

Towards a UTAUT Model for Acceptance of MOOCs

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Abstract

In many training institutions, the major advancement of Information Technology is having a profound impact on the way in which instructors teach and students learn, as well as how the two interact. The training process is continuing with the goal of enhancing the calibre of instruction and engagement. Top colleges and institutions have more recently developed a variety of Massive Open Online Courses (MOOC) systems centred on the development of new educational offering ways. These have not only captured the interest of students and scholars in the field of higher education, but also that of staff members in the private and public sectors. This study uses a Unified Theory of Acceptance and Use of Technology (UTAUT) model to assess the top MOOC providers and pinpoint the key elements influencing learner acceptance of MOOCs in Saudi Arabian training. A total of 382 government trainees in Saudi Arabia participated in an online survey, the results of which underwent analysis using structural equation modelling. This study identifies the key elements influencing Saudi government employee trainees' intentions to use MOOCs, with the findings indicating that the suggested model can account for 86.2% of user behaviour and 88.5% of user intentions.

Keywords:

e-learning, e-training, MOOCs, Massive Open Online Courses, UTAUT, Online Learning

1. Introduction

An online course available to a large number of people is known as an MOOC. The original intent of MOOCs was to make introductory university level courses available to students all around the world. The MOOC concept is currently broadening its use to include training in both the public and private sectors. Only in the Latin American and Caribbean region do the public sector employ more than 30 million people. Using MOOCs for training in the public sector is not only a viable choice, but also a need when considering the enormous number of public personnel who need to be regularly taught at regional, national, and local levels. Public sector culture, government structure and policies, national development plans, strategy, economics, monetary and policy, regulatory and legal frameworks, and public administration are a few of the

areas of government in which public personnel need training.

A MOOC can be described as a web-based class and open-access platform providing students with alternate approaches to learning their chosen subject through online resources [1]. MOOCs are recognised as one of the key trends to have swept the higher education arena in recent times, with MOOCs—as a term—signifying free, global, open access, video-based instructional content, forums, problems and videos available through online means to large populations of students seeking to enrol in courses or educate themselves [2]. With the application of flexibility in terms of both place and time, MOOCs attract not only learners and scholars, but also any other like-minded individual on a global scale. Despite the fact that they have significant standing in their application, thus far, a lack of research has been dedicated to the field, with very few critical papers analysing the present situation of MOOCs on a global scale [3]-[4]. In mind of this objective, beginning first and foremost with the definition and a brief overview of MOOCs, this paper seeks to analyse this new approach from a number of different perspectives, namely pedagogical and technological implementations from across the globe, and its research focus. Accordingly, MOOCs' characteristics will be detailed in a literature review, with attention also directed towards its development, and the presentation of a combination of practical considerations with the experience of providers in the field.

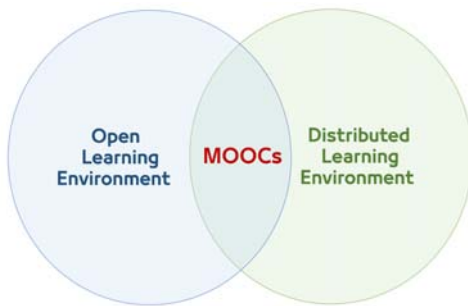


FIGURE 1. MOOCs are Open and Distributed learning environments

Some of the most notable elements inherent in an MOOC include its open, participatory and easily distributed nature. Importantly, Open Participation in an MOOC is free of charge, meaning anyone with internet access is able to join [5]. More than one course might be taken by an individual, with all courses open and available to individuals seeking to learn. The work completed and created (not only by learners but also by the creators) is shared and distributed across the community. Lastly, the learner's role is open [4], this may be explained as, 'When learners step through our open door, they are invited to enter our place of work, to join the research, to join the discussion, and to contribute in the growth of knowledge within a certain field' [52]. Participatory learning in an MOOC is further improved through involvement, not only in the creation of personal contributions, but also through the sharing of such, as well as in the contributions and interactions of others, with voluntary involvement [6]. It is recognised that MOOCs are distributed based on the connectivist method; therefore, all knowledge should be disseminated amongst various network subjects [7]. The majority of the course activity is carried out in a social learning setting, where each of the students interacts with material, as well as with one another's interpretation of such [6–7]. The course readings, as well as the other available learning materials, are a valuable starting point for debate and discussion, and further thinking [8].

A number of MOOCs continue to adhere to the provision of a number of more conventional course elements and interactive user forums in order to facilitate interactions across the community, such as between learners and teachers. In the first instance, MOOCs were presented in 2008, subsequently becoming a popular e-learning model in 2012 [9]. The majority of providers of MOOCs have a wealth of open licensing content to encourage the reuse and

mixing of resources; nonetheless, cloud licenses have been used by some for their course materials, similar to those offered by universities [10]. Importantly, courses offered through MOOCs are seen to last for a period of 4–10 weeks, with each week providing 1–2 hours' worth of video lessons. Quizzes, weekly exercises, as well as final exams and projects, are offered through such courses [13], in addition to on-demand access and availability, thereby allowing the user to study at their pace. Furthermore, as of May 2015, 104 courses are available on-demand [14]. Data pertaining to web traffic patterns for the key providers of MOOCs indicate that, although MOOC-relevant interest is generally seen to be highest in the US, nonetheless, economically developing countries are quickly developing interest in this field and are thus seeking to gain access to this form of education and training.

This paper directs attention to a number of different areas: Section II provides a general overview of the field, with a literature review and background. Section III provides a comparison of MOOC providers; subsequently, Section IV provides a proposed and evaluated UTAUT Model for acceptance of MOOCs; and, lastly, a summary and recommendations for further works are given in Section V.

2. BACKGROUND AND LITERATURE REVIEW

MOOCs which make web-based courses available for free to anybody with an internet connection, have led to a significant change in online education. As a result, MOOCs have attracted a wealth of media, student, teacher, and business attention in 2012. Because of a new endeavour by the founders George Siemens and Stephen Downes in 2008, MOOCs were given a name and definition. Their first course, 'Connectivism & Connective Knowledge,' was obviously created using connectivist ideas. It was described as a gigantic open online course due to its size, with more than 2,200 students registering [50]. MOOCs may usher in a new era of online learning. They unmistakably support a novel approach to remote education. According to a 2013 analysis from the University of Edinburgh, the recent surge of MOOC-created university courses offers key turning points for online learning [51]. Additionally, MOOCs have significant difficulties as a result of the high

participant dropout rates, with few students completing the course. One of the main drawbacks of MOOCs' flexibility is a related issue where some participants take the course without the direct participation of a classroom full of students [49].

Overall, according to Downes, there are certain drawbacks, such as the possibility that technology may supplant tutors in MOOCs and that the social and individualized parts of learning may be lost. However, self-motivation and academic readiness are crucial for MOOC participants [50]. MOOCs can be synchronous, in which case everyone enrolled is working through the same lessons or modules at the same time, or asynchronous, in which case students can join at any time and work through the material at their own pace. As a result, at any given moment, some students may be just beginning the course, while others may already be halfway through or have completed it. According to Figure 2, there are two distinct forms of MOOCs: xMOOCs, or extended Massive Open Online Courses, and cMOOCs, or connective Massive Open Online Courses, which share digital online learning environments and features and are linked to one another in a number of ways. Universities and other educational institutions that offer considerable research-based content and background in the online learning content frequently base xMOOCs on their materials.

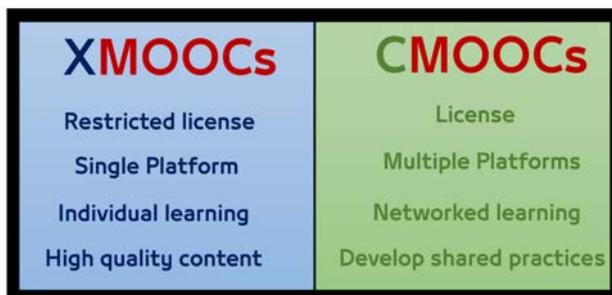


FIGURE 2. Types of MOOCs

More than 30 MOOC providers are available, with the number steadily rising. MOOCs have been introduced by private companies, such as Coursera, Udacity, and Canvas Network. A university or a confederation of institutions supports many MOOC providers: for instance, edX was started by MIT and Harvard University, as well as other colleges from all around the world, joined. Indian Institutes of Technology (IITs) and the Indian Institute of Science

have also sponsored the National Program on Technology Enhanced Learning (NPTEL) in India.

Similarly, Taiwan's National Chiao Tung University introduced the eWant MOOC platform. Additionally, governments are funding national MOOC sites: for instance, MexicoX, which receives more than 85% of its customers from Mexico, is supported by the Mexican government. To provide MOOCs to Indian students and professionals, the Indian government is supporting the Study Webs of Active learning for Young Aspiring Minds (SWAYAM) platform.

While MOOCs may reach a lot of students at a relatively inexpensive cost with high-quality content and can offer insights into how people learn, they also have certain drawbacks. An authoritative evaluation of written work, trustworthy validation for certification, and regular student-faculty contact are sometimes lacking in MOOCs [40]. However, MOOCs have an edge over traditional classroom-based courses since they are more adaptable, customizable, and accessible, which supports students' organised, self-paced learning [49].

One of the first MOOCs from Stanford University—notably an MOOC on Artificial Intelligence—drew 160,000 students from all around the world in 2011, catapulting MOOC into the spotlight [48-50]. The New York Times' designation of 2012 as the Year of MOOC increased the buzz surrounding MOOC [49]. Although there have been varying views on the way in which MOOCs would affect the current educational system, their popularity has increased over time. According to Class Central, a top MOOC aggregator, there are around 78 million users of MOOCs [44-46]. Additionally, it has been noted that the rate of increase in MOOC participants is slowing [47]. In this regard, the research study makes an effort to investigate the variables that can result in greater MOOC enrolment rates [46]. In an effort to pinpoint the elements impacting MOOC uptake, it expands on the Unified Theory of Acceptance and Use of Technology (UTAUT) [45].

3. COMPARISON OF THE BEST MOOC PROVIDERS

There is a large number of providers in the MOOC field, with this section providing a description of the best six through highlighting the various pros and cons associated with each.

A. edX

edX is an open-source platform, first introduced in March 2013, whilst the MOOC platform for edX was presented in May 2012 through University and Massachusetts Institute of Technology (MIT), led by an MIT computing professor [12]. In October 2012, this provider offered seven individual courses, one of which received 53,000 registrations from learners, as highlighted by Classroom in the Cloud [43]. Subsequently, by June 2013, it was serving 28 partners [42].

edX is recognised as a non-profit platform, devised by Harvard and MIT [40-41]. At the present time, it provides Harvard, MIT and Berkely with a number of different courses, with in excess of 200 entities having registered their interest in joining. As of April 2014, the institution had a total user base of more than 2.1 million across 176 courses [12], [41].

A number of the top universities, including Harvard and MIT, are known to apply the edX platform in its provision of courses to a student base of more than 10,000. The most prominent of benefits provided through this platform is its alignment with WordPress, where users can create plug-ins in order to expand their overall functionality. Other benefits include the propensity to garner large enrolment figures. Nonetheless, the platform does have the drawback of requiring investment in areas of both maintenance and installation.

B. Udemy

Udemy is an open-sharing platform that can be used by individuals, where instructors are able to design, create and accordingly host their own courses, which then can be offered to students, either for a nominal charge or for free.

One of the key benefits associated with Udemy is the fact it has approximately 2,000,000 users, meaning courses can be shared across a large number of potential learners. Importantly, the platform is a profit platform, which enables MOOCs in a number of different fields, including arts, design,

entrepreneurship, IT, sports and software use, for example. It enables all individuals to make MOOCs available, with the website communicating details of its courses by the world's top experts, including New York Times best-selling authors, CEOs, celebrities, and Ivy League professors. The website of the organisation further emphasises that more than 3 million students have enrolled in courses since 2010, with more than 16,000 courses available at the present time [13].

C. Canvas

Canvas is comparable to edX in the same that it enables organisations to create their own courses and accordingly select whether or not to make it available as a significant online course format (MOOC) or, conversely, a smaller online course format with additional capabilities to interact [14],[15].

The key drawbacks associated with the Canvas Network include the fact that it contains a smaller number of users and fewer courses when compared with other providers of MOOCs. Furthermore, there is a limit on the number of students that can be involved for all courses, which limits tools in sharing the course and thus increasing its exposure. Nonetheless, this particular drawback may provide valuable opportunities for universities through expanding and developing the courses of MOOCs for LMSs that have a maximum capacity of student numbers for each online course [12], [16].

D. Udacity

Udacity originally was founded in February 2012 by one of the computing teachers at a Stanford University. By April of the following year, the organisation had on offer a total of 24 courses, with a total of 90,000 students registered to its first two classes alone.

Udacity is a profitable educational businesses. The founders, Sebastian Thrun, David Stavens and Mike Sokolsky, provide a significant array of MOOCs. [14] As has been stated by Thrun, Udacity's name was derived from the organisation's underpinning objective to be, 'audacious for you, the student' [15], [12]. Although, in the first instance, it focused on providing university-style courses, at the current time, it provides a larger number of vocational courses for business professionals.

Throughout its initial several months in operation, the enrolment figures for each class were restricted and no longer accessible after the first homework

assignment's due date, with courses subsequently re-offered each hexamester. As of August 2012, all of the courses have been offered on an open enrolment basis, meaning learners are able to enrol in one or several courses at any one time following the launch of the course. Upon enrolment, all course details and problem sets are made available to the learner and then may be completed at the chosen pace of the student.

The organisation is a profit-centred business and, although it was co-founded by a Stanford professor in 2012, Udacity does not have a university partner; however, the website does make reference to the fact that it has maintained close relations with 20 high-tech companies, amongst which are Microsoft, Google, Facebook and Twitter. As of April 28, 2014, Udacity was known to have attracted 1.6 million users across 12 full courses and 26 free courses [17].

E. P2PU

Peer 2 Peer University (P2PU) is a non-profit open learning community, which provides users with the ability to arrange and get involved in study groups and courses in order to learn about particular subjects. The P2PU was established in 2009 following the provision of funding from the Hewlett Foundation and the Shuttleworth Foundation, with its first of courses in September of that year. One example of so-called 'edupunk' method of providing education can be seen when considering that P2PU charges no fees for tuition, and courses are not accredited.[4] Nonetheless, a number of courses in 'The School of Webcraft' facilitate the opportunity for the recognition of achievements through the Open Badges project [18]. Importantly, a number of the key features inherent in MOOCs are provided by P2PU; however, the platform essentially is centred on knowledge-sharing, facilitated by its members, and focused on a variety of topics offered by other users adopting a type of wiki-type approach [14]. In contrast to the more conventional MOOC providers, individuals are able to create courses and enrol on them [15]. Furthermore, owing to its less hierarchical nature, P2PU activities do not need to adopt a course-like format; rather, the learning environment's admin may choose from Challenge and Study Group, in addition to opting to implement their own term.

The peer-to-peer approach adopted by P2PU is intended to position open access and educational materials on a social and pedagogical platform. It has been implied that greater social involvement in P2PU

could result in a greater degree of invested learner than in other online education. [15] For example, in an early P2PU course focused on cyberpunk literature, it was recognised through the research that there has been a notable 'shift from the subject-authority pattern of relations generally associated with teacher-led education to the agential pattern of relations associated with peer-led education' [16]. In this vein, it is seen that class participants communicate live through technologies such as Skype and IRC, in addition to through asynchronous means, via the P2PU website, thus enabling peers to partake in conversations and interactions regardless of their geographic location [19].

F. Coursera

Launched in April of 2012, Coursera was founded by two Stanford computing professors. By June of the following year, Coursera had in place a number of agreements with 70 different higher education partners including Stanford and Princeton [20].

Coursera is a profit-oriented educational technology organisation providing MOOCs. Coursera works alongside universities, taking some of their courses and making them available via online platforms.

Essentially, Coursera may be described as a 'social entrepreneurship Website that partners with the top universities in the world' [4]. As stated on their company website, in excess of two million students were involved to some degree in Coursera Websites. There has been the recognition that quality, however, differs from one course to the next.

All of the Coursera courses are recognised as being 'accessible for free' [20], with some providing the opportunity to pay a fee to join the 'Signature Track', where such learners are provided with verified certificates, which are suitable when making job applications or indeed applications for any further educational pursuit. Such learners have their course submissions authenticated by sending webcam photos and having their typing patterns analysed. [20]

The Coursera website makes available a number of different courses in various fields, such as Humanities, Medicine, Biology, Social Sciences, Mathematics, Business, and Computer Science.[20] All of the courses are seen to offer short video lectures on different topics, as well as assignments that need to be completed on a weekly basis.[21].

G. Ethrae

An interactive electronic environment with Arabic material serves as the setting for this electronic training platform, which is used by the Institute of Public Administration in the Kingdom of Saudi Arabia to boost the effectiveness of human capital. By utilising the most recent digital training patterns in accordance with high-quality training and technological mechanisms and standards, without regard for the constraints of space or time, electronic training programs are provided, covering a variety of topics that improve ways to achieve optimal job performance.

H. Comparing between MOOCs Providers

By the end of 2013, across the globe, a number of universities were working to develop online education services for students through delivering Learning Management Systems, including Moodle and Blackboard Inc., for example. In addition, owing to the mixture of courses potentially developed through MOOC material and in-person instruction, many of the world's top universities in Europe, America and Asia have made agreements and initiated partnerships with large-scale MOOC providers, including Canvas, Coursera, Udacity and edX.

Of the MOOC providers, the most popular amongst the non-profits establishments are P2PU and edX, with Udemy, Udacity, Canvas and Coursera the most popular of the for-profit entities. The majority of the introductory section provided by all MOOC courses is without charge, which acts as a way of attracting new learners to enrol in courses with fees.

Many course developers are able to establish a good business when developing MOOCs as they are able to charge licensing fees for educational establishments for the use of their materials [22]. Moreover, a number of the MOOCs providers, including Udemy, which enables teachers to sell online courses and keep as much as 70– 85% of the income and copyrights [16]. The table below provides a direct contrast between the top MOOC providers [24-33]. A tick (✓) means that there is strong evidence to show MOOC providers as offering these criteria according to specific references; however, a cross (✗) means there is no any evidence to suggest that these systems offer the required criteria, whilst a question mark (?) means that there is no information about these criteria.

TABLE I

COMPARING BETWEEN MOOCs PROVIDERS

Criteria	Udemy	Coursera	Udacity	Canvas	Edx	Ethrae
Certificate dee	✓	✓	✓	✓	✓	✗
Scheduled course	✗	✓	✗	✓	✓	✗
Mobile apps	✓	✓	✓	✓	✓	✓
For Profit	✓	✓	✓	✓	✗	✓
Free to access	✗	✓	✓	✓	✓	✓
Specific length and duration	✓	✓	✓	✓	✓	✓
Accessibility for users with disabilities	?	✓	?	?	✓	?
Support Arabic language	✗	✗	✗	✗	✗	✓
Have Assessments	✓	✓	✓	✓	✓	✓

4. PROPOSED a UTAUT MODEL

A technology's success not only depends on the good reviews or revenue generated, but also on the elements that can assist in someone understanding the level of acceptance that can be garnered from technology. The section below considers the design and use of a model in calculating the degree to which the acceptance of the MOOCs, can be explained, predicted and understood. To maximise robustness of study results, this study applied the UTAUT model as a framework and accordingly integrated the learning and training government employees in Saudi Arabia. The UTAUT model was developed by Venkatesh through the completion of a comparison concerning the overall efficiency of the eight theoretical models in the IT systems of four different industries, namely two mandatory and two voluntary systems [10]. It was established that these include effort expectancy, performance expectancy, social expectancy and the

necessary facilitation. All of these individual elements are recognised as direct antecedents of the information system-related behaviour of a user [10].

The main theoretical framework of this study is based on UTAUT, a potent theoretical technique that is frequently used to assist the evaluation of technology acceptance in associated educational and training contexts [41].

According to the UTAUT model, performance expectancy (PE), social influence (SI), performance expectancy (PE), effort expectancy (EE), and enabling conditions (FC) all have an impact on trainees' adoption and usage of technology [40-43]. The original UTAUT model contained four moderators (gender, age, voluntariness, and experience), in addition to the four independent variables (PE, EE, SI, and FC), to help illustrate the way in which models may be applied to different types of organisations and backgrounds. However, the study revealed that these four moderators' moderating functions were absent from trainees' online learning. All of the trainees in the study's samples were of a comparable age and background. The four moderators in the UTAUT model were not considered since the study's samples were highly consistent. The four UTAUT factors (PE, EE, SI, and FC) are thus expected to have an impact on trainees' sustained intention to utilise MOOCs in this study [39-41]. Consequently, the following present the research hypotheses for this study:

would enable them to execute their jobs more effectively [30]. Performance expectancy is further defined as having origins in perceived usefulness, strong drive, fit, relative advantage, and result expectation. The importance of performance expectancy in determining the desire to embrace ICT in one's own profession has been highlighted by several research in 2003 [38-42]. Many research have revealed that performance expectation has a favourable impact on MOOC learning intention when it comes to online learning. For instance, José & Antonio state that performance expectancy was the most effective element boosting MOOC uptake [25]. In other words, people frequently think that enrolling in an MOOC will help them perform better [29]. UTAUT claimed that behavioural desire to utilise a specific technology is directly influenced by performance expectation [30-32]. Employees would be more inclined to enrol in an MOOC, according to this study, if they believe that MOOC-based learning will improve their performance. The following hypothesis was put forth:

H1: Performance expectancy has a positive impact on trainees' MOOC learning and training intention

The phrase effort expectation may be defined as the degree of simplicity associated with using the system as viewed without any difficulty of usage, with convenience and complexity being its key components. Since it makes the job of medical specialists easy and seamless, information and communication technology has become essential as a tool. An individual's expectations of how easy it will be to use a system become the yardstick for judging its success [33]. The simplicity with which pertinent information may be acquired utilising online technologies is expected to have an impact on MOOC attendance [28]. Therefore, if learners or students think using MOOC online learning systems is simple, they can be encouraged to utilise them. José & Antonio support the conclusion that the adoption of new technologies is influenced by their simplicity of use [25]. Consequently, the following hypothesis was put forth:

H2: Expected effort influences trainees' MOOC learning intentions in a favourable way.

Social effect is the extent to which an individual believes that others should feel or acknowledge that

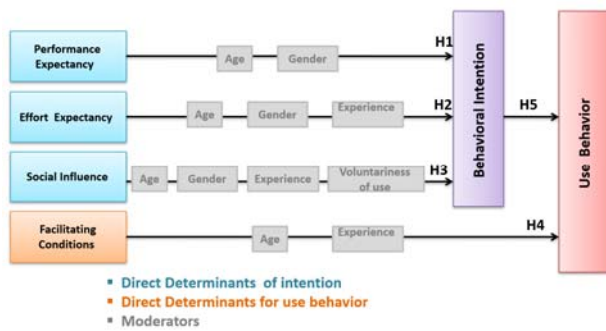


FIGURE 3. The original UTAUT

A. **Constructs and Hypotheses**

Performance expectation is defined as the assumption that utilising information and communications technologies in one's line of work

he/she should use the new system; the influence that an individual has over those whom he/she believes to be important regarding the use of a certain system is also extensive [27]. According to this study's findings, social influence factors that are related to MOOC participation include the perception of a significant social contact who believes that he should learn through the MOOC, the number of students or trainees in the class, and the support for or requirements placed on learning through MOOCs by the schools or institutions. As a result, this study suggested the following hypothesis:

H3: Social influence has a positive effect on trainees' MOOC learning intention.

The extent to which consumers believe their current circumstances support new technology is referred to as the 'facilitating conditions' [30-31]. MOOCs were seen as beneficial for gaining access to affordable, high-quality educational materials and providing a flexible online setting where learning may take place without regard to time or location [34], [26]. The usage of technology by students is positively impacted by conducive conditions. According to this study [35], the information, expertise, network, and equipment resources needed by trainers to learn in an MOOC are the primary enabling circumstances. The enabling conditions can have a direct impact on usage behaviour when a person feels that the amount of assistance for using technology is appropriate. The following hypothesis was put forth:

H4: Facilitating conditions have a positive effect on trainees' MOOC learning behaviour.

The subjective probability assessment of the students' learning behaviour in the MOOC, which primarily reflects the person's desire to carry out the action, is the motivating goal of the MOOC. An individual's behavioural intention and actual conduct are positively correlated, according to several behavioural researchers [36], [11]. Studies on MOOC uptake over the past 10 years have provided compelling evidence that MOOC learning intention may influence MOOC learning behaviour [37-38]. The ensuing theory was developed:

H5: The MOOC learning intention has a positive influence on trainees MOOC learning behaviour.

For evaluating the five main hypotheses, statements and constructs recognised as relevant to the study are applied by Venkatesh et al. [10], [24]. The UTAUT model was employed in this study's questionnaire design, which drew on the observation indicators of the pre-existing research scale. The definitions of performance expectation, effort expectancy, social influence, and enabling circumstances used in these investigations were Venkatesh et al. [38-40]. A 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5, was used to evaluate each item (strongly agree). Employees of the Saudi government were used for convenience sampling. These workers are enrolled in training courses for two or three credits at the Institute of Public Administration in Saudi Arabia. The training programs have fostered MOOCs growth in online system named Ethrai owing to both their face-to-face character and their requirement to use online resources accessible at the Institute of Public Administration. These web-based, online-assisted courses often strive for widespread interactive engagement and open availability.

Data for this study was gathered between July 1 and August 1, 2022, with the questionnaires made accessible online. In Saudi Arabia, 382 government trainees took part, and structural equation modelling was used to evaluate the data. The main factors influencing Saudi government employee trainees' inclinations to use MOOCs are identified by this study. Table 2's findings demonstrate that the UTAUT model's performance expectation, effort expectancy, social influence, and enabling circumstances all had a substantial beneficial impact on participants' sustained desire to utilise MOOCs. According to the results of this study, the recommended model can explain 86.2% of user behaviour and 88.5% of user intents.

TABLE II.

CRONBACH'S A OF MEASUREMENTS

Variables	Cronbach's α value
Performance expectancy	0.75
Expected effort	0.77
Social influence	0.74
Facilitating conditions	0.71
MOOC learning intention	0.72

Figure 2 shows the outcomes of the structural model route analysis. Performance expectation to MOOC

learning intention had a path coefficient of 0.44, effort expectancy to MOOC learning intention of 0.29, social influence to MOOC learning intention of 0.71, and MOOC learning intention to MOOC learning behaviour of 0.88. Therefore, there is a considerable influence on MOOC learning behaviour as evidenced by the significance of the first, second, third, fourth, and fifth route coefficients at the level of p.05. The UTAUT model was partially supported by this investigation, as indicated by the fact that the H1, H2, H3, H4, and H5 of the study were all supported.

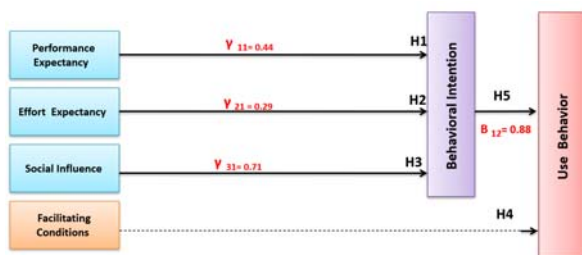


FIGURE 4. The UTAUT and the results

5. FUTURE RESEARCH AND CONCLUSION

The significant increase in the application of IT across educational establishments is causing a pivotal shift in the way learners learn and teachers teach, with this process a continuous one that is designed in mind of collaboration and ensuring high-quality courses. Recent announcements made by top universities in their changes of direction to the provision of education in new and innovative ways, namely through MOOCs not only has been successful in garnering attention from students and academics in higher education, but also from learners and teachers in the K-12 environment, in home schooling, or otherwise in the conventional classroom setting [23]. Through the provision of MOOCs, ways of teaching are becoming more diverse and are shifting away from conventional methods, with the teacher not necessarily serving as the holder and communicator of knowledge, but instead with learners interacting with peers and students, and being able to access information and resources prior to entering a classroom environment. This paper has provided an overview of the MOOC arena, with a literature review centred on the six most

popular and widely used providers in the field. Furthermore, it has provided a comparison completed between the best MOOC available on the internet. Such an overview has been valuable in establishing the main objective and purpose of MOOCs, and further enables the simplification of evaluating the best MOOCs providers for Arabic culture in terms of testing hypotheses using UTAUT Model for future research.

Only cross-sectional surveying was done for this study, and only in Saudi Arabia, for a certain amount of time. Additionally, even though the sample is sizable and the modelling is accurate, the study only uses self-report data. Future studies should gather data from different nations to assess the applicability of this study approach, and they can also take other factors like language, engagement, and support into account. Furthermore, future research can undertake a longitudinal study to see whether, following extensive usage of an MOOC platform, the path association between two variables changes over time.

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Data Availability

All data generated during this study are included in this published article.

REFERENCES

- [1] A. Abusobaih, M. Havranek and M. A. Abdulgabber, "Unified Theory of Acceptance and Use of Technology (UTAUT) LEGO Sets in Education," *2021 International Conference on Information Technology (ICIT)*, 2021, pp. 708-713, doi: 10.1109/ICIT52682.2021.9491665.
- [2] A. Ashton, H. Daniel, K. Jon, and L. Jure, "Engaging with massive online courses," in *Proc. 23rd International Conference on World Wide Web*, USA, 2014, pp. 687-698.

- [3] A. Ntourmas, Y. Dimitriadis, S. Daskalaki and N. Avouris, "Assessing Learner Facilitation in MOOC Forums: A Mixed-Methods Evaluation Study," in *IEEE Transactions on Learning Technologies*, vol. 15, no. 2, pp. 265-278, 1 April 2022, doi: 10.1109/TLT.2022.3166389.
- [4] Armando Fox. From MOOCs to SPOCs. ACM, pp. 38-40, 2013.
- [5] B. Yang and Y. Zhao, "Research on the Continuance Intention of MOOC Platforms Based on the Technology Acceptance Model : A Case of MOOC Learning Platforms in Chinese Universities," *2021 2nd International Conference on Artificial Intelligence and Education (ICAIE)*, 2021, pp. 642-645, doi: 10.1109/ICAIE53562.2021.00141.
- [6] C. Shen and C. Kuo, "Learning in massive open online courses: Evidence from social media mining," *Computers in Human Behavior*, 2015.
- [7] C. Derrick, F. Armando, A. Marti, and H. Bjoern, "Chatrooms in MOOCs: All talk and no action," in *Proc. First ACM Conference on Learning*, New York, NY, USA, 2014, pp. 127-136.
- [8] C. Doug, "MOOCs and the funnel of participation," in *Proc. Third International Conference on Learning Analytics and Knowledge*, New York, NY, USA, 2013, pp. 185-189.
- [9] C. Yeager, D. Hurley, B. Betty, A. Catherine, "eMOOCs and global learning: An authentic alternative," *Journal of Asynchronous Learning Networks*, vol. 17, no. 2 pp. 133-147, Jul. 2013.
- [10] D. Chrysanthos and V. Marshall, "Money models for MOOCs," *ACM*, vol. 56, pp. 25-28, 2013.
- [11] D. Chrysanthos and V. Marshall, "Money models for MOOCs," *ACM*, vol. 56, pp. 25-28, 2013.
- [12] D. G. Sooryanarayan and D. Gupta, "Impact of learner motivation on MOOC preferences: Transfer vs. made MOOCs," *2015 International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, 2015, pp. 929-934, doi: 10.1109/ICACCI.2015.7275730.
- [13] D. Jennifer and B. Lori, "Tracking progress: Predictors of students' weekly achievement during a circuits and electronics MOOC," in *Proc. First ACM Conference on Learning*. ACM, USA, 2014, pp. 169-170.
- [14] D. N. Pratiwi and T. Mauritsius, "Mobile Marketplace Evaluation Using UTAUT Method: A Case of Market Place Company," *2021 7th International HCI and UX Conference in Indonesia (CHuXiD)*, 2021, pp. 27-32, doi: 10.1109/CHuXiD54398.2021.9650680.
- [15] F. Yunping, C. Di, Z. Zihao, C. Haopeng, and X. Puzhao, "The impact of students and TAs' participation on students' academic performance in MOOC," in *Proc. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. ACM, USA, 2015, pp. 1149-1154.
- [16] G. Kostopoulos, T. Panagiotakopoulos, S. Kotsiantis, C. Pierrakeas and A. Kameas, "Interpretable Models for Early Prediction of Certification in MOOCs: A Case Study on a MOOC for Smart City Professionals," in *IEEE Access*, vol. 9, pp. 165881-165891, 2021, doi: 10.1109/ACCESS.2021.3134787.
- [17] Gómez Galán José; Lázaro Pérez Cristina; Martínez López Jose Ángel; López Meneses Eloy, "9 VLE Environments and MOOC Courses," in *Innovation and ICT in Education: The Diversity of the 21st Century Classroom*, River Publishers, 2021, pp.77-91.
- [18] H. Aoulad Ali, C. Mohamed, B. Abdelhamid and T. El Alami, "Prediction MOOC's for student by using machine learning methods," *2021 XI International Conference on Virtual Campus (JICV)*, 2021, pp. 1-3, doi: 10.1109/JICV53222.2021.9600310.
- [19] I. G. Buguño-Córdova, R. A. Sperberg-Parra, C. A. Mathias-Naranjo, D. E. Menares-Fernández and A. O. Ehijo-Benbow, "From xc-MOOC to e-MOOC: A case study as a reference model and a proposed non-linear approach to an evolved MOOC," *2022 IEEE Global Engineering Education Conference (EDUCON)*, 2022, pp. 1523-1532, doi: 10.1109/EDUCON52537.2022.9766554.
- [20] I. Uddin, A. S. Imran, K. Muhammad, N. Fayyaz and M. Sajjad, "A Systematic Mapping Review on MOOC Recommender Systems," in *IEEE Access*, vol. 9, pp. 118379-118405, 2021, doi: 10.1109/ACCESS.2021.3101039.
- [21] I. Waard, S. Abajian, M. Gallagher, R. Hogue, N. Ö. Keskin, A. Koutropoulos, and O. Rodriguez, "Using Mlearning and MOOCs to understand chaos, emergence, and complexity in education," *International Review of Research in Open and Distance Learning*, vol. 12, no. 7, pp. 94-115, 2011.
- [22] J. Mackness, S. Mak, and R. Williams, "The ideals and reality of participating in a MOOC," presented at the Seventh International Conference on Networked Learning, Aalborg, Denmark, 2010.
- [23] J. Xu, Q. Li, J. Liu, P. Lv and G. Yu, "Leveraging Cognitive Diagnosis to Improve Peer Assessment in MOOCs," in *IEEE Access*, vol. 9, pp. 50466-50484, 2021, doi: 10.1109/ACCESS.2021.3069055.
- [24] Jonathan Haber, "A list of MOOC providers mentioned in this book," in *MOOCs*, MIT Press, 2014, pp.217-217.
- [25] José Gómez Galán; Antonio H. Martín Padilla; César Bernal Bravo; Eloy López Meneses, "7 MOOC Reflections on the Future," in *MOOC Pedagogical Framework*, River Publishers, 2018, pp.105-110.
- [26] K. Daphne, "MOOCs: What have we learned?" in *Proc. 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2015.
- [27] K. Apostolos, G. Michael, A. Sean, R. Inge de, H. Joanne, Ö. Nilgün, and R. Osvaldo, "Emotive vocabulary in MOOCs: Context & participant retention," *Eurodl. European Journal of Open, Distance and E-Learning*, 2011.
- [28] K. Colvin, J. Champaign, A. Liu, Q. Zhou, C. Fredericks, and D. Pritchard, "Learning in an introductory physics MOOC: All cohorts learn equally, including an on-campus class," in *Proc. International Review of Research in Open and Distance Learning*, 2014.
- [29] K. M. Alzahrani and M. Meccawy, "MOOCs One-Stop Shop: A Realization of a Unified MOOCs Search Engine," in *IEEE Access*, vol. 9, pp. 160175-160185, 2021, doi: 10.1109/ACCESS.2021.3130841.
- [30] K. Vallerie, N. I. Fahira, V. Sebastian and N. Limantara, "Usage Evaluation of Beauty E-Commerce with Unified Theory of Acceptance and Use of Technology (UTAUT)," *2021 International Conference on Information Management and Technology (ICIMTech)*, 2021, pp. 429-433, doi: 10.1109/ICIMTech53080.2021.9535051.
- [31] L. S. Grandhi, S. Grandhi and S. Wibowo, "A Security-UTAUT Framework for Evaluating Key Security Determinants in Smart City Adoption by the Australian City Councils," *2021 21st ACIS International Winter Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD-Winter)*, 2021, pp. 17-22, doi: 10.1109/SNPDWinter52325.2021.00013.
- [32] L. Wai Keong and A. Ayue Binti Abdul Rahman, "The Relationship between UTAUT Model and Behavioral Intention to use HRIS System Among Middle-Level Employees at a Retail Company," *2021 7th International Conference on Research and Innovation in Information Systems (ICRIIS)*, 2021, pp. 1-5, doi: 10.1109/ICRIIS53035.2021.9616979.
- [33] M. Baturay, "An overview of the world of MOOCs," in *Proc. International Conference on New Horizons in Education*, Paris, France, June 25-27, 2014, pp.

- 427–433.
- [34] M. Kamal and A. P. Subriadi, "UTAUT Model of Mobile Application: Literature Review," *2021 International Conference on Electrical and Information Technology (IEIT)*, 2021, pp. 120-125, doi: 10.1109/IEIT53149.2021.9587377.
- [35] Maryani, K. T. Utaminingsih and H. Alianto, "The Influence Of UTAUT Model Factors On The Intension Of Millennials Generation In Using Mobile Wallets In Jakarta," *2020 International Conference on Information Management and Technology (ICIMTech)*, 2020, pp. 488-492, doi: 10.1109/ICIMTech50083.2020.9211274.
- [36] Moshe Y., "Will MOOCs destroy academia?," *ACM*, vol. 55, no. 11, p. 5, 2012.
- [37] N. Ilona and D. Antoine, "Building engagement for MOOC students: introducing support for time management on online learning platforms," in *Proc. 23rd International Conference on World Wide Web*, USA, 2014, pp. 1077-1082.
- [38] N. H. Al-Fahim, R. Abdulgafor and E. H. Qaid, "Determinants of Banks' Customer's Intention to adopt Internet Banking Services in Yemen: Using the Unified Theory of Acceptance and Use of Technology (UTAUT)," *2021 International Congress of Advanced Technology and Engineering (ICOTEN)*, 2021, pp. 1-8, doi: 10.1109/ICOTEN52080.2021.9493448.
- [39] O. Almatrafi and A. Johri, "Improving MOOCs Using Information From Discussion Forums: An Opinion Summarization and Suggestion Mining Approach," in *IEEE Access*, vol. 10, pp. 15565-15573, 2022, doi: 10.1109/ACCESS.2022.3149271.
- [40] R. Osvaldo, "MOOCs and the AI-Stanford like courses: Two successful and distinct course formats for massive open online courses," *Eurodl. European Journal of Open, Distance and E-Learning*, 2011.
- [41] R. Stephen, "Can MOOCs help reduce college tuition? MOOCs and technology to advance learning and learning research (Ubiquity symposium)," *Ubiquity*, 2014, p. 10.
- [42] R. Fuster and E. E. Grandón, "Determinants of e-voting acceptance in Chile: An approach based on the UTAUT model," *2021 16th Iberian Conference on Information Systems and Technologies (CISTI)*, 2021, pp. 1-6, doi: 10.23919/CISTI52073.2021.9476668.
- [43] R. J. H. Habeeb, S. M. S. Hilles and A. M. Momani, "Social Commerce Adoption Based UTAUT Model for Consumer Behavior: Iraq Small and Medium Enterprise," *2021 2nd International Informatics and Software Engineering Conference (IISEC)*, 2021, pp. 1-8, doi: 10.1109/IISEC54230.2021.9672383.
- [44] R. Rohan, D. Pal, S. Funilkul, W. Chutimaskul and W. Eamsinvattana, "How Gamification Leads to Continued Usage of MOOCs? A Theoretical Perspective," in *IEEE Access*, vol. 9, pp. 108144-108161, 2021, doi: 10.1109/ACCESS.2021.3102293.
- [45] S. Han, M. Park, H. Yook and G. Gim, "A Study on the Effect of Customer Usage on the Intention of Continuously Coffee Brand App based on UTAUT Model," *2022 IEEE/ACIS 7th International Conference on Big Data, Cloud Computing, and Data Science (BCD)*, 2022, pp. 342-346, doi: 10.1109/BCD54882.2022.9900731.
- [46] S. Javier, J. Héctor, A. José, J. Pedro, and K. Carlos, "Towards the development of a learning analytics extension in open edX," in *Proc. Second International Conference on Technological Ecosystems for Enhancing Multiculturality*, 2014, pp. 299-306.
- [47] S. Srivastava and N. S. Bhati, "Determinants for Adoption of MOOCs from the Perspective of UTAUT," *2022 8th International Conference on Advanced Computing and Communication Systems (ICACCS)*, 2022, pp. 805-810, doi: 10.1109/ICACCS54159.2022.9785318.
- [48] T. -T. Chen, Y. -J. Chang, T. -H. Hsu and H. -K. Hsu, "Using UTAUT, TTF, and PR integrating models to evaluate employees' acceptance and behavioral intention of PHM-based system in the military industry," *2022 IEEE International Conference on Prognostics and Health Management (ICPHM)*, 2022, pp. 88-93, doi: 10.1109/ICPHM53196.2022.9815710.
- [49] V. Venkatesh, M. Morris, G. Davis, and F. Davis, "User acceptance of information technology: Toward a unified view," *MIS Quarterly*, vol. 27, no. 3, pp. 425-478, 2003.
- [50] V. Reda and R. Kerr, "The MOOC BA, a New Frontier for Internationalization," *2018 Learning With MOOCs (LWMOOCs)*, 2018, pp. 94-97, doi: 10.1109/LWMOOCs.2018.8534651.
- [51] W. Zakharov, "Comparison of MOOCs and implications for nano HUB-U MOOCs," Presented at 2013 Association for Educational Communications and Technology International Convention, Anaheim, CA, 2013.
- [52] X. Sang, "Application of High-Performance MOOC Based on Multi-Center and Multi-Backup in the Design and Parallel Retrieval of a Combined Teaching Resource Library," *2022 International Conference on Applied Artificial Intelligence and Computing (ICAIC)*, 2022, pp. 961-964, doi: 10.1109/ICAIC53929.2022.9793113



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