Technology Acceptance of Massive Open Online Courses in Malaysia

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Abstract

The past few years have witnessed the emergence of massive open online courses (MOOCs) as a learning trend in the field of open distance education. Previous studies have indicated that there are limited studies which focus on the technology acceptance of MOOCs in a South East Asia perspective. Thus, this study investigates a national MOOCs initiative where the technology acceptance of MOOCs is studied. Data was collected via an online survey distributed to 1,055 students using MOOCs. Findings were obtained based on aspects of the Unified Theory of Acceptance and Use of Technology (UTAUT) model that are 1) performance expectancy, 2) effort expectancy, 3) social influence, 4) facilitating conditions, 5) behavioural attention, as well as three other factors 6) attitude, 7) self-efficacy and 8) anxiety. Findings revealed that students accepted MOOCs as a technology for learning. Results also indicated that positive results were gained for four of the UTAUT factors except behavioural intention. With regards to the non-UTAUT factors, encouraging results were gained for attitude and anxiety, yet mixed results were obtained for self-efficacy. The findings of this study could be useful for understanding MOOCs from a Malaysian perspective as well as a South East Asia and global comparative perspective.

Keywords: massive open online courses, open education, distance learning, UTAUT model, Malaysia MOOCs, higher education

Introduction

The emergence of massive open online courses (MOOCs) has great impact on the educational field, particularly in the distance education field. MOOCs differ from traditional online courses as students participating in the courses are massive – scaling up to thousands of students per course (Siemens, 2013). As the number of students is quite large, this shifts the dynamics of the pedagogy in a sense that students are required to be more independent in learning due to the instructor-student ratio (Liyanagunawardena, Adams and Williams, 2013). MOOCs also allow a global set of learners to learn from an 'open-based' learning environment (Daniel, 2012; Grover et al., 2013). MOOCs learners are very diverse – ranging from people who work in industries (e.g. engineers and architects) to people who work at home (e.g. housewives) and from learners who are young to learners who are old. As MOOCs learners may come from different backgrounds, the learners may apply various approaches, pedagogical context and aims in their learning (Grover et al., 2013). In other words, MOOCs have transformed the context of learning in which learners can learn outside the 'boundaries of learning institutions' (Kop, 2011).

To date, MOOCs are categorised according to cMOOCs and xMOOCs. cMOOCs are founded based on the theory of connectivism while xMOOCs are laid on the behaviourist theory (Daniel, 2012). Both types of MOOCs have their benefits and limitations. For cMOOCs, these type of MOOC are based on the theory of 'connectivism,' where learning is viewed as a process of generating and linking networks that connect knowledge (Siemens, 2013). In contrast to cMOOCs, xMOOCs are developed in an enclosed platform providing some sort of structure as to which learning resources are available to learners. xMOOCs are also beneficial as they have been reported to create a 'tutor-like' learning space (Adams et al., 2014).

Although MOOCs have been developed since 2008, limited studies have investigated the technology acceptance of MOOCs, particularly in the South East Asia context (Hara, Moskal and Saarinen, 2013; Lim, Lee and Lee, 2014; Nor Fadzleen, Rose Alinda and Ohshima, 2014). Global studies on technology acceptance of MOOCs include works of Kelly (2014) and Boe (2014) where the former studied the path analysis of the

technology acceptance model (TAM) while the latter investigate teachers' technology acceptance using TAM. In an attempt to study the technology acceptance of MOOCs in the South East Asia context, particularly Malaysia, the study investigate technology acceptance using the Unified Theory of Acceptance and Use of Technology model (UTAUT) by Venkatesh et al. (2003).

Methodology

MOOC for Ethnic Relations

Malaysia MOOCs are the initiative by Ministry of Education Malaysia in collaboration with public universities. A pilot study of the initiative was carried out with four public universities which were Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Teknologi MARA and Universiti Malaysia Sarawak. The respective universities developed four MOOCs for courses on ethnic relations, Asia and Islamic civilisation, introduction to computer and introduction to entrepreneurship. The learning platform chosen for the deployment of Malaysia MOOCs was the OpenLearning platform at https://www.openlearning.com/ malaysiamoocs. These courses are compulsory for undergraduate students in Malaysian universities. In this pilot study, the learning content and tasks developed in the MOOCs covered at least 30% of the whole course syllabus. All instructors of these four courses were recommended to utilise the MOOCs as learning resources. These four courses were conducted as a blended learning course – where 30% of the course was conducted in MOOCs while the remaining percentage was carried out according to course instructors in their respective universities.

The ethnic relations course is a compulsory course which is required to be completed by all undergraduate students in Malaysian public universities. The course is aimed to expose students to the issues related to ethnic relations in Malaysia from the perspective of social cohesion. The MOOC learning content and tasks were developed in *Bahasa Malaysia* (Malay language) by the Universiti Kebangsaan Malaysia – where the Center of Teaching and Learning Technologies acted as a project manager and the CITRA Center as subject-matter experts, the Information Technology Center as technical experts and content developers, and the Corporate Communication Center as videographers. Since the course launched on

1 September 2014, the total students enrolled in the course after four months was over 12,000 students.

Data Collection and Analysis Procedures

Online surveys were used to collect data that was aimed at assessing the technology acceptance of Malaysia MOOCs. The respondents of the survey were 1,055 students who were taking the ethnic relations MOOC from September 2014 to December 2014. The questionnaire was developed based on the works of Venkatesh et al. (2003) and Marchewka, Liu and Kostiwa (2007), where both studies focused on the assessment of technology acceptance using the UTAUT model. The UTAUT model is selected rather than any other technology acceptance model due to the fact that this model is a technology acceptance model that has high reliability and validity. The model was developed based on a combination of eight models which explained usage behaviour in information systems. The eight models include the theory of reasoned action, technology acceptance mode, motivational model, theory of planned behaviour, a combined theory of planned behaviour, model of personal computer use, diffusion of innovations theory and social cognitive theory (Venkatesh et al., 2003). In the model, Venkatesh et al. (2003) discovered that technology acceptance model covered the following aspects (Ventakesh et al., 2003; Marchewka, Liu and Kostiwa, 2007):

1. Performance expectancy – users' expectancy of the technology in assisting them to increase their work performance
2. Effort expectancy – technology's ease of use
3. Social influence – users' perception of whether others believe that they should use the technology
4. Facilitating conditions – user's perception of support for technology use in terms of organisational and infrastructural level
5. Behavioural intention – user's intention to use the technology

This study also includes three non-UTAUT factors studied by Marchewka, Liu and Kostiwa (2007), which are attitude, self-efficacy and anxiety:

6. Attitude – user's attitude toward using the technology
7. Self-efficacy – users' perception of their own ability to complete a task using the technology
8. Anxiety – users' anxiety state of using the technology

The study did not include the behaviour factor of the UTAUT model as it was investigated using MOOC analytics and is not covered in this paper. The data was analysed using descriptive statistics using the Statistical Package for the Social Sciences (SPSS) software.

Results

The results are discussed according to the UTAUT factors that include performance expectancy, effort expectancy, social influence, behavioural attention and facilitating conditions. Three other non-UTAUT factors (i.e. attitude, self-efficacy and anxiety) as well as demographical results are also explained.

Demography

The respondents of the survey were 1,055 students (308 males and 747 females) who were taking the MOOCs from September 2014 to December 2014. The respondents were aged 19–20 years old (72%) and 21–22 year old (19%) while the rest of them were 23 years old or more. Most of the participants were from public universities in Malaysia – 15% were from Universiti Kebangsaan Malaysia, 15% from Universiti Malaysia Sabah, 13% from Universiti Putra Malaysia, 11% from Universiti Utara Malaysia, 10% from Universiti Malaysia Sarawak while the remaining were from other universities. With regards to their ICT competency, most of the respondents where either competent or highly competent (91%). For MOOCs as learning platforms, 40% of them have used MOOCs for learning while the remaining respondents have never used MOOCs for learning purposes.

UTAUT Factors: Performance Expectancy, Effort Expectancy, Social Influence, Behavioural Intention and Facilitating Conditions

For the UTAUT factors, positive results were gained for most of the five factors, as shown in Table 1. In terms of performance expectancy, the students perceived that MOOCs assisted them in learning (74.6%), enabled in quicker task completion (69.8%), increased their productivity (73%), and increased their understanding in learning (74.2%). With regards to effort expectancy, students' perception were also positive,

where they agreed that interactions in MOOCs was easy (72.3%), it was easy to enhance their skills by using MOOCs (71.5%), MOOCs was easy to use (76.9%), and they found that it was easy to learn on how to use MOOCs (77.1%).

For the social influence, more than half of the respondents (58.3%) perceived that people who influence their behaviour think they should use MOOCs for learning and half of the students (51.9%) perceived that people who are important to them think they should use MOOCs. The majority of the respondents also perceived that their lecturers think that they should use MOOCs (85.7%) as well as perceived that the university thinks they should use a learning platform (83.6%). With regards to behavioural intention, the students agreed that 64% of them intend to use MOOCs immediately. Only half of them (50.8%) intend to use the platform for the next two months and similarly, only half of them (50.7%) predicted that they would use MOOCs as a platform for learning. For facilitating conditions, 69.5% of the respondents agreed that they have sufficient resources for MOOCs usage while 68.9% of them perceived that they have sufficient knowledge to MOOCs. Out of 1,055 students, 667 of them agreed that they gained support when having problems with MOOCs.

Table 1 Survey results for performance expectancy, effort expectancy and social influence (N=1,055)

Factors	Questionnaire item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Performance expectancy (PE)	PE1: MOOCs assisted me in learning.	53 (5%)	215 (20.4%)	553 (52.4%)	234 (22.2%)	2.92	0.788
	PE2: MOOCs enabled me to complete my learning tasks more quickly.	64 (6.1%)	255 (24.2%)	522 (49.5%)	214 (20.3%)	2.84	0.814
	PE3: MOOCs enabled me to increase my productivity in learning.	58 (5.5%)	227 (21.5%)	545 (51.7%)	225 (21.3%)	2.89	0.798

Table 1 (*continued*)

Factors	Questionnaire item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev.
	PE4: MOOCs enabled me to increase my understanding in learning.	54 (5.1%)	216 (20.5%)	540 (51.0%)	245 (23.2%)	2.93	0.798
Effort Expectancy (EE)	EE1: I could easily interact in MOOCs.	56 (5.3%)	240 (22.7%)	524 (50%)	235 (22.3%)	2.89	0.807
	EE2: It was easy to enhance my learning skills by using MOOCs.	65 (6.2%)	236 (22.4%)	541 (51.3%)	213 (20.2%)	2.85	0.807
	EE3: MOOCs were easy to use.	51 (4.8%)	193 (18.3%)	519 (49.2%)	292 (27.7%)	3.00	0.809
	PE3: MOOCs enabled me to increase my productivity in learning.	58 (5.5%)	227 (21.5%)	545 (51.7%)	225 (21.3%)	2.89	0.798
	EE4: It was easy to learn how to use MOOCs.	40 (3.8%)	202 (19.1%)	539 (51.1%)	274 (26.0%)	2.99	0.777
Social Influence	SI1: People who influence my behaviour think I should use MOOCs for learning.	104 (9.9%)	336 (31.8%)	460 (43.6%)	155 (14.7%)	2.63	0.851
	SI2: People who are important in my life think I should use MOOCs for learning.	131 (12.4%)	377 (35.7%)	426 (40.4%)	121 (11.5%)	2.51	0.853

Table 1 (*continued*)

Factors	Questionnaire item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev.
	BI3: I predict that I will be using MOOCs in the next two months.	153 (14.5%)	367 (34.8%)	436 (41.3%)	99 (9.4%)	2.46	0.852
	SI4: My university thinks I should use MOOCs for learning.	28 (2.7%)	145 (13.7%)	488 (46.3%)	394 (37.3%)	3.18	0.764
Behavioural intention	BI1: I intend to use MOOCs immediately.	89 (8.4%)	290 (27.5%)	501 (47.5%)	175 (16.6%)	2.72	0.838
	BI2: I intend to use MOOCs for the next two months.	146 (13.8%)	373 (35.4%)	437 (41.4%)	99 (9.4%)	2.46	0.845
	BI3: I predict that I will be using MOOCs in the next two months.	153 (14.5%)	367 (34.8%)	436 (41.3%)	99 (9.4%)	2.46	0.852
Facilitating conditions	FC1: I have sufficient resources to use MOOCs.	67 (6.4%)	254 (24.1%)	510 (48.3%)	224 (21.2%)	2.84	0.827
	FC2: I have the sufficient knowledge to use MOOCs.	64 (6.1%)	264 (25.0%)	524 (49.7%)	203 (19.2%)	2.82	0.809
	FC3: I get the support from a specific person/group when I face difficulties with MOOCs.	86 (8.2%)	302 (28.6%)	498 (47.2%)	169 (16.0%)	2.71	0.830

Table 2 Attitude, self-efficacy and anxiety (N=1055)

Other factors	Questionnaire item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Attitude (A)	A1: I prefer to use MOOCs for learning.	89 (8.4%)	351 (33.3%)	443 (42.0%)	172 (16.3%)	2.66	0.848
	A2: Using MOOCs increased my motivation during learning.	73 (6.9%)	311 (29.5%)	480 (45.5%)	191 (18.1%)	2.75	0.830
	A3: MOOCs makes learning more interesting.	54 (5.1%)	205 (19.4%)	489 (46.4%)	307 (29.1%)	2.99	0.831
	A4: It was easier for me to learn by using MOOCs.	71 (6.7%)	292 (27.7%)	482 (45.7%)	210 (19.9%)	2.79	0.837
Self-efficacy (SE)	SE1: I could complete my tasks by using MOOCs if there is no one instructing me to act.	137 (13.0%)	400 (37.9%)	409 (38.8%)	109 (10.3%)	2.46	0.846
	SE3: I could complete my tasks by using MOOCs by using the built-in facilities available in the MOOC.	86 (8.2%)	375 (35.5%)	458 (43.4%)	136 (12.9%)	2.61	0.812
	SE2: I could complete my tasks by using MOOCs if I can seek of assistance when facing difficulties in learning.	81 (7.7%)	348 (33.0%)	498 (47.2%)	128 (12.1%)	2.64	0.792

Table 2 (*continued*)

Other factors	Questionnaire item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Anxiety (AX)	AX1: I felt anxious to use MOOCs for learning	287 (27.2%)	424 (40.2%)	265 (25.1%)	79 (7.5%)	2.13	0.898
	AX2: I felt anxious that I will lose a lot of data if I click the wrong button.	215 (20.4%)	392 (37.2%)	327 (31.0%)	121 (11.5%)	2.34	0.928
	AX3: I feel afraid to use MOOCs for learning.	391 (37.1%)	385 (36.5%)	214 (20.3%)	65 (6.2%)	1.96	0.905

Non-UTAUT Factors: Attitude, Self-efficacy and Anxiety

Three other factors, which are not UTAUT factors, were also assessed in the survey, as summarised in Table 2. The factors are attitude, self-efficacy and anxiety. In terms of attitude, 58.3% of the respondents agreed that they prefer learning using MOOCs, while the remaining 41.7% did not prefer the platform for learning. The students were also inquired about their motivation using MOOCs, whether the platform makes learning more interesting, as well as whether MOOCs made learning easier. A total of 63.6% of the students perceived that MOOCs increased their motivation during learning, while more than two thirds of them (75.5%) agreed that the platform makes learning more interesting. In addition, 692 out of 1,055 respondents (65.6%) agreed that MOOCs made learning easier for them.

With regards to self-efficacy, mixed results were gained for the three items inquired. Less than half of the students (49.1%) perceived that they could complete the tasks in MOOCs if there was no one instructing them to act while more than half of them (59.3%) agreed that they could complete task if sufficient assistance is provided when facing difficulties. For the third item, 56.3% of the respondents agreed that they could complete their learning tasks using the MOOCs' built-in facilities. In terms of anxiety, less than one third of respondents (32.6%) felt anxious to use MOOCs for learning while a lesser percentage of them (26.5%) also agreed that they did not feel afraid of using MOOCs for learning. Less than half of the

students (42.5%) also agreed that they did not feel anxious about losing data due to clicking the wrong button in MOOCs.

Discussion

Discussion on UTAUT Factors

Overall, positive results were gained for the UTAUT factors (i.e. performance expectancy, effort expectancy, social influence, behavioral intention and facilitating conditions). This indicates that students in South East Asia context accepted the use of MOOCs as a learning platform. The most positive results obtained were for the performance expectancy, effort expectancy and facilitating conditions factors. This can be linked to the works of Adams et al. (2014) and Guo, Kim and Rubin (2014). Adams et al. (2014) studied the effects of video lectures in MOOCs. These lectures contained pre-recorded teaching videos where the instructors were present in the lectures as 'talking-heads'. They discovered that by using talking-heads, an unexpected intimate tutorial space was created – as if the lecturers were speaking directly to them. The study also found out that by having instructors in the videos, students felt that instructors were always there for them. In another study, Guo, Kim and Rubin (2014) revealed that students were more engaged in learning via talking-heads rather than PowerPoint slides. Linking back to the MOOCs that we developed, this suggests that talking-heads video could be useful in the development of learning content of MOOCs in order to improve performance expectancy (e.g. assist and increase understanding in learning). However, this type of video lectures should be explored further as there is tendency to perceive video lectures as the most effective tool for learning in MOOCs, especially xMOOCs. Future studies could examine which formats of learning content delivery are the most appropriate for MOOCs.

Mixed results were obtained for the social influence and behavioural intention factors. With regards to social influence, half of the students perceived that people who have a great influence on their behaviour and are important to them would think that MOOCs are important in learning.

This could be due to the fact that MOOCs is a relatively new field in learning for South East Asia (Hara, Moskal and Saarinen, 2013; Manalo, 2014) causing the public to be less aware of MOOCs' potential. On the

other hand, positive results were achieved for the support of MOOCs usage from lecturers and universities, where a majority of the respondents perceived that their lecturers (85.7%) and universities would think that they should use MOOCs for learning (83.6%). Since MOOCs in Malaysia is a recent initiative at the governmental level, this may have the reason behind such positive results. For behavioural intention, only half of them (50.8%) intend to use the platform for the next two months and similarly, only half of them (50.7%) predicted that they would use the platform for learning. This could be caused by the lack of MOOCs that are developed specifically for the Asian community (Mohd Ismail and Doria, 2014; Jung and Yoo, 2014; Nor Fadzleen, Rose Alinda and Ohshima, 2014).

Discussion on Non-UTAUT Factors: Attitude, Self-efficacy and Anxiety

Positive results were gained for the attitude factor where a large number of respondents perceived that MOOCs made learning more interesting and easier for them. Interestingly, only 58.3% of students preferred learning using MOOCs, while the remaining did not prefer the platform. This could be caused by the nature of MOOCs that requires a high level of autonomy in learning that do not suit some learning styles of particular students. This can be linked to the previous studies in MOOCs where they discovered that self-directed learning in MOOCs has caused students to be disoriented and 'loss' during learning (Mackness et al., 2013; Kop, 2011).

With regards to self-efficacy, more than half (50.9%) of the students perceived that they could not be able to complete the tasks in MOOCs if there was no one instructing them to act. Again, this could be related to the preferences of learning where some learners possessed a higher autonomy over learning while other would require a higher level of guidance from instructors. Such limitations could be overcome by implementing pedagogical agents as virtual tutors. However, it would be interesting to investigate whether the agents would actually enhance or disrupt learning. As for the final factor, anxiety, most of them felt less anxious (32.6%) to use MOOCs for learning. Although this showed that two thirds of the students were not anxious in using MOOCs, the remaining one third of the students expressed anxiety. This could be caused by the anxiousness of students who are new to MOOCs. In a related study, Kop (2011) reported that newcomers were overwhelmed and confused with the management of

a high level of resources and contributions by other MOOCers. It would be beneficial to explore approaches on reducing anxiety in using MOOCs (e.g. providing online manuals for MOOCs usage).

Conclusion and Future Directions

The paper has presented the findings of technology acceptance towards MOOCs in Malaysia on ethnic relations based on UTAUT and non-UTAUT factors. This study discovered that MOOCs were accepted as technology for learning where positive results were gained for UTAUT factors (i.e. performance expectancy, effort expectancy, social influence, behavioural intention and facilitating conditions). Yet, for non-UTAUT factors such as attitude, self-efficacy, and anxiety, mixed results were gained where only approximately 60% of students preferred MOOCs for learning and more than 50.9% of students could not be able to complete the learning tasks if no one was instructing them to act. With regards to anxiety, it was found that most of the students felt less anxious (32.6%) to use MOOCs for learning.

As such, future directions based on the study's findings are suggested as follows. First, since the MOOCs in Malaysia on ethnic relations received positive results based on the UTAUT factors, other MOOCs for different domains should be developed. Second, as only 60% of the 1,055 students preferred MOOCs for learning, it would be interesting to further investigate as to which MOOC components and aspects could increase and decrease their preference towards using MOOCs for learning. Third, only 50.9% of the students had a higher level of self-efficacy to perform tasks in MOOCs without supervision. These prompt some interesting questions on the approaches to increase the levels of students' self-efficacy in conducting learning tasks. Some potential approaches include the implementation of learning style assessment and adaptive feedback. The learning style assessment on pre-MOOC, during MOOC and post-MOOC could be useful for personalising appropriate learning content and tasks for specific learners. When students are assessed for their learning styles, MOOCs could be tailored according to their preference in learning – whether it is visual, auditory, read/write or kinaesthetic. The assessment results could then be used to provide adaptive feedback in terms of pedagogical agents to encourage engagement and increase level of students' self-efficacy in completing learning tasks (Keong et al., 2013).

Although several positive results were discovered, some limitations of the study should be kept. First, this study investigates on a MOOC for learning about ethnic relations. Studies on more technical domains such as engineering or computer sciences could yield in different results in terms of technology acceptance of MOOCs. Second, the MOOCs content was conveyed in *Bahasa Malaysia* (Malay language). It would be interesting to investigate the use of other languages on learning about ethnic relations on MOOCs. Third, the type of learning content used in the MOOCs was restricted to 2D animations and 'live action' videos (i.e. video with people as actors) (Norazah et al., in press). Utilising different learning contents such as audio recordings or interactive slides could yield in different results towards technology acceptance of MOOCs. Finally, the study only assessed technology acceptance based on students' perception of MOOCs. Learning analytics, such as social participation network diagrams (Helmi et al., 2015), could be used to investigate participation level of students during learning.

In sum, the findings of this study could be useful for understanding MOOCs from a Malaysian perspective as well as a South East Asian and global comparative perspective.

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