

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

Waleed Al-Rahmi<sup>1\*</sup>, Ahmed Aldraiweesh<sup>2</sup>, Noraffandy Yahaya<sup>1</sup>, Yusri Bin Kamin<sup>1</sup>

<sup>1</sup> Faculty of Education, University Technology Malaysia, 81310, UTM Skudai, Johor, Malaysia

<sup>2</sup> College of Education Educational Technology Department, King Saud University, Kingdom of Saudi Arabia KSA

\*Corresponding author E-mail: [aaldrivish@ksu.edu.sa](mailto:aaldrivish@ksu.edu.sa)

## 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

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 indicator 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 Table 1. 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
11 <sup>th</sup> 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 Icwol 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 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.

### Acknowledgements

We would like to thank the Research Management Centre (RMC) at Universiti Teknologi Malaysia (UTM) for funding this project under grant number PY/2017/00760: Q.J130000.2531.16H59. The authors extend their appreciation to the Deanship of Scientific Research at King Saud University for funding this work through Research Group No. RG-1438-070.

### References

- [1] Abedi, M., & Beikverdi, A. (2012, December). Rise of massive open online courses. In *Engineering Education (ICEED), 2012 4th International Congress on* (pp. 1-4). IEEE.
- [2] Ajzen I 1991. The theory of planned behavior, *Organizational Behavior and Human Decision Processes*,50, 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- [3] Al-Atabi, M., & DeBoer, J. (2014). Teaching entrepreneurship using massive open online course (MOOC). *Technovation*, 34(4), 261-264. <https://doi.org/10.1016/j.technovation.2014.01.006>.
- [4] Al-Rahmi, W, Othman, M and Musa, M. (2014). The Improvement of Students'Academic Performance in Malaysian Higher Education””, *Asian Social Science*; 10, 8, 2010-221.
- [5] Al-Rahmi W. M, & Zeki, A. M (2017). A model of using social media for collaborative learning to enhance learners' performance on learning. *Journal of King Saud University-Computer and Information Sciences*, 29(4): 526-535. <https://doi.org/10.1016/j.jksuci.2016.09.002>.
- [6] Al-Rahmi W. M, Zeki A. M, Alias N, & Saged A (2017b). Use of social media and its impact on academic performance among university students in Malaysian Higher Education. *Anthropologist*, 28(1-2): 52-68. <https://doi.org/10.1080/09720073.2017.1317962>.
- [7] Al-Rahmi, W. M., Alias, N., Othman, M. S., Ahmed, I. A., Zeki, A. M., & Saged, A. A. (2017a). Social Media Use, Collaborative Learning and Students'academic Performance: A Systematic Literature Review of Theoretical Models. *Journal of Theoretical & Applied Information Technology*, 95(20).
- [8] Al-Rahmi, W. M., Alias, N., Othman, M. S., Alzahrani, A. I., Alfarradj, O., Saged, A. A., & Rahman, N. S. A. (2018). Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia. *IEEE Access*, 6, 14268-14276. <https://doi.org/10.1109/ACCESS.2018.2802325>.
- [9] Al-Rahmi, W. M., Alias, N., Othman, M. S., Marin, V. I., & Tur, G. (2018). A model of factors affecting learning performance with social media in Malaysian higher education. *Computers & Education*, 121, 59-72. <https://doi.org/10.1016/j.compedu.2018.02.010>.
- [10] Al-rahmi, W. M., Othman, M. S., & Yusuf, L. M. (2015a). Social media for collaborative learning and engagement: Adoption framework in higher education institutions in Malaysia. *Mediterranean Journal of Social Sciences*, 6(three S1), 246-252. <https://doi.org/10.5901/mjss.2015.v6n3s1p246>.
- [11] Al-rahmi, W. M., Othman, M. S., & Yusuf, L. M. (2015b). The effect of social media on researchers' academic performance through collaborative learning in Malaysian higher education. *Mediterranean Journal of Social Sciences*, 6(4), 193-203. <https://doi.org/10.5901/mjss.2015.v6n4s1p193>.
- [12] Al-rahmi, W. M., Othman, M. S., & Yusuf, L. M. (2015c). The effectiveness of using e learning in Malaysian higher education: A case study Universiti Teknologi Malaysia. *Mediterranean Journal of Social Sciences*, 6(5), 625- 637. <https://doi.org/10.5901/mjss.2015.v6n5s2p625>.
- [13] Al-Rahmi, W., Othman, M. S., and Yusuf, L. M. (2015d). The role of social media for collaborative learning to improve academic performance of students and researchers in Malaysian higher education. *The International Review of Research in Open and Distributed Learning*, 16(4), 177-204. <https://doi.org/10.19173/irrodl.v16i4.2326>.
- [14] Al-rahmi, W. M., Othman, M. S., & Yusuf, L. M. (2015e). Exploring the factors that affect student satisfaction through using e learning in Malaysian higher education institutions. *Mediterranean Journal of Social Sciences*, 6(4), 299. <https://doi.org/10.5901/mjss.2015.v6n4s1p299>.
- [15] Al-Rahmi, W. M., & Yusuf, M. S. O. L. M. (2015f). Effect of Engagement and Collaborative Learning on Satisfaction Through the use of Social Media on Malaysian Higher Education. *Research Journal of Applied Sciences, Engineering and Technology*, 9(12), 1132-1142. <https://doi.org/10.19026/rjaset.9.2608>.
- [16] Al-rahmi, W. M., Othman, M. S., & Yusuf, L. M. (2015g). Using Social Media for Research: The Role of Interactivity, Collaborative Learning, and Engagement on the Performance of Students in Malaysian Post-Secondary Institutes. *Mediterranean Journal of Social Sciences*, 6(5), 536-546. <https://doi.org/10.5901/mjss.2015.v6n5s2p536>.
- [17] Andersen, R., & Ponti, M. (2014). Participatory pedagogy in an open educational course: challenges and opportunities. *Distance Education*, 35(2), 234e249. <https://doi.org/10.1080/01587919.2014.917703>.
- [18] Arnold, K.E., Pistilli, M.D. (2012). Course signals at Purdue: using learning analytics to increase student success. In: *Proceedings of the second International Conference on Learning Analytics and Knowledge*. ACM, New York, NY, USA, pp. 267-270.
- [19] Ayub, E., & Leong, L. C. (2017). Developing a Pedagogy Framework for Institution-Wide Implementation of MOOC: A Case Study from a Malaysian Private University. *Advanced Science Letters*, 23(2), 809-813. <https://doi.org/10.1166/asl.2017.7464>.

- [20] Ayub, E., Wei, G. W., & Yue, W. S. (2017, January). Exploring Factors Affecting Learners' Acceptance of MOOCs Based on Kirkpatrick's Model. In Proceedings of the eighth International Conference on E-Education, E-Business, E-Management and E-Learning (pp. 34-39). ACM.
- [21] Azhan, M. H. B. N., Saman, M. Y. B. M., & Man, M. B. (2016, March). A Framework for Collaborative Multi-Institution MOOC Environment. In Proceedings of the International Conference on Internet of things and Cloud Computing (p. 36). ACM. <https://doi.org/10.1145/2896387.2896421>.
- [22] Bakar, N. F. A., Yusof, A. F., Iahad, N. A., & Ahmad, N. (2017, July). Framework for embedding gamification in Massive Open Online Course (MOOC). In Research and Innovation in Information Systems (ICRIIS), 2017 International Conference on (pp. 1-5). IEEE.
- [23] Baxter, J. A., & Haycock, J. (2014). Roles and student identities in online large course forums: Implications for practice. *The Int. Review of Research in Open and Distance Learning*, 15(1). <https://doi.org/10.19173/irrodl.v15i1.1593>.
- [24] Breslow, L., Pritchard, D., de Boer, J., Stump, G., Ho, A., Seaton, D. (2013). Studying learning in the worldwide classroom: Research into edX's first MOOC, *Research & Practice in Assessment* 8, pp 13- 25.
- [25] Che, X., Luo, S., Wang, C., & Meinel, C. (2016). An attempt at MOOC localization for Chinese-speaking users. *International Journal of Information and Education Technology*, 6(2), 90e96. <https://doi.org/10.7763/IJJET.2016.V6.665>.
- [26] Chiu, C.-M., Hsu, M.-H., Sun, S.-Y., Lin, T.-C., & Sun, P.-C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45(4), 399e416. <https://doi.org/10.1016/j.compedu.2004.06.001>.
- [27] Cho, M.-H., & Heron, M. L. (2015). Self-regulated learning: the role of motivation, emotion, and use of learning strategies in students' learning experiences in a self-paced online mathematics course. *Distance Education*, 36(1), 80e99. <https://doi.org/10.1080/01587919.2015.1019963>.
- [28] Clow, D. (2013). Moocs on Learning Analysis. Third International Conference on Learning Analysis.
- [29] Comeau, J. D., & Cheng, T. L. (2013). Digital "tsunami" in higher education: Democratization Movement towards Open and Free Education. *Turkish Online Journal of Distance Education*, 14(3).
- [30] Conole, G. (2013). MOOCs as disruptive technologies: Strategies for enhancing the learner experience and quality of MOOCs.2 e-Lis. Retrieved from <<http://eprints.rclis.org/19388/>>.
- [31] Davis FD 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly*, 13, 3, 319-340. <https://doi.org/10.2307/249008>.
- [32] Davis FD, Bagozzi N RP, Warshaw PR 1989. User acceptance of computer-technology - a comparison of 2 theoretical-models. *Management Science*.35, 8, 982-1003. <https://doi.org/10.1287/mnsc.35.8.982>.
- [33] Fesol, S. F. A., & Salam, S. (2016, August). Towards MOOC for technical courses: A blended learning empirical analysis. In User Science and Engineering (i-USER), 2016 fourth International Conference on (pp. 116-121). IEEE.
- [34] Fesol, S. F. A., & Salam, S. (2016, August). Towards MOOC for technical courses: A blended learning empirical analysis. In User Science and Engineering (i-USER), 2016 fourth International Conference on (pp. 116-121). IEEE.
- [35] Fini, A. (2009). The technological dimension of a massive open online course: The case of the CCK08 course tools. *The International Review of Research in Open and Distance Learning*, 10(5). <https://doi.org/10.19173/irrodl.v10i5.643>.
- [36] Gillani, N., & Eynon, R. (2014). Communication patterns in massively open online courses. *Internet and Higher Education*, 23, 18e26. <https://doi.org/10.1016/j.iheduc.2014.05.004>.
- [37] Goh, O. S., Ghani, M. K. A., Kumar, Y. J., Choo, Y. H., & Muda, A. K. (2014, October). Massive Open Online Course (MOOC) with learning objects and intelligent agent technologies. In IT Convergence and Security (ICITCS), 2014 International Conference on (pp. 1-4). IEEE.
- [38] Hakami, N., Ali, M., White, S., & Chakaveh, S. (2017). Motivational factors that influence the use of MOOCs: learners' perspectives a systematic literature review.
- [39] Holt, D. T., Armenakis, A. A., Harris, S. G., & Feild, H. S. (2007). Toward a Comprehensive Definition of Readiness for Change: A Review of Research and Instrumentation. *Research in Organizational Change and Development*, 16, 289-336. [https://doi.org/10.1016/S0897-3016\(06\)16009-7](https://doi.org/10.1016/S0897-3016(06)16009-7).
- [40] Hossain, M. A., & Quaddus, M. (2012). Expectation e confirmation theory in information system research: a review and analysis. In *Information systems theory* (Vol. 1, pp. 441e469). New York: Springer.
- [41] Huang, J., Dasgupta, A., Ghosh, A., Manning, J., & Sanders, M. (2014). Superposter behavior in MOOC forums. In Proc. ACM Conf on Learning@scale (pp.117- 126).
- [42] Imran, A. S., Pireva, K., Dalipi, F., & Kastrati, Z. (2016, July). An Analysis of Social Collaboration and Networking Tools in eLearning. In International Conference on Learning and Collaboration Technologies (pp. 332-343). Springer International Publishing.
- [43] Iqbal, S., Naeem, M. A., & Nayyar, A. (2016, November). Status of MOOCs in Pakistan: Optimism and Concerns. In *Modelling Symposium (EMS)*, 2016, European (pp. 237-241). IEEE.
- [44] Jones, E. R. (2005). The impact of organizational culture and reshaping capabilities on change implementation success: the mediating role of readiness for change. *Journal of Management Studies*, 42(2), 361-386. <https://doi.org/10.1111/j.1467-6486.2005.00500.x>.
- [45] Juhary, J. (2014). Perceived usefulness and ease of use of the learning management system as a learning tool. *International Education Studies*, 7(8), 23. <https://doi.org/10.5539/ies.v7n8p23>.
- [46] Lewin, T. (2013). *Universities Abroad Join Partnerships on the Web*. New York: The New York Times.
- [47] Li, N., Himanshu, V., Skevi, A., Zufferey, G., Blom, J., & Dillenbourg, P. (2014). Watching MOOCs together: investigating co-located MOOC study groups. *Distance Education*, 35, 217e233. <https://doi.org/10.1080/01587919.2014.917708>.
- [48] Lim, C. L., Tang, S. F., & Ravichandran, P. (2017, January). A Study on the Mediation Effects of Intention to Enroll in MOOCs on its Actual Usage. In Proceedings of the eighth International Conference on E-Education, E-Business, E-Management and E-Learning (pp. 30-33). ACM.
- [49] Loeckx, J. (2016). Blurring Boundaries in Education: Context and Impact of MOOCs. *The International Review of Research in Open and Distributed Learning*, 17(3). <https://doi.org/10.19173/irrodl.v17i3.2395>.
- [50] Mak, S., Williams, R., and Mackness, J. (2010). Blogs and forums as communication and learning tools in a MOOC. In *Networked Learning Conference*, (pp. 275-285).
- [51] Mat-jizat, J. E., Samsudin, N., & Yahaya, R. (2014). Higher Education Institutions (HEI) Students Take on MOOC: Case of Malaysia. International Association for Development of the Information Society.
- [52] Mazoue, J. G. (2014). The MOOC model: Challenging traditional education. EDUCAUSE. Review online. Retrieved from <http://www.educause.edu/ero/article/mooc-model-challengingtraditional-education>.
- [53] Mee, C. K., Sui, L. K. M., Jano, Z., & Husin, H. (2016). The Readiness of the Administrators and Undergraduates in Using Massive Open Online Course (MOOC) in the Mandarin Subject. *The Social Sciences*, 11(12), 3017-3023.
- [54] Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research*, 17(4), 460e469. <https://doi.org/10.2307/3150499>.
- [55] Ong, D., Ong, D., Jambulingam, M., & Jambulingam, M. (2016). Reducing employee learning and development costs: the use of massive open online courses (MOOC). *Development and Learning in Organizations: An International Journal*, 30(5), 18-21.
- [56] Othman, M. S., Tashimaimaiti, G., Yusuf, L. M., & Al-Rahmi, W. M. (2017, April). End-User Perspectives on Effectiveness of Learning Performance through Massive Open Online Course (MOOCs). In International Conference of Reliable Information and Communication Technology (pp. 699-707). Springer, Cham.
- [57] Radford, A. W., Robles, J., Cataylo, S., Horn, L., Thornton, J., & Whitfield, K. E. (2014). The employer potential of MOOCs: A mixed-methods study of human resource professionals' thinking on MOOCs. *The International Review of Research in Open and Distributed Learning*, 15(5). <https://doi.org/10.19173/irrodl.v15i5.1842>.
- [58] Sa Don, N.F., Alias, R.A., Ohshima, N. (2015). Stakeholders' View on Moocs Sustainability in Malaysian Higher Education: A Preliminary Study. *ARPN Journal of Engineering and Applied Sciences* 10(23), pp. 18104-18112.
- [59] Saadatdoost, R., Sim, A. T. H., Jafarkarimi, H., & Hee, J. M. (2016). Understanding the Setting of a MOOC: A Journey into Coursera. *International Journal of Information and Communication Technology Education (IJICTE)*, 12(1), 77-98. <https://doi.org/10.4018/IJICTE.2016010107>.
- [60] Sa'don, N. F., Alias, R. A., & Ohshima, N. (2014, November). Nascent research trends in MOOCs in higher educational institutions: A

- systematic literature review. In Web and Open Access to Learning (ICWOAL), 2014 International Conference on (pp. 1-4). IEEE.
- [61] Salamon, H. M., Ali, N. M., Miskon, S., & Ahmad, N. (2016). INITIAL RECOMMENDATIONS OF MOOCS CHARACTERISTICS FOR ACADEMIC DISCIPLINE CLUSTERS. *Journal of Theoretical and Applied Information Technology*, 87(2), 204.
- [62] Santos, J. L., Roth, K. R., Huerta, A. H., & Ritter, Z. S. (2015). Tech-Centric Classrooms: A Discussion of Policy, Costs, and Access. In *Mitigating Inequality: Higher Education Research, Policy, and Practice in an Era of Massification and Stratification* (pp. 209-241). Emerald Group Publishing Limited.
- [63] Shroff, R. H., Vogel, D. R., & Coombes, J. (2008). Assessing individual-level factors supporting student intrinsic motivation in online discussions: a qualitative study. *Journal of Information Systems Education*, 19(1), 111e125.
- [64] Siemens, G. (2005). Connectivism: Learning theory for the digital age. *International Journal of*.
- [65] Siemens, G., 2013. Learning analytics: the emergence of a discipline. *Am. Behav. Sci.*, <https://doi.org/10.1177/0002764213498851>.
- [66] Siemens, G., Gasevic, D., 2012. Guest editorial – learning and knowledge analytics. *Educ. Technol. Soc.* 15, 1–2.
- [67] Singh, S., & Lal, S. P. (2013, December). Educational courseware evaluation using machine-learning techniques. In *e Learning, e-Management and e-Services (IC3e), 2013 IEEE Conference on* (pp. 73-78). IEEE.
- [68] Sivapalan, S., Clifford, M. J., & Speight, S. (2016). Engineering education for sustainable development: using online learning to support the new paradigms. *Australasian Journal of Engineering Education*, 21(2), 61-73. <https://doi.org/10.1080/22054952.2017.1307592>.
- [69] Sunar, A. S., Abdullah, N. A., White, S., & Davis, H. (2015, May). Personalisation in MOOCs: A Critical Literature Review. In *International Conference on Computer Supported Education* (pp. 152-168). Springer International Publishing.
- [70] Sunar, A. S., Abdullah, N. A., White, S., & Davis, H. C. (2015). Personalisation of MOOCs: The state of the art. *CSEDU 2015 - seventh International Conference on Computer Supported Education, Proceedings 1*, pp. 88-97.
- [71] Tanes, Z., Arnold, K.E., King, A.S., Remnet, M.A., (2011). Using signals for appropriate feedback: perceptions and practices. *Comput. Educ.* 57, 2414–2422. <https://doi.org/10.1016/j.compedu.2011.05.016>.
- [72] Venkatesh V, Morris MG, Davis GB, Davis FD 2003. User acceptance of information technology: Toward a unified view, *MIS Quarterly*, 27, 3, 425-478. <https://doi.org/10.2307/30036540>.
- [73] Wahid, R., & Sani, M. A. M. (2015). MOOCs and Youth Employment Strategy. *The Social Sciences*, 10(7), 1726-1731.
- [74] Wen, M., Yang, D., & Rose, C. P. (2014). Sentiment Analysis in MOOC Discussion Forums: What does it tell us? *Proceedings of Educational Data Mining*
- [75] Wildavsky, B. (2014). Evolving toward significance or MOOC ado about nothing? NAFSA: Association of International Educators. Retrieved from [http://www.nafsa.org/\\_/File/\\_/ie\\_mayjun14\\_forum.pdf](http://www.nafsa.org/_/File/_/ie_mayjun14_forum.pdf).
- [76] Yang, D., Wen, M., Rose, C. P. (2014). Peer Influence on Attrition in Massively Open Online Courses, *Proceedings of Educational Data Mining*.
- [77] Yue, W. S., & Jing, T. W. (2016). SIMPLIFICATION OF GAME DEVELOPMENT LEARNING VIA MASSIVE OPEN ONLINE COURSES (MOOC): APreliminary ANALYSIS. *JURNAL TEKNOLOGI*, 78(2-2), 57-62.
- [78] Yusof, A., Atan N.A., Harun, J, and Doulatabadi M. (2017). Understanding learners' persistence and engagement in Massive Open Online Courses: A critical review for Universiti Teknologi Malaysia. *Man in India*, 97 (12) 147-157.
- [79] Zang, X., Iqbal, S., Zhu, Y., Riaz, M. S., Abbas, G., & Zhao, J. (2016, June). Are MOOCs advancing as predicted by IEEE CS 2022 Report? In *Systems Informatics, Modelling and Simulation (SIMS), International Conference on* (pp. 49-55). IEEE.