

# MOOCs Acceptance and Use in Higher Education Institutions through UTAUT2: An Overview

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## Abstract

Massive Open Online Courseware (MOOC) offers a new alternative for learning and it has been widely accepted especially in many Higher Education Institutions (HEIs). This study critically reviewed MOOC acceptance and uses from the perspective of the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). This paper highlighted about background of MOOC, MOOC acceptance and use in HEIs, model of acceptance and use, UTAUT2 model, suggestions for future work, and conclusion. Based on the review, an interactive learning framework will be designed to support the teaching and learning processes among students and lecturers that provide an engaging and meaningful learning experience. It provides significant implications to improve and understand the acceptance and use of technology. Moreover, this study makes a significant contribution by giving suggestions for future work by using UTAUT2 with other variables and extends the theory with the integration of other latest technological advancements. Thus, indirectly the research can provide theoretical contributions in the field of education and information systems.

**Keywords:** Massive Open Online Courses, MOOCs, Higher Education Institutions, UTAUT2

## Introduction

Massive Open Online Courses (MOOCs) have become one of the most significant learnings platform in Higher Education. MOOCs are free online courses taught to student over the Internet. MOOCs are open, large-scale web-based courses structured and conveyed by institutions of higher education (Deng et al. 2018). Despite the fact that MOOCs are not new to educational plan structure, they have expanded consideration and examination in advanced education. A few universities in the world started to offer MOOCs through associations with MOOC providers (Hakami et al. 2018). Top five MOOCs providers supported courses are Coursera, EdX, XuetangX, Udacity and FutureLearn. MOOC courses generally center on business and computer science fields. Most of the courses offered in three key languages: English, Spanish, and French with 6,287, 634, and 323 courses, respectively (Shah, 2017). MOOC offers a few features, for example, cooperation, joint effort, self-reflection, and assessment that help learning encounters (de Waard et al. 2014). MOOC's course includes language of guidance and discussions, social foundation of educator, and limited course, which can give knowledge into student conduct across diverse contexts (Ruiperez-Valiente et al., 2019).

In spite of the growth in the number of MOOCs acceptance and use, there are a few issues encompassing its achievement in higher education contexts. The major issue raised is the consistently high dropout (or retention) of MOOC learners (Fianu et al. 2018; Hew et al. 2018). Most MOOCs had completion rates of less than 10%. For example, the top MOOC platforms such as Coursera and EdX have standard completion rates of less than 10% of student who registered for the course (Jordan, 2014). Research studies (Hew et al. 2014; Jordan, 2015), has shown that completion rates in MOOC courses could be under 10%, and such high dropout rates have happened over numerous institutions. However, according to course (Jordan, 2014), completion rate is not a suitable method to measure MOOCs achievement. Numerous studies have researched the factors affecting dropout in MOOCs. It has reported that span obviously course activity and students' demographic attributes, adequately foresee dropout. The psychological factors, such as students' motivation, self-regulation and self-efficacy also effect dropout. Yet, an absence of motivation among members considered the key purpose behind the high dropout rate (Shapiro et al., 2017; Xu & Yang, 2016). According to (Chen et al. 2019), misconceptions also have affect students' learning performance. However, no investigation on between misconceptions and student dropout found using this study's algorithm.

Although MOOCs developed since 2008, limited studies have examined in the area of MOOC acceptance and usage. This study reviewed articles on the acceptance and use of MOOC especially in universities of Malaysia. This study applied The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) to improve understanding of MOOC acceptance especially in the use of educational applications among students.

### **Background of MOOC**

Dave Cormier and Bryan Alexander coined Massive Open Online Courseware or known as MOOC in 2008, in light of a course considered Connectivism and Connective Knowledge that drove by Stephen Downes and George Siemens. It is to define connectivist learning on networks and MOOCs researched in open and distance education (Daniel 2012). This course was participated by 25 in-house students who paid education costs and 2,200 non-paying outer members. This first MOOC likewise use a few social media applications, for example, blogs, discussions and forums, Facebook, and Wikis. In the year 2012, the New York Times declared MOOCs as "The Year of the MOOC". The courses categorised MOOCs according to cMOOC and the xMOOC (Yousef et al., 2014).

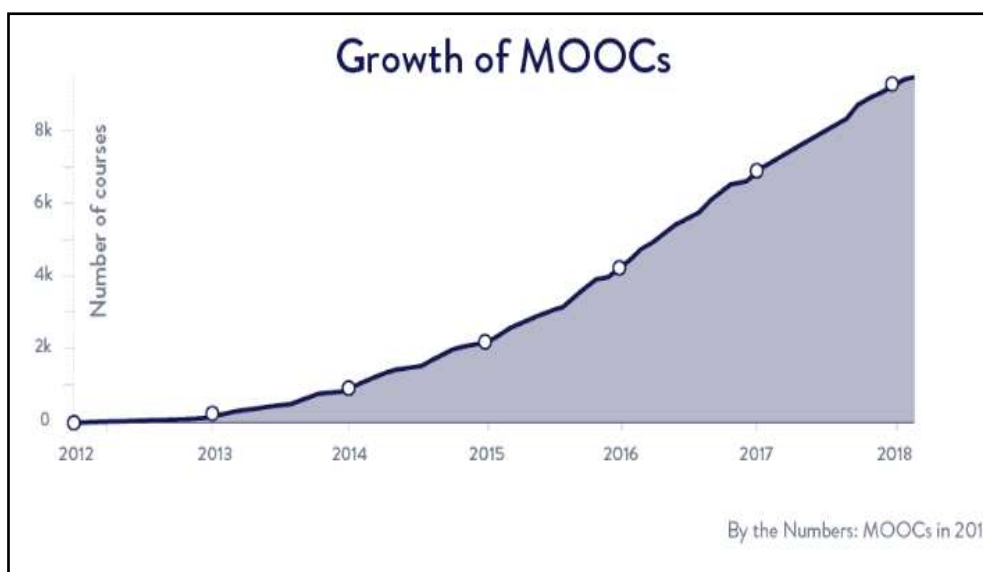
The cMOOC made dependent on the learning theory of Connectivism, which learning viewed as a process of generating and linking networks that connect knowledge (Yousef et al. 2014). The xMOOC falls into the cognitive-behaviourist pedagogical classification. The xMOOC is an extension of MOOCs which is the prevailing MOOCs nowadays that is offered by providers such as Coursera, Udacity, edX, etc. (Yousef et al. 2014; Admiraal et al., 2015). The goal of MOOC is to improve the level of networking between students and the community. Through this goal, students obtain the same skills and knowledge by the end of the program (Vardi, 2012). Organizations like universities use the MOOC as a current learning tool in global education to deliver information and course materials between course lecturers and students. It is because MOOC provides people from everywhere the chance to expand their learning freely without any commitment or prior requirements.

### MOOC Acceptance and Use in Higher Education Institutions

The number of MOOCs had increased rapidly since 2008 in HEIs. In 2018, approximately 9,400 courses offered by over 800 universities and 81 million people participated from all over the world. Figure 1 shows the development of MOOCs from 2012 to 2018 (Shah, 2017). Meanwhile, the study of MOOC acceptance and use in HEIs dominated by the field of education. However, past studies on the acceptance and use of MOOC have also focused on other areas such as industry, computer science, social sciences, and engineering (Costa et al., 2019). Studies of MOOC acceptance and use in education help open and distance education to gain a level of quality education in HEIs.

Acceptance and use of MOOC by students determined by several factors. The potential impact of MOOC on HEIs have brought up important issues to provide MOOC environments and their impact on lifelong learning opportunities. Yet, this issue is still unclear (Ulrich & Nedelcu, 2015). Additionally, HEIs and the Ministry of Higher Education need to understand the process of acceptance of technology to respond such questions: Why does a learner or lecturer chooses to accept and use MOOC while another opposes? What are the factors of acceptance and use of MOOC? Technology acceptance and diffusion theory like UTAUT2 can help answer these questions. However, the UTAUT2 model does not completely address the extraordinary setting of the MOOC (Leong & Ravichandran, 2017). Attempts to apply the acceptance model information to explain student use and intent in using MOOC and MOOC applications are limited. These require further and detailed investigations to determine whether the model needs modification to identify MOOC acceptance and use. Fianu et al. (2018); dan Hudiya et al. (2017) suggested that further study conducted on the acceptance and use of MOOC and focused on student acceptance and use factors including usage behaviour, and all independent variables of UTAUT2 should be done. Several studies conducted on the acceptance and use of MOOC in Malaysia and abroad but studies of MOOC acceptance in the Malaysian education system using UTAUT2 models are limited.

In the context of Higher Education, there is a flourishing interest in MOOC where new courses kept on being made and propelled as forcefully as could be. More than 800 universities around the globe have propelled in any event of MOOC. MOOC providers are also joining forces with organizations to launch courses. The complete number of MOOCs that declared stands at 9,400, up from 6,850 last year. It was started by Udacity in 2012, an organization established by Sebastian Thrun and an aggregate of 90,000 students enlisted for 24 courses offered by Udacity for its initial two classes alone. This is trailed by Coursera which work together with 70 Higher Education including Princeton University and Stanford University. EdX launched in May 2012 by means of cooperation between Harvard University and Massachusetts Institute of Technology (MIT) offering seven courses at the underlying stage, pulling in 53,000 enrolled students around the world (Pappano, 2012). Figure 1 shows the development of MOOCs within the range of six years (2012-2018).



**Figure 1. Growth of MOOCs (2012-2018) (Shah 2018)**

The Malaysian Blueprint for Higher Education launched the Globalized Online Learning (GOL). The central focus of GOL is on the open education in the context of MOOC, which significantly improves the field of open and distance education. The existence of MOOC in education changes the paradigm of open and distance learning. MOOC is a learning and teaching innovation that allows courses offered to be accessible and open online encompassing 10,000 to 100,000 students at a time (Yousef et al. 2014). Despite the fact that MOOCs created since 2008, limited studies have explored on determining influential predictors for learners' acceptance and use of MOOCs (Admiraal et al., 2015; Baturay, 2015) particularly in the context within. In addition, the majority learner from the previous paper did not know the MOOC concept (Costa et al. 2019). Understanding the nature of learners and their acceptance of online education is crucial to the success of any MOOC provider, especially those in which learners expected to be self-motivated and self-directed in their learning. This study reviewed articles on the acceptance and use on MOOC acceptance and use based on several theories such as UTAUT and UTAUT2. The literature analysis implemented and mapped using the UTAUT2 model to better understanding the acceptance and use of MOOC among students. Subsequently, MOOC model designed to support interesting and meaningful learning & teaching processes.

### **Model of Acceptance and Use**

Table 1 shows the models or theories of technology acceptance. There are the Social Cognitive Theory (SCT), Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), the Extended Technology Acceptance Model (TAM2), Unified Theory of Acceptance and Use of Technology (UTAUT), and the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). This study used the UTAUT2 for the theoretical framework.

Table 1.

*Models or Theories of Technology Acceptance*

No	Theory	Person Introduced	Year
1	Theory of Reasoned Action (TRA)	Ajzen & Fishbein	1980
2	Theory of Planned Behaviour (TPB)	Ajzen	1985
3	Social Cognitive Theory (SCT)	Compeau & Higgins	1995
4	Technology Acceptance Model (TAM)	Davis	1989
5	Extended Technology Acceptance Model (TAM2)	Venkatesh and Davis	2000
6	Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh et al.	2003
7	Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)	Venkatesh et al.	2012

The Unified Theory of Acceptance and Use of Technology (UTAUT) model was created by (Venkatesh et al. 2003), based on eight theoretical models of technologies' acceptance. UTAUT model comprises of four constructs: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and four moderating variables: Gender, Age, Experience, and Voluntariness of Use.

Studies about MOOC's acceptance and use dominated as in the education field. However, previous studies on the acceptance and use of MOOC also focused on other areas such as information technology and computer science (Gasevic et al. 2014). Past studies on the acceptance and use of MOOC use various theories and models as they focus on different contexts and objectives. Although various theories and models used, UTAUT and UTAUT2 have become the main theory in studying the acceptance and use of MOOC (Yousef et al. 2014; Baturay, 2015). Previous studies also found that many acceptance studies apply UTAUT models in various area compared to other models (Hamdan et al. 2015). Student acceptance and use of MOOC at HIEs should examined to see the acceptance of students in the Malaysian education system. One of the studies conducted among university students to examine factors affecting MOOC's acceptance of ethnic relations. The finding shows that positive outcomes for most of the five factors of UTAUT, which are Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions and Behavioural Intention. Other factors such as attitude, self-efficacy, and concern show different decisions. Learning styles used to evaluate MOOC's learning of students according to their learning style (Deng, 2017). Hence, the understanding of technology adoption and students' learning styles need consideration in developing effective MOOC education. Contrary, (Deng, 2017) found that factor in UTAUT such as performance expectancy, effort expectancy, social influence and other factors such as perceived playfulness will have a significant impact on the acceptance and use of MOOC. Perceived playfulness influenced moderately by gender variables.

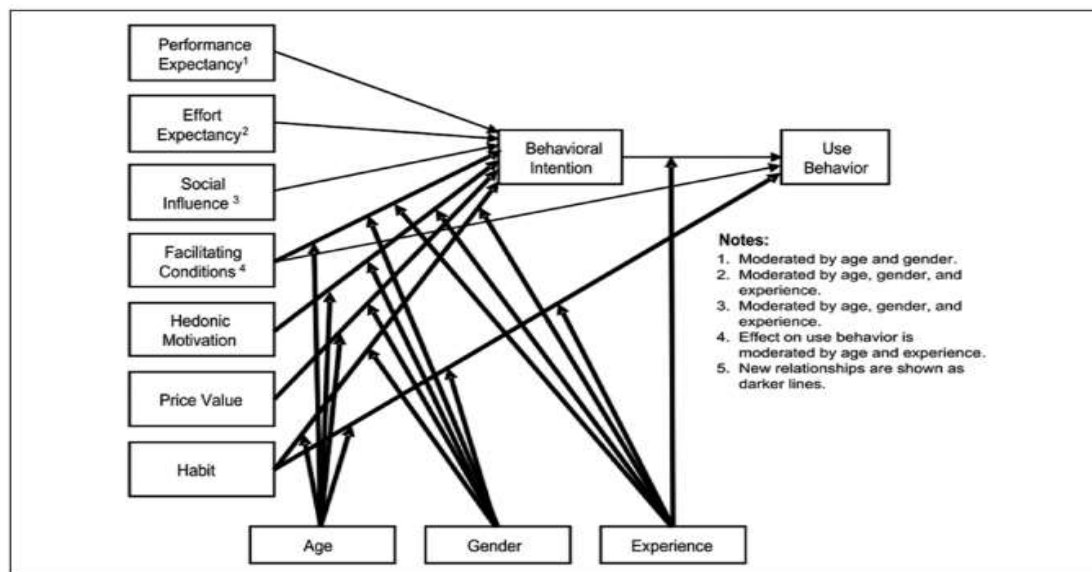
UTAUT's theory has high reliability and validity because of the combination of eight models describing behavioural use in information systems and assessed from employee perceptions (Im et al. 2011). Meanwhile, UTAUT2 theory possess a high level of reliability when assessed from user context (Venkatesh et al. 2012). The finding of an empirical study on the acceptance and use of MOOC using the UTAUT2 model shows intention to join in MOOCs intercedes the relationship among Habit and MOOC Actual Usage (Limayem et al. 2007). This study uses a structural equation model approach (SEM) to test UTAUT2 models and hypothesis relationships between UTAUT2 ideas. The implication of this study shows that

MOOC designers need to be more sensitive and ready to design interesting and easy-to-use learning applications. The most important learning environment should be in line with the advancement of Web 2.0 technology (Limayem et al. 2007).

### UTAUT2 Model

Unified theory of acceptance and use of technology (UTAUT) developed by Venkatesh et al. (2003) explained factors affecting acceptance and use of technology. According to Venkatesh et al. (2003), UTAUT developed as combination of eight models that are predominantly utilized in earlier examinations for clarifying acceptance and use of new technology. These eight models and theories include Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Combined TAM and TPB (C-TAM-TPB), Motivational Model (MM), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) (Venkatesh et al. 2003).

Figure 2 shows the extended theory of acceptance and use of technology (UTAUT2) proposed by Venkatesh et al. (2012), to investigate factors influencing acceptance and use of technology with consumers' point of view. This theory extends the UTAUT by adding three new constructs, which are Hedonic Motivation, Price Value and Habit. Meanwhile, UTAUT2 maintaining the four main constructs which are Performance Expectancy, Effort Expectancy, Facilitating Conditions and Social Influence. These three new constructs adapted from the concept of habit (Limayem et al. 2007), hedonic motivation (Van-der-Heijden, 2004) and use of technology (Burton-Jones & Hubona 2006; Ketterl et al. 2011). UTAUT2 continue four constructs of UTAUT together with the three of new constructs.



**Figure 2. Unified Theory of Acceptance and Use of Technology (UTAUT2) Model (Venkatesh et al. 2012)**

### Performance Expectancy

Performance expectancy can be defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh et al. 2003). Online learning like MOOC allows students to access learning materials from courses that they are participating and delivering completed tasks online. Performance expectancy expected to be one of the most important factors that directly influence the acceptance intention (Decman, 2015).



**Effort Expectancy**

Effort expectancy can be defined as the degree of ease associated with the use of the system (Venkatesh et al. 2003). To use online learning like MOOC, students need to believe that MOOC matches the needs and values required. Past studies have shown that effort expectancy make a significant impact on behavioural intentions. Self-efficacy is a powerful and persistent determinant of individual behaviour on the actual use of the system or intention to use the system (Raman & Jambulingam, 2012).

**Social Influence**

Social influence is the degree to which an individual perceives that important people believe they should use the new system (Sumak et al. 2010). Social influence is a direct determinant of behavioural intention (Venkatesh et al. 2003). In this context, social influence defined as a stage of a student who believes that the individual who is important for the student should use the MOOC.

**Facilitating Conditions**

Facilitating conditions can be defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh et al. 2003). Facilitating conditions is an environmental factor for an action to be easy (Mazman & Usluel, 2010). A user who has access to a favourable set of facilitating conditions, such as online courses as MOOC will have a greater intention to use.

**Hedonic Motivation**

Hedonic Motivation can be defined as the fun or pleasure derived from using a technology (Van-der-Heijden 2004). Hedonic motivation plays an important role in determining the acceptance and use of a technology (Venkatesh et al. 2012). In this study, hedonic motivation refers to students who use the MOOC in learning and find it enjoying, fun and entertaining. Therefore, students become motivated to learn the topics through MOOC and these students tend to continue to use the MOOC.

**Price Value**

Price value is the consumers' cognitive trade-off between the perceived benefits of using mobile banking services and the monetary cost of using it (Venkatesh et al. 2012). It includes factors such as data service carriers cost, device cost, service cost, and transaction fee, where appropriate. The price value is positive when the benefits of using the technology perceived to be greater than the associated monetary cost.

**Habit**

Habit can be defined as the extent to which individuals tend to behave automatically because of the learning gained from experience using certain technologies (Venkatesh et al. 2012). According to (Davis and Venkatesh 2004), habit known as the determinants of behavioural intentions. Research in the Information System (ICT) indicates that habit has a significant impact on the behavioural intention of using a technology (Lee at al. 2014). Habit affects the intention of behaviour towards the acceptance and use of user technologies, such as MOOC. Habit can be measured through the extent in which individual beliefs in behaviour and actions change into a habit (Limayem et al. 2007).

### Suggestions for Future Work

The acceptance of technologies applied different models in different criteria. The Unified Theory of Acceptance and Use of Technology (UTAUT) and the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) are the famous theories, but its sustainability should be tested in e-learning environments, particularly obligatory ones. UTAUT theory had high reliability and validity as it combined eight models that described usage behaviour in information systems as well as assessing employees' perceptions (Norazah et al. 2016; Deng 2017; Al-Shami et al. 2018). While UTAUT2 theory, examined the high level of reliability and confidence of technology in information systems use and evaluated from the context of users (Venkatesh et al. 2012). The review of MOOC acceptance and use currently dominated by the education field. However, it should also focus on other areas such as industry, computer science, social science, and engineering (Gasevic et al. 2014).

Relatively few studies have examined students' acceptance and use of MOOC in HEIs context from the perspective of UTAUT (Deng 2017; Ayub et al. 2017; Al-Shami et al. 2018), while for UTAUT2, very little study have been done in the present literature (Lim et al. 2017; Esteve et al. 2017). Hence, it is vitally important to consider students' acceptance and use of MOOCs based on the perspective of UTAUT2 in the future. Future work suggested that UTAUT2 theory should combined with other variables, e.g., learning styles and personal innovativeness. More studies needed in order to accurately observe the levels of reliability and confidence in the use of MOOC technology. Additionally, by approving the current constructs of UTAUT2 with other variables help future researchers in examining the adoption and use of MOOC successfully.

Since the UTAUT2 concerned with both the adoption of technology and its continuous use, the second future work suggested is the combination of other new technological tools such as Moodle and mobile social media with UTAUT2 theory. The combination of other new technological tools with UTAUT2 theory has enabled us to improve the limitations of the formal education system. Further, proposed conceptual framework using UTAUT2 theory can help the applicable experts comprehend students' acceptance and take important actions for better integration of new technological tools.

### Conclusion

MOOC provides opportunities for the new generation with better learning method especially in distance education activities regardless of time and place. A comprehensive study of every aspect of MOOC is necessary as MOOC acceptance and use in Malaysia is still in the early stages and not widely implemented. Thus, using the UTAUT2 model, the acceptance and use of MOOC among students especially in the Malaysian education system need to identify. Based on the review, Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Hedonic Motivation, Price Value, and Habit have a significant role in the adoption of the latest technological advancements, such as MOOC. The UTAUT2 model is a powerful and appropriate model for studying the acceptance and use of MOOC among students compared to other models. Thus, a framework based on the acceptance and use model should designed with the appropriate learning tools used by student's platform to support the MOOC environment in all HEIs in Malaysia.

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