Usage Preferences of Massive Open Online Course (MOOC): An Exploratory Study Among Pharmacy Students in UiTM Puncak Alam

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Abstract: Massive Open Online Course (MOOC) is an online education system that has gained increasing popularity in higher education in recent years. Universiti Teknologi MARA (UiTM) has implemented MOOC as part of its teaching and learning modalities, in line with the launch of the Vice Chancellor's special project, MOOC 450 in 2017. In the Faculty of Pharmacy, UiTM, a total of seven MOOC courses are being offered to the students. However, the enrolment rate of MOOC courses is quite low. Therefore, this research is conducted to gain insihts on the preferences of our students in using MOOC as part of their learning process in UiTM. A total of 133 students of Bachelor of Pharmacy in UiTM Puncak Alam, Selangor were involved in this reasearch. Respondents were given a set of self-administered questionnaire comprising of three parts: (i) general usage of MOOC; (ii) factors that influence students' preference in using MOOC; (iii) problems that hinder students from using MOOC. Our results showed that various teaching materials, flexible accessibility and the capacity to learn at one's own pace are the top three variables that affect the students' preferences in using MOOC. Meanwhile, the top three problems which prevent students from using MOOC are a poor internet connection, lack of physical interactions between students and tutors and lack of interaction between students.

Keywords: blended learning, e-learning, MOOC, online learning, pharmacy education

INTRODUCTION

Massive Open Online Course (MOOC) is a model of online education delivery which embraces large-scale borderless learning opportunities to provide high-quality education to as many people as possible. It is a form of distance education where the learning process takes place albeit the student and teacher are physically distant apart (Martin, 2018). Generally, MOOC consists of short teaching videos, interactive assignments, quizzes, online discussion forums and text-based instructional materials. These materials are made available through an online platform, allowing learners to experience the flexibility of time and space in their online learning environment. In Malaysia, MOOC is developed in tandem with several key national plans including Malaysian Education Blueprint for Higher Education 2015 -2025. The plan is to leverage MOOC as one of the initiatives to enhance quality and access to education (Zulkifli, 2020). Universiti Teknologi MARA (UiTM) has been actively involved in MOOC development since 2014. UiTM has implemented MOOC as part of its teaching and learning modalities, in line with the launch of the Vice Chancellor's (VC's) special project, MOOC 450 in 2017. The Faculty of Pharmacy, UiTM has introduced seven courses of MOOC namely Basic Pharmacology, Biostatistics, Pharmacognosy, Veterinary Pharmacy, Drugs in Sports, Hospital Pharmacy and Radiopharmacy. However, the enrolment rate for these MOOC courses is below satisfactory level. Therefore, this research was conducted to determine factors that influence students' preferences in using MOOC in the Faculty of Pharmacy, UiTM Puncak Alam and to identify the problems that hinder students from using MOOC. This information can be used to improve the effectiveness of MOOC for pharmacy education and to increase students' adherence to MOOC. Plus, this study can assist educators to construct effective teaching methods and subsequently provide students with a more flexible yet effective learning experience.

METHODS

The present study is a descriptive survey design using a self-report questionnaire. It is conducted in the Faculty of Pharmacy in UiTM Puncak Alam to determine factors that influence students' preferences in using MOOC and to identify problems that hinder them from using it. This research has received ethics approval from UiTM Research Ethics Committee (Ref.

No. REC/231/19). Data analysis was performed using Statistical Package for the Social Sciences (SPSS) software.

2.1 Participants and Data Collection

A total of 139 students were involved in this study but 6 respondents were excluded due to incomplete responses. The respondents were second-year undergraduate students pursuing the Bachelor of Pharmacy programme at UiTM Puncak Alam, Selangor. This group of students were chosen as participants of this research as they have been exposed to MOOC as part of their learning activities in their second and third semester. The participants were given a set of self-administered questionnaires and completed questionnaires were collected for analysis.

2.2 Research Instrument

The questionnaire was developed based on a comprehensive literature review and was subsequently pilot-tested. It consists of open and closed-ended questions as well as Likert scale type questions. The questionnaire comprises three parts: (i) general information on MOOC usage; (ii) factors that influence students' preference in using MOOC; (iii) problems that hinder students from using MOOC.

RESULTS

3.1 General usage of MOOC

After the exclusion of individuals with missing values, 133 respondents were included in the analysis. As depicted in Table 1, the majority of the respondents are females. There were a total of 126 female respondents (94.7%) while the were only 7 male respondents (5.3%). All respondents confirmed that they have participated in MOOC courses before and some reported that they have previously enrolled in more than one MOOC course. A total of 115 and 73 students reported having enrolled in Biostatistics and Basic Pharmacology MOOC, respectively. While three students have enrolled in another subject which is the Mandarin language.

Table 1: Demographic profile

Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	7	5.3
	Female	126	94.7
Course	Biostatistics	115	86.5
	Basic Pharmacology	73	54.9
	Others	3	2.3

A total of 92 students (69.2%), which is more than half of the respondents have completed their MOOC session. Among this were 87 female respondents and 5 male respondents, respectively (Fig. 1a). As for the reasons for completion, the majority voted for the requirement of the course (N=52), followed by encouragement by lecturers (N=46), easy to access (N=26) and interesting contents (N=22) (Fig. 1b). When the respondents were asked about the reasons for incompletion, the majority agreed the course was time consuming as the biggest hindrance to completion (N=19), followed by loss of interest (N=12) and the course was difficult to access (N=10) (Fig. 1c).

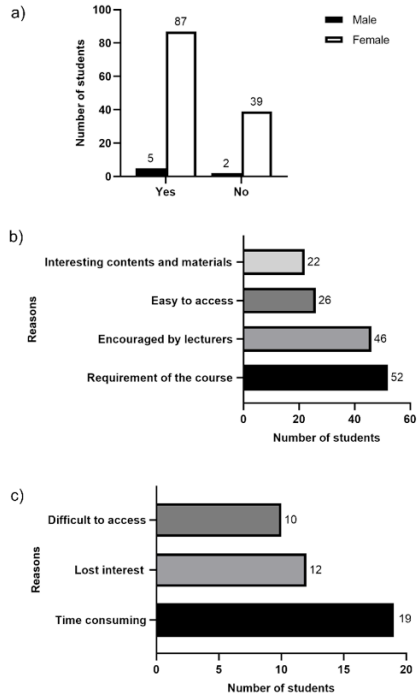

Fig. 1: MOOC completion and contributing factors. a) Number of students who have completed their MOOC courses. b) Reasons for MOOC completion. c) Reasons for incompletion of MOOC

In regards to learning methods, over half of the respondents (51.9%) preferred face-to-face lectures only (Fig. 2a). In stark contrast, a very small portion of the respondents (3%) chose MOOC over traditional lectures. Meanwhile, 60 students (45.1%) preferred a combination of face-to-face lectures and MOOC as preferred learning modalities. When asked about how much time they spend on MOOC, most students (76.7%) responded that they occasionally use MOOC, which is once a week (Fig. 2b). Another 21 respondents (15.8%) stated that they use MOOC often, which is 2 to 3 times per week. Meanwhile, only 1 student (0.8%) reported having used MOOC very often, which is more than 3 times per week. The remaining 9 students (6.8%) mentioned that they never used MOOC even though they have enrolled for the course. As for the duration of engagement per session, almost half of the students (45.1%) responded that they spend 30 minutes

per session, slightly more than those who spend 31 minutes to 1 hour (41.4%) (Fig. 2c). Lesser students (12%) reported going online for a longer duration per session and 1.5% spending 1 to 2 hours and more than 2 hours, respectively.

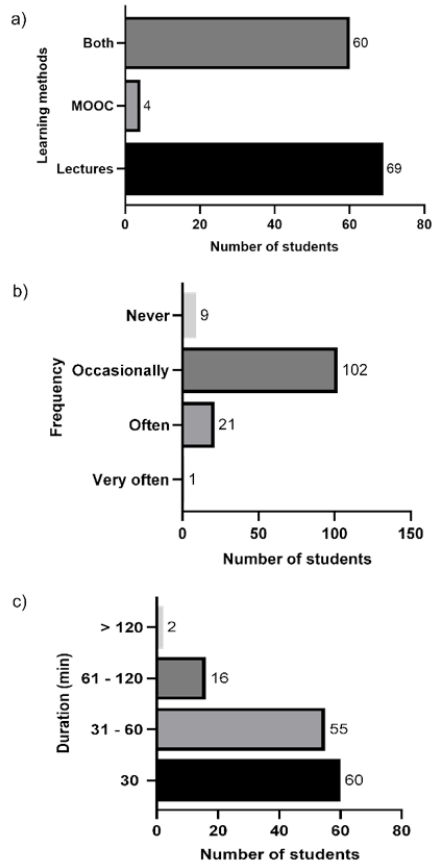

Fig. 2: The preference and usage of MOOC. a) Preferred learning methods. b) Frequency of MOOC usage. Occasionally (once per week), Often (2-3 times per week), Very often (>3 times per week). c) Duration of MOOC usage per session.

3.2 Factors that influence the students' preference in using MOOC

Respondents were asked to rate their opinion on the factors that promote the use of MOOC based on a four-point Likert scale which excluded the midpoint option to mitigate the possibility of misusing it as a dumping ground (Chyung et al., 2017). Eight factors were identified as promoting factors for MOOC usage based on literature were outlined namely flexibility, design, content, interaction, privacy, learning pace, progress and learning experience (Table 2). All factors received more than half positive responses. Out of these, three factors were identified as the main factors that promote the use of MOOC which are a variety of learning materials (97%), flexibility in accessing the course content (93.2%), and ability to learn at own pace (86.5%). While close to half of the respondents disagree that convenience communicating with peers/lecturers as a promoting factor of MOOC usage (48.5%).

Table 2: Factors promoting the usage of MOOC. Data represent the total number of respondents who either agree or strongly agree with the factors listed (N=133).

Factor		Number of students
Flexibility	Ability to access course content anywhere and anytime	124 (93.2%)
Design	Attractive interface	108 (81.2%)
Content	Variety of learning materials such as images and videos	129 (97.0%)
Interaction	Convenience communicating with peers/lecturers	68 (51.1%)
Privacy	Ability to be anonymous which could reduce social anxiety	104 (78.2%)
Learning Pace	Ability to learn at own pace	115 (86.5%)
Progress	Ability to keep up with the rest of the class	81 (60.9%)
Learning Experience	Makes classes more interesting and stimulating	91 (68.4%)

3.3 Problems that influence the students' preference in using MOOC

To identify the factors that hinder the use of MOOC among the students of the Faculty of Pharmacy, UiTM, the respondents were asked to rate their opinion on nine problems that were identified as common problems of MOOC usage. Generally, these problems are technical difficulties, poor design, literacy, interaction and content (Table 3). The majority of the respondents agreed on poor connection as the main hindrance for MOOC usage (90.2%). This is followed by a lack of physical interaction and support from tutors (87.3%) and a lack of student-student interaction (81.2%). Meanwhile, more than half of

the respondents disagreed that lack of access to computers (57.9%), interface is not user friendly (56.4%) and less interactive (52.6%) as barriers to MOOC usage.

Table 3: Problems hindering students from using MOOC. Data represent the total number of respondents who either agree or strongly agree with the factors listed (N=133).

Factor		Number of students
Technical Difficulties	Poor internet connection	120 (90.2%)
	Lack of access to computers	56 (42.1%)
Poor Design	Interface is not user friendly	58 (43.6%)
	Less interactive	63 (47.4%)
Literacy	Student lacks of computer literacy	68 (51.3%)
	Students lack of writing, communication and English language skills	77 (57.9%)
Interaction	Lack of student-student interaction	108 (81.2%)
	Lack of physical interaction and support from tutors	116 (87.3%)
Content	Lengthy materials	93 (69.9%)

DISCUSSION

MOOC once sets off a tsunami in education particularly in 2012 (Pappano, 2012) and 2013 (Booker, 2013). It continues to stay significant until now despite many issues and challenges especially in regards to its impersonal nature (Littlefield, 2020) and high attrition rate (Aldowah et al., 2020). Leveraging the MOOC technology transforms the way education is delivered thus maximises education opportunities and benefits. Key benefits of MOOC could be interpreted from different perspectives. For example, from the learner's perspective, MOOC endows students with flexibility in terms of time, space and pace, permitting greater opportunities for further learning and development. While from the educator's perspective, MOOC enables teachers to empower students by fostering self-directed learning, shifting the teaching and learning process from the traditional teacher-centric to student-centric environment.

Faculty of Pharmacy supports the national and UiTM education agenda to increase access to quality education for Malaysians and the global community. MOOC Malaysia is one of the initiatives launched in 2014 to achieve said agenda. In line with this, the faculty is offering seven MOOC courses namely Basic Pharmacology, Biostatistics, Pharmacognosy, Veterinary Pharmacy, Drugs in Sports, Hospital Pharmacy and Radiopharmacy. These courses are offered in addition to traditional face-to-face lectures. This approach is termed as the "distributed flip" (Caulfield, 2013) or the "blended/hybrid" model (Bruff, 2013). Blending MOOC with conventional teaching is hoped to address various learning preferences and enhance students' knowledge and skills. The positive impact of blended learning on teaching and learning has been affirmed by various studies (Morris, 2014; Rudneva et al., 2020). Among merits of embedding MOOC into traditionally taught courses include providing unlimited access to learning materials, enriching learning resources, filling gaps in expertise, implementing a variety of teaching and learning styles, fortifying principal skills, and teaching students how to teach online (Griffiths, 2015). Furthermore, MOOC has increasingly played a role in health sciences education to enhance the quality of teaching and learning in health care professionals.

Despite the many benefits of MOOC, enrolment in MOOC courses offered at Faculty of Pharmacy remains poor. Hence, the study was conducted to

identify the promoting and hindrance factors that influence MOOC usage among Bachelor of Pharmacy students at UiTM Puncak Alam. With these findings, effective and innovative initiatives can be implemented in the design and development of MOOC for pharmacy education. Second-year undergraduate students from the Faculty of Pharmacy, UiTM Puncak Alam were chosen as respondents for the current study because they have been exposed to MOOCs during their second and third semester. All 133 respondents confirmed that they have enrolled in MOOC courses and 69.2% responded to have completed their MOOC.

The majority of the respondents completed their MOOC courses to fulfil the requirement of the course. Although MOOC completion is not compulsory for the students to pass their course, many still feel obligated to do so. While those who failed to complete their course blame it on time constraints. This is in agreement with a previous study by Eriksson et al. (2017) where 21 of 34 interviewees mentioned lack of time as the reason for their dropout. Time management is of utmost importance in the life of university students. Juggling between academics and extracurricular activities is a daunting task. However, when conflict arises and one has to choose between MOOC and other tasks, MOOC is often not prioritized due to ambiguous benefit of MOOC on career and employment (Eriksson et al., 2017).

As for preferred learning modalities, our data suggest that students prefer face-to-face lectures, either alone or in combination with MOOC content over MOOC alone. Since our respondents are full-time students, gravitating towards face-to-face lectures is anticipated as stated by Arias et al. (2018). A study by Cao and Sakchutchawan (2011) on older students, working students, part-time students and students with family obligations revealed that online courses are more favourable compared to face-to-face classes. Students are more inclined to gravitate towards the pedagogical approach that best suit their needs, where they believe will give them success. MOOCs are generally offered as standalone courses. Many integrates MOOC contents into existing curriculum in thier practice (Bralić & Divjak, 2018; Robinson, 2016; Swinnerton et al., 2017) and they have been receiving positive feedbacks (Aboshady et al., 2015). While face-to-face lectures are found to be interesting and motivating by some students, integrating MOOC in conventional classroom settings accommodates different learning styles, needs and preferences. However, incorporating MOOC into regular

classroom teaching has its challenges. Various factors have to be taken into consideration for it to be a success. Among tips for excellent integration include outlining detail instructions on how the MOOC and its resources should be utilised, explaining what are the learning objectives that the students should achieve, and providing ample opportunities for discussions and feedback, be it synchronous or asynchronously (de Jong et al., 2020). It is crucial to ensure that the students fully understand their responsibilities so they can get the most out of this learning model.

Our study posits that the ideal duration and frequency for MOOC usage is less than 30 minutes per week, respectively. As reported by Guo et al. (2014), the duration of videos is the most significant indicator for engagement. The authors recommended instructors to segment videos into chunks shorter than 6 minutes because videos less than 6 minutes are more engaging than longer videos. Delivering content in bitesize chunks allows learners to easily digest the content in one sitting. Another study compared learners' engagement, retention and completion rate between two versions of Study Skills MOOC (Padilla Rodriguez et al., 2020). Both versions share the same contents but differ in length formats. The first version was delivered as a single six-week course, while the second version was deployed as two three-week blocks. The findings showed that learners enrolled in the second version have higher engagement, retention and completion rates compared to those in the other version. Therefore, to optimise students' engagement in MOOC courses, educational content should be delivered over a shorter time.

Our exploratory study reveals that the variety of learning materials is the number one factor that promotes the use of MOOC by our students. According to Hone & El Said (2016), course content significantly enhances retention. Sujatha and Kavitha (2018) stated that a mixture of lectures, reading passages, exercises and illustrations is imperative to motivate learners to complete the MOOC course. Having diverse instructional materials will aid in addressing different learning styles and therefore increase the retention rate. Other factors that influence MOOC usage by our students are flexibility in accessing the course content and learning pace. These are similar to previous findings on the advantages of MOOC (Bodenham, 2019; Hone & El Said, 2016; Robinson, 2016; Sujatha R., 2018). Having the freedom to access the materials anytime anywhere without being constrained by time allows learners to complete the tasks at

their convenience.

The top three problems which hinders students from using MOOC are a poor internet connection, lack of physical interaction and support from tutors and lack of student-student interaction. A study by Zulkifli et al. (2020) at a polytechnic in the south Malaysia revealed that low internet or Wi-Fi coverage is the biggest barrier to teaching and learning using MOOC despite students eagerness to commit. Lack of physical interaction is one of the major differences between online learning and on-campus learning that negatively affect students' perception of the former (Khalil et al., 2020). Students feel that they received less social interaction and technical support with online learning (Muilenburg, 2005). As stated by Cheng et al. (2014), interactions through online forums create a positive impact on learners' perception towards MOOC.

Even though MOOC has been recognised as an important tool to widen access to higher education, the effectiveness has always been debatable. This research provides us with some insights on the students' preference on MOOC usage in their study. This was corroborated by a study that suggested that many complex factors are influencing the effectiveness of MOOC in health sciences education (Longhini et al., 2021). A multidisciplinary approach both in the design and implementation of MOOC should be addressed. Thus, the findings of this study will aid educators in constructing more attractive and effective MOOC courses that would promote students' engagement in MOOC. Moreover, this would provide students with a more flexible yet effective learning experience especially when online distance learning has become a new norm in education, globally.

The strength of this study is that it used qualitative data to evaluate learners' reactions to the learning and skills gained from MOOC. However, MOOC should be evaluated and analysed based on learning theories such as behaviourism, cognitive constructivism and social constructivism (include connectivism) (Picciano, 2017). Hence more questions in each domain should be addressed to establish a more conclusive theoretical foundation for MOOC developed in this faculty. Furthermore, the limitation of the study was no data were gathered from pre-course surveys and post-course surveys, depending mostly on the respondent's self-reported data.

CONCLUSION

Advancement in technology has brought a new paradigm shift in the education field. Despite challenges and hurdles, new alternatives and innovations in teaching modalities are readily accepted by students and educators. With the use of MOOC as a standalone or blended in existing curriculum, quality education can be provided even in trying times like the COVID-19 pandemic. Moreover, MOOC is capable of ensuring transferable credits both for university and continuing education that may benefit many in this emergency phase. This study highlights factors that influence the use of MOOC among pharmacy students of UiTM Puncak Alam that will allow educators to recognise the issues and devise the best strategies to maximise the quality of MOOC. Variety of learning materials, flexibility, internet connection and interaction are among factors influencing MOOC usage. Designing MOOCs with diverse teaching materials and making them readily accessible by students may enhance students retention to complete the MOOC courses. To overcome the challenges concerning internet connection, universities should improve their infrastructure especially internet connection so that a conducive environment for online learning can be provided to students. MOOCs should offer more opportunities for synchronous and asynchronous interactions, be it student-student or student-instructor interactions to avoid students feeling left out. This will hopefully provide enough support if not equal to what students will receive in a face-to-face classroom. It is important to note that although MOOC offers freedom in terms of time, space and pace to the students, discipline is crucial factor that ensures the completion of the course. Students are required to manage their time efficiently and take the effort to complete the tasks within the required time frame. Future studies could explore the correlation between the intention of enrolling in MOOC courses and the rate of engagement in the activities and completion of the course.

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