



# MOOC's impact on higher education<sup>☆</sup>

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## ARTICLE INFO

### Keywords:

Higher Education (HE)  
Massive Open Online Courses (MOOCs)  
Teaching and learning  
Students Skills  
Education outcomes  
Effective communications

## ABSTRACT

The Massive Open Online Course has exerted a significant influence on adult learning. MOOC's has been discussed in all previous literature. However, the current study tries to investigate the MOOC's effect on higher education systems. This study investigates the impact of MOOCs on Higher Education in the Kingdom of Saudi Arabia (KSA). Its main objective is to examine the essential aspects of developing the teaching and learning mechanisms used in Saudi universities by employing open-source courses (MOOCs) in university education. This research adopted a descriptive and analytical approach. A quantitative survey was used to collect the necessary data. The study population included all professors at King Saud University (KSU). The results of the analysis reveal that MOOCs have a significant direct impact on higher education as it improves education outcomes ( $t = 23.46$ ,  $p \leq 0.001$ ), which supports H1. Also, MOOCs accounted for a 65% improvement in education outcomes. The findings show MOOC's classes have a positive influence on the kingdom's higher education System.

## Implications for practice or policy

- Kingdom's university development is one of the pillars of KSA vision 2030. KSA has the determination to keep up with the development of global higher education institutions.
- The finding of research stated MOOC's is the best solution for economically disadvantaged students who cannot otherwise have access to a university.
- MOOC's is providing a new way of a long-time learning culture. Many of MOOC's platform has been developed in the Kingdom, such as Rwaq, Droob.
- A policymaker in the Kingdom might implement MOOC into the Higher Education System.
- COVID-19 forces KSA educational systems to test the readiness of the Saudi university for full eLearning shift experience.

## 1. Introduction

Education, previously thought to be a bastion of tradition, has lately experienced dramatic changes through the incorporation of digital technology. Among these changes has been the introduction of MOOCs, massive, open, online classes that aim to provide a comprehensive educational format. In 2011, MOOCs reflected significant developing trends in education were introduced by several organizations such as Coursera, Udacity, and EDX. As known the role of higher educational

institutions is to provide an individual with the skills and the knowledge. And to promote the idea of life-long learning. To achieve that higher education has been influenced by the rapid development of information and communication technologies. It has contributed to the creation of new technological means, such as MOOCs, to introduce the skills and techniques of learning observed in modern scientific research, thus allowing learners to gain a foothold in the competitive world.

Saudi Arabia Universities development is one of the pillars of KSA 2030 Vision. KSA has the determination to keep up with the development of global higher education institutions. Thus, the Ministry of Higher Education inaugurated the first international conference on e-learning and distance learning. The framework of the National Communication Plan introduces the use of eLearning and online courses to the traditional teaching and learning practice in the universities. So, there is a call for the implementation of e-learning in higher education institutions and regulating this approach. It sought to accomplish that goal by studying and building upon the previous experiences of others in this field, exchanging experiences with specialists and interested parties, and encouraging partnership and cooperation between the public and private sectors in the areas of e-learning and distance learning. Many Saudi universities and colleges have been able to make considerable strides in the use of e-learning. For example, KSU in Riyadh was one of the first universities to adopt Blackboard LMS in its curricula through the adoption of web management solutions. King Khalid University implemented an E-Learning Project in 2005. In 2020 with the COVID-19 pandemic, the

<sup>☆</sup> This is a research project that was supported by a grant from the Research Center for the Humanities, Deanship of Scientific Research at King Saud University.  
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spread of COVID-19 has caused the closure of educational establishments all over the world. Such closure extended the improvement of the on-line learning environments within those institutions so that learning and teaching would no longer be disrupted. The readiness of the Saudi university for full eLearning shift experience is tested during the COVID-19 pandemic.

## 2. Literature review

Connectivism presents a model of learning that acknowledges the tectonic shifts in society wherever data isn't any longer an indoor, individualistic activity. However, individuals work, and performance is altered once new tools are utilized. The sector of education has been slow to acknowledge each the impact of the latest learning tools and therefore, the environmental changes in what it suggests that to find out. Connectivism provides perceptiveness into learning skills and tasks required for the learner to flourish during a digital era. (Siemens (2014). The success of Connectivism and Connective Knowledge (CCK08) eventually led to an explosion of MOOCs, to the point where hundreds of universities, companies, and not-for-profit organizations have launched MOOCs along with other e-learning platforms. Universities have, over the past several years, engaged in a concerted effort to offer and expand the use of MOOCs, which makes them available to both their students and the general public.

In many cases, the MOOCs have been offered entirely free. The purpose of this research is to shed light on MOOCs, which would constitute a qualitative leap in the development of teaching and learning in universities. Despite the novelty of this type of education, the initial results proved its success. This type of education, in its current state, is still in its early phases. It faces some challenges that might not necessarily prove to be obstacles to its implementation as one of the main tributaries to the development of university teaching and learning in the Kingdom.

In 2011, Sebastian Thrun and other colleagues at Stanford University offered a free academic course on artificial intelligence to provide an educational opportunity for anyone interested in studying that subject. One hundred sixty thousand participants from 190 countries enrolled in that course and a similar level of interest followed in the MOOCs subsequently developed by many other universities and educational institutions. Waldrop (2013) noted that in less than two years, 328 open electronic courses were launched by 62 educational institutions, enrolling 2.9 million students from 220 countries. These figures strongly confirm the premise that learning is accessible to all who want to learn without restrictions. MOOCs provide a platform for free online courses for large numbers of people from all over the world, where the subject is discussed and pre-recorded by educational experts. The latter provides educational materials, text, sound, and video. They use social networking pages (Twitter, Facebook, and blogs) to share experiences and learn from others. This collaborative learning distinguishes MOOCs from other educational platforms. It can offer a more participatory and interactive experience than other Means.

According to Bonk and Reynolds (1997), to enhance thinking on the web, online learning must create new challenges through activities that enable learners to link new information with old information they already possess. Thus, they acquire knowledge by developing meaning and using their knowledge-acquisition abilities. Therefore, the use of an education technology strategy affects the quality of learning (Kozma, 2001). Kozma points out that there are particular features for the computer to simulate real-life learners (McGhee and Kozma, 2003). The machine itself cannot teach students, but the design of simulated models based on real-life situations enables students to interact successfully with those models. A computer is merely a means to motivate learners (Clark, 1983). Open-source courses are based on the idea of collaborative writing, where knowledge is produced and shared by a large number of learners. Wikipedia defines collaborative writing as creating projects and other works written by several people together in a collaborative way, not individually, and projects are designed without supervision

(Mackness, 2010).

In 2011, MOOCs that reflected significant developing trends in education was introduced by several organizations such as Coursera, Udacity, and EDX. That effort was followed by a rapid response from universities to the concept and practice of online learning in which millions of learners on a global basis have joined. MOOCs cover many subjects, including the humanities, medicine, biology, social sciences, mathematics, business, computer science. Students can participate without having to pay tuition or other fees or abandon their jobs. Many people began to speculate whether MOOCs would disrupt higher education from the bottom up. After the spectacular success of Thrun's Artificial Intelligence course, Coursera launched two more courses from Stanford University. In March 2012, MIT, which was a founder of another MOOC platform, EDX, launched an attempt to develop a free and open platform for online learning.

Coursera courses are designed to allow the organization of materials taught by international professors to enhance concepts and knowledge through interactive exercises among a global community of thousands of students. Courses are designed to help spread new concepts quickly and effectively. That goal is accomplished by focusing on key ideas, learning to master concepts, and ensuring that new knowledge is consistent. Further, they employ user interaction to ensure students' participation and long-lasting retention, providing feedback so that a learner's progress can be monitored and evaluated.

MOOCs are based totally at the four major principles of Siemens Connectivism (Siemens(2014):

### (1) Compilation

Educational files appear on the MOOC web page each week, providing a first view of the subject. These files are the starting point for discussions, which include shared interactive dialogue, worksheets, video files, and the like. All of these materials are collected and published on the page and sent by e-mail. That approach is the fundamental difference between open-source courses and traditional courses, where content is prepared at an early stage of the course.

### (2) Modification

After developing a general impression of the subject, the learner collects files from within and outside the session, places them in a particular directory in their personal computer and classifies them in an easily understandable way. These materials are created and manipulated with each other and with other elements in an integrated manner.

### (3) Re-employment

After completing the compilation and sorting of files, the learner first studies them, and then adds their particular perceptions of the content and what they understand, using the course's blog, Twitter account, or panel discussions.

### (4) Dissemination of distinctive ideas

The exchange of views and content with other participants around the world.

The importance of MOOCs is that they provide the experience of open-ended online courses which have enabled participants from different countries to join international universities and benefit from their unique programs and courses. MOOCs have reduced the anxiety that arose with the first appearance of online courses that seemed to threaten the future of academic institutions. That anxiety was based on the perception that if students could obtain a degree or classes from a prestigious online university, they would not pay the high financial costs associated with studying on campus.

Some experts say the online study is the best solution for

economically disadvantaged students who cannot otherwise have access to a university. The physical campus will continue to attract students who want to communicate with their peers and professors and obtain a university degree from top universities. On the other hand, if MOOCs can be used to create a system that rewards demonstrable competence, they will further undermine the value of campus-based networking. When applied to connect talent directly to prospective employers, MOOCs can circumvent one of the few remaining rationales for seeking a traditional college experience (Mazoue, 2014).

MOOC course design must go beyond providing regular online content. MOOCs, whether they are online or blended, should include both passive and declarative elements to improve student's problem-solving skills (Koedinger, Kenneth, 2015). Video-lectures and readings made a significant difference to participant studying on the direction and application in their MOOC learning into their expert practice (Domingo, Paran, Révész, Palange, 2019). MOOCs themselves are not seen as necessarily innovative. Still, they do provide the opportunity for new thinking and working and, in offering courses in non-traditional ways, are open to all, anywhere, with possible links to the institution's conventional degree-granting programs. (Fox, 2016).

### 2.1. Advantages of MOOC'S

The positive reaction towards MOOC platforms and the courses they provide stems from the fact that many students said that their MOOC experiences motivated them. Research indicated that learning through a MOOC was very efficient and effective. Some students seem to thrive on online access. Accessing online courses where they can study what they like and when they want is highly motivating. MOOC's may provide one answer to their needs. The flexible nature of MOOC's was highly appreciated by the students (Cripps, 2014). The student has their preference to find out about a new subject or to extend modern-day knowledge, and they had been curious about MOOCs, for the private challenge, and the desire to collect as many completion certificates as possible. (Hew & Cheung, 2014).

### 2.2. Is MOOC challenging to KSA students?

Comparing Saudi student challenges with the findings of many studies, address challenges student face when taking MOOC courses. Research finds difficulty in evaluating students' work, having a sense of speaking into a vacuum due to the absence of immediate student feedback, being burdened by the heavy demands of time and money, and encountering a lack of student participation in online forums. ((Hew & Cheung 2014).

### 2.3. Purpose of the study

The purpose of this research is to shed light on MOOCs, which would constitute a qualitative leap in the development of teaching and learning in universities. The above literature review indicates one conclusion emerging, MOOC's has some impact on higher education. Educators and policymaker and local researchers should investigate the effect of MOOC in higher education. Teaching and learning may face challenges and constraints when MOOC's are introduced to the Saudi higher education system. This research seeks to explore the impact and collect enough data on how MOOC's affection the learning outcomes. Comparing with the findings of other studies is one means of identifying the challenges students face when taking MOOCs. It has been challenging to find, through research, a means to evaluate students' work. The reason for this difficulty is that researchers have a sense of working in lack of information caused by the absence of immediate student feedback, the heavy demands of time and money, and a lack of student participation in online forums (Hew & Cheung, 2014). Though this study started before the COVID-19 pandemic, it is worth mentioning how the sudden shift in all educational institutions in Saudi Arabia, as well as the whole world, rely

on eLearning to continue the student learning process from homes. There have been successful transitions amongst many KSA universities. However, there are challenges to overcome, such as well design academic course. Many instructors turn to MOOC's for supporting their academic courses. Thus this study focuses on the faculty feedback when using MOOC's. Alharthi Study (2016) examined the requirements for the Saudi Universities to implement MOOC's and students and faculty attitudes towards MOOC. Which conclude faculty show positive attitudes towards MOOC's and realize the need for implementation. This study fills the gap with previous studies done locally in the subject.

### 2.4. The problem of the study

The problem of this research focuses on the impact of MOOC on higher education. The university curricula lack content quality and do not coincide with the University's strategic plan. In the light of the Kingdom's university development that is one of the pillars of KSA vision 2030. KSA has the determination to keep up with the development of global higher education institutions. The universities seek to have high-quality standards in teaching, focusing on the productive employment of technology in university curricula. Using MOOC online courses can contribute to the solution of this problem. However, MOOC's have impacted higher education.

## 3. Research model and hypothesis

The current study aimed to explore MOOC online courses affects higher education institutions. Eom, Wen, and Ashill (2006) study of 397 US university students who had studied at least one online course found that instructor feedback affected both learning outcomes and user satisfaction. For this research, three-factor were retained to see if these effects also play out in a MOOC context, and thus hypothesis was reframed as follows:

- **H1: MOOCs** have a significant statistical impact on Higher Education by improving education outcomes.
- **H2: MOOCs** have a significant statistical impact on Higher Education by developing students' learning skills.
- **H3: MOOCs** have a significant statistical impact on Higher Education by employing effective communication.

## 4. Research methodology

### 4.1. Data collection method and sampling framework

Research methodology to better understand describing, explaining, and predicting phenomena. The qualitative data analysis followed the phenomenological approach, underlining the insights, beliefs, and epistemic views of the participants (Willig, 2013). Then the researcher starts developing and presenting the research plan. The researcher identifies the type of research to be performed as well as the subsequent analysis. The research employed in this study adopted a descriptive and analytical approach. A quantitative survey was used to collect the necessary data. In (Al-Rahimi, 2020) study survey was used to receive trainee's feedback after taking the MOOC training class. The study population included all professors at KSU. A randomly selected faculty members total of 48 members who never have been introduced to MOOC classes before. The author administered an online survey via KSU faculty listserve with permission from the subcommittee for ethics of human and social research. A convenient sampling technique was used to select the participants—the participants (n = 48) faculty members. Of the 75 questionnaires that were distributed, 48 were analyzed. Table 1 shows the sample characteristics. It shows the distribution of the individual sample of the study according to the variables (gender, educational experience, academic rank, specialization, and technical expertise, the extent of use of technology in lectures or interaction with students).

**Table 1**  
Sample characteristics.

Personal Information		Frequency	Per cent
Gender	Male	26	54.2
	Female	22	45.8
Educational rank	Lecturer	13	27.1
	Assistant Professor	27	56.3
	Associate professor	7	14.6
	Professor	1	2.1
	Less than five years	14	29.2
Experience	5–10 years	12	25
	11–15	7	14.6
	<15	15	31.3
	Humanities	22	45.5
Specialization	Scientific	17	36.4
	Medical	9	18.9
	High	17	36.5
	Medium	26	54.5
Technical expertise	Low	5	9
	High	9	18
	Medium	26	54
Use of technology in lectures	Low	13	27
Total		48	100%

## 5. Instrument design

The research is based on a questionnaire that was developed for this study. The questionnaire's face validity and contents validity were assessed. Answers were classified according to a Five-point Likert scale. The survey includes two parts. The first part contains six items on personal information, according to the variables (gender, educational experience, academic rank, specialization, and technical expertise, the extent of use of technology in lectures or interaction with students). The second part consists of 25 items related to the research variables selected after reviewing pieces of literature finding.

## 6. Data analysis

Partial least squares (PLS) was chosen for the current study using SmartPLS software. It was used in a two-stage approach, measurement and structural model testing. Among the 75 surveys in the initial dataset, 27 questionnaires were removed due to either extremely low response across all variables (i.e., greater than 75% were missing).

## 7. Measurement model

The measurement model can be assessed by examining reliability, convergent validity, and discriminant validity. Specifically, reliability refers to the internal consistency of measurement. It can be evaluated by checking whether the value of composite reliability (CR) is more than 0.7, the average variance extracted (AVE) is more significant than 0.5, and Cronbach's  $\alpha$  is greater than 0.6 (Hair, Black, Babin, Anderson, & Tatham, 2006). Table 2 shows that the CR values ranged from 0.78 to 0.87, and the AVE values ranged from 0.51 to 0.63. These values are higher than the acceptable amounts of 0.70 and 0.50, thus indicating excellent construct reliability.

Furthermore, to check the convergent validity, the loading factor for each item was calculated. All item loadings are more significant than 0.6, and  $t$  values indicate that all uploads are significant at 0.05. Thus, the scale has good convergent validity, Table 3.

The Bootstrapping method in SmartPLS software was used to test the statistical significance of path coefficients (Fig. 1) & (Fig. 2). Fig. 2 shows the  $P$ ,  $T$ , and  $R^2$  values for all research variables and the PLS model of the study.

### 7.1. Structural model

The research analysis result reveals that the factor (MOOC) has a significant impact on Higher Education.

**Table 2**  
Result of construct assessment.

Constructs	Items	Factor loading	CR	Cronbach's $\alpha$	AVE
<b>MOOC</b>	MQ1	0.728	0.844	0.838	0.517
	MQ2	0.718			
	MQ3	0.749			
	MQ4	0.768			
	MQ5	0.777			
	MQ6	0.723			
	MQ7	0.707			
	MQ8	0.790			
	MQ9	0.789			
	MQ10	0.740			
<b>Improving education outcomes</b>	Q11	0.735	0.871	0.804	0.630
	OQ1	0.794			
	OQ2	0.818			
	OQ3	0.843			
<b>Developing students' skills</b>	OQ4	0.797	0.863	0.808	0.515
	SQ1	0.756			
	SQ2	0.829			
	SQ3	0.846			
	SQ4	0.872			
	SQ5	0.773			
<b>Effective communication</b>	SQ6	0.707	0.786	0.762	0.586
	EQ1	0.790			
	EQ2	0.846			
	EQ3	0.872			
	EQ4	0.773			

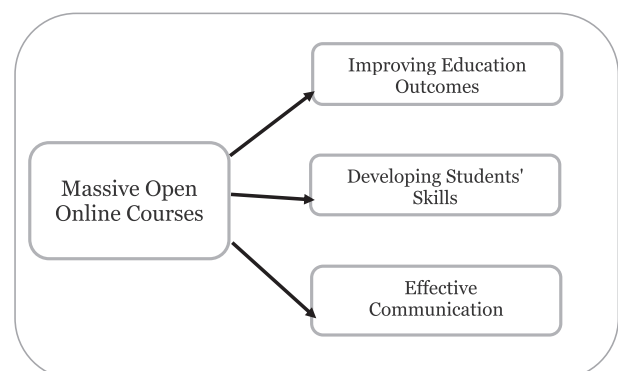
**Table 3**  
Summary of hypothesis testing results.

No.	Path (hypothesis)	t	p	Results
1	MOOC $\rightarrow$ Improving education outcomes (direct impact) <b>H1</b>	23.463	***	Supported
2	MOOC $\rightarrow$ Developing students' skills (direct impact) <b>H2</b>	28.645	***	Supported
3	MOOC $\rightarrow$ Effective communication (direct impact) <b>H3</b>	14.985	***	Supported

**H1.** MOOCs have a direct impact on higher education by Improving education outcomes ( $t = 23.46$ ,  $p \leq 0.001$ ) which supported **H1**. Besides, MOOC accounted for a 65% Improving education outcomes.

**H2.** MOOCs have a significant direct impact on higher education by developing students' skills ( $t = 28.64$ ,  $p \leq 0.001$ ) which supported **H2**. Besides, MOOC accounted for 0.65 per cent of developing students' skills variance.

**H3.** MOOCs have significantly impact higher education through effective communication with values ( $t = 14.98$ ,  $p \leq 0.001$ ) and explained 0.63 per cent of Effective communication. Thus, **H3** was supported.

**Fig. 1.** Research model and Hypothesis.



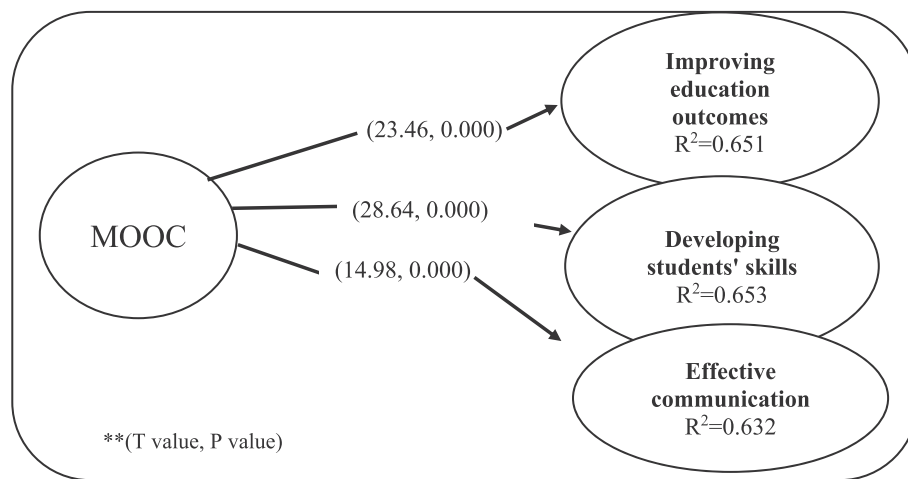


Fig. 2. P, T, and  $R^2$  values for all research variables and the PLS model of the study.

## 8. Discussion

The goal of the study is to explore MOOC online courses affect higher education institutions in three dimensions, improving educational outcomes, developing students learning skills and deploying effective communications with instructors. To our knowledge, this is the most recent national study examining MOOC's possible implementation in the Saudi higher education system. Some research project examines the requirement and attitudes towards MOOC's among students (Alharthi, 2016). The theoretical frameworks that were identified as being utilized most were the impact of the MOOCs on student learning and their education (Mazoué, 2013). This research found the majority of university faculty think that MOOC's have a direct impact on improving educational outcomes.

Furthermore, the research data support hypothesis 2 MOOC's has a direct impact on developing students' learning skills. Thus, the development of the university curricula. The last hypothesis this study examines is effective communication between students and faculty. The result shows MOOC's have a direct impact on effective communication. Lastly, this study has some limitations, such as the experimental testing of MOOC's, which can be examined in future studies. The finding of the current study agrees with Al-Atabi & DeBoer (2014) study endorse that the MOOC is a suitable platform to train entrepreneurship because it provides tools to enable students' collaborative mastering as properly as enhancing individuals' affective key entrepreneurial factors together with such possibility reputation and aid acquisition. Also the significant impact of MOOC on student academic performance found in (Al-Rahmi et al., 2018).

### 8.1. Recommendations and limitations and future directions

Based on the results of this study, the study recommends the following, there is need to experiment with the application of a curriculum in universities using MOOC's, and then evaluate this experience as a first step. However, the university's administration can support faculty incentives which are interested in building MOOC's to develop and examine many types of learning. Therefore, help resolve challenges that constitute an obstacle to faculty teaching using MOOCs. By reducing the administrative protocols adopted in the universities allowing faculty members to embrace creativity and innovation to achieve their teaching objectives. The study finds there is a need for technical support by establishing a specialized body at the university level to provide technical support. Many universities need training programs for faculty and students. In conclusion, universities should have a plan to develop MOOC as a part of college teaching and learning.

## Declaration of competing interest

The author declare that she has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## CRediT authorship contribution statement

**Noura Alhazzani:** Conceptualization, Project administration, Validation, Writing - original draft, Writing - review & editing, Supervision.

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