2018b; Al-Rahmi et al., 2015c; Al-Rahmi et al., 2015d). Unfortunately, the process of learning through the use of MOOCs is lacking the feature of team and group work which is vital to the learning environment. These

notions of group and team work are not supported by MOOCs platforms and that is why instructors and teachers resort to third party platforms. A growing number of researches are conducted in an attempt to better understand the issue of the dropouts in MOOCs and on the same time, researchers are trying to improve the effectiveness of MOOCs (Chamberlin & Parish, 2011). In spite of the rapid development of MOOCs, researchers are still learning about learners and their need so that they can build better MOOCs able to satisfy their needs. That will also prove better insights on the low student retention (Clow, 2013; Lewin, 2013). The issue of effective learning with MOOCs stays as the central issue that has to be addressed by the academic community. It also has a positive impact on learners' motivation as it facilitates a smooth and fruitful exchange of ideas within the learning communities (Al-Rahmi et al., 2017; Al-Rahmi et al., 2015b). Thus, we as researchers working in this field are responsible for improving the kind of learning and look for solutions to the different problems.

6.1. Future research

Future studies should consider this information to extend the existing literature in Malaysia and elsewhere. This study also suggests the development a models and frameworks for using Massive Open Online Courses (MOOCs) in Malaysia and other countries. The current study recommends that future research should utilize more elements to measure the various factors that might influence learning using MOOC like interactivity, collaborative learning and engagement among learners.

6.2. Conclusion

This research provided a general picture of the present state of using Massive Open Online Courses (MOOCs) in Malaysian higher education by conducting a systematic review of 32 papers throughout 29 journals from 2012 to 2017. The researchers specifically conducted an analysis of contributions in light of the research questions developed that covered the year of publication, research methods, journals, authors, countries, type of study area and the theories employed. The contributions were classified in a systematic manner to provide a general picture of using MOOCs and to assist researchers in searching for important studies in this area. This study contributes to materials required by readers who are interested in different aspects related to the literature of using Massive Open Online Courses (MOOCs) in Malaysian higher education. Many theories were utilized in this research for the enhancement of MOOC through highlighting the five concepts of intention to use, interaction, engagement, motivations and satisfaction. In summary, we confirm that students' academic performance can be influenced by MOOC which has the advantage of facilitating the learning process through offering materials and enabling the share of information.

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