

The adoption of blended learning using Coursera MOOCs: A case study in a Vietnamese higher education institution

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This research is unique to a Vietnamese higher education institution that adopted blended learning using Coursera MOOCs. Employing the service quality model, the objective was to investigate factors affecting the continuance intention and recommendation to others towards blended learning using Coursera MOOCs. This study was conducted an online survey with 637 students across four campuses of a Vietnamese higher education institution. The results of the structural equation modeling showed that the learning content and online responsiveness increased satisfaction with Coursera MOOCs whereas online reliability did not affect satisfaction with Coursera MOOCs. There were also positive relationships between empathy, tangibles, classroom responsiveness, and classroom activities. Assurance and classroom reliability had no significant impacts on classroom activities. Satisfaction and classroom activities positively influenced the continuance intention towards blended learning using Coursera MOOCs. Lastly, satisfaction, classroom activities, and continuance intention significantly affected the recommendation to others towards blended learning using Coursera MOOCs.

Implications for practice or policy:

- A case study process for evaluating the quality of the blended learning using Coursera MOOCs is detailed.
- Practical recommendations are made for curriculum development, teaching and learning, assessment, and professional development as universities implement the blended learning using MOOCs.

Keywords: blended learning, Coursera MOOCs, offline mentoring, service quality model, higher education institutions

Introduction

Blended learning is seen as the way forward for higher education. Teachers need to meet a variety of students' learning needs, scaffold learning processes, and promote active, reflective, and collaborative learning by employing a blended learning mode (Hoang, 2015). Therefore, higher education systems across the world, including Vietnamese higher education institutions, have developed and implemented blended learning models that aim to enhance learning activities in face-to-face classrooms and personalise the online learning for students (Tang & Tien, 2020). Vietnamese higher education institutions have employed a model of blended learning using Coursera MOOCs since September 2019. In this model, students must pass the required courses on the Coursera platform to obtain certificates, and be eligible to sit the offline final exams offered by the higher education institution. Importantly, the model of blended learning using Coursera MOOCs incorporates organisation and management of the self-learning skills of students, which can assist in the development of students' lifelong learning skills.

There is little research on the implementation of a model of MOOCs blended with offline mentoring. Further, few empirical studies have assessed the quality of blended learning. Therefore, this study was conducted to investigate how the quality of Coursera MOOCs and offline mentoring affect the students'

continuance intention and willingness to recommend to others to study at a higher education institution. This study collected data from four higher education institution campuses across Vietnam: Hanoi, Ho Chi Minh City, Da Nang, and Can Tho.

Literature review

Blended learning methods allow students to gain technical expertise through online videos deployed on learning management systems, and then use those materials in the classroom (Wibawa & Kardipah, 2018). Students benefit from a strong cyber infrastructure that can accommodate the use of technologies such as videoconferencing, live streaming, and MOOCs (Malaysia Ministry of Education, 2015). The quality of blended learning has not been widely investigated. There is little research on the models of MOOCs used for blended learning generally, and the model of blended learning using Coursera MOOCs particularly. Very few universities use the learning materials from the well-known MOOC provider, Coursera, and blend them with offline mentoring in traditional classrooms.

MOOCs for blended learning

There have been several studies on the advantages of blended learning using MOOCs. Bruff et al., (2013) mentioned that a model was piloted in which a Coursera MOOC, Machine Learning, was integrated within a graduate machine learning course at Vanderbilt University in USA. The results of Bruff et al. (2013) noted the students provided positive feedback with this model as they might develop their self-paced learning skills.. Loviscach (2013) noted that well-known universities offered high-quality courseware to students. Noticeably, blended MOOCs allow instructors more time for classroom activities including discussions and problem solving (Estévez-Ayres et al., 2015). Bralić and Divjak (2018) stated that blended learning using MOOCs could be useful in providing high-quality learning experiences that are both affordable and suitable for culturally diverse students. Last but not least, effective offline teaching combined with MOOCs can assist in raising the educational standards and quality of education in India (Virani et al., 2020).

The concept of service quality in blended learning in higher education

There are different definitions of service quality in the previous studies. Juran (1988) gave an early definition of service quality as achieving customer expectations, whereas Zeithaml (1988) described it as superiority or excellence in service delivery. Service quality refer to a customer's comparison of service expectations with perceptions of what is actually delivered by the service provider (Parasuraman et al., 1988). From a service quality viewpoint of higher education, students are the direct clients, so the primary responsibility is to meet students' needs.

There are few studies on the service quality of blended learning. Notably, Moore (2012) identified five pillars of quality: (1) learning effectiveness, (2) access, (3) cost-effectiveness and institutional commitment, (4) faculty satisfaction, and (5) student satisfaction, to enable stakeholders to ensure instructional quality in blended learning. Blended learning is widely used in Vietnamese higher education institutions, however there is a need to develop a set of quality criteria for online assessments, examinations, and student involvement (Pham & Ho, 2020).

MOOC platforms

Siemens and Downes (2008) created the first MOOC in 2008 called “Connectivism and Connective Knowledge” based on their ideas. Later, Daphne Koller and Andrew Ng founded Coursera as an independent for-profit technology in early 2012. In the same year, Udacity and Udemy were established. In February 2012, MIT and Harvard merged their MITx platforms into EdX. FutureLearn is another digital education platform, created in December 2012 and operated by the Open University of the United Kingdom (Chen, 2020).

Blended learning in the Vietnamese higher education institution: The model of blended learning using Coursera MOOCs

In this study, the board of management of the Vietnamese higher education institution has evaluated the benefits of Coursera MOOCs for students as being to: (1) acquire the most up-to-date content from renowned universities' instructors; (2) enhance English, self-learning, and digital skills of students; and (3) achieve worthy specialisation certificates issued by Coursera (Anh et al., 2019). Simultaneously, the board of management has also assessed the benefits of Coursera MOOCs for the studied Vietnamese higher education institution as the: (1) implementation of digital transformation; (2) enhancement lecturers' receptiveness to novel content and instructional approaches; (3) optimisation of learning materials; and (4) pioneering to gain competitive advantage over other higher education institutions (Anh, et al., 2019). A model of blending learning using Coursera MOOCs has been officially employed at the higher education institution in this study since September 2019. Students from information technology, business administration, graphic design, linguistics, multimedia communication, and hospitality management programs must take a Coursera MOOC each semester. Students work through the Coursera MOOCs at their own pace over 13 to 15 weeks. Coursera instructors work not only as facilitators but also as developers. Coursera MOOCs are given on mass for learners across the world, therefore, individual support for the students of the Vietnamese higher education institution in this study many not be synchronous. Further, MOOCs lack direct student-lecturer interaction and student-student interaction compared with the face-to-face classrooms (Quora, 2017). Consequently, students have still had five offline mentoring sessions with their lecturers at this Vietnamese higher education. These Vietnamese higher education's lecturers are mentors who guide, advise, and support their students on the matters related to Coursera MOOCs. It is necessary that students receive Coursera certificates to be qualified for the final exams. Above all, this Vietnamese higher education institution has to conduct offline final exams at the end of the semester to ensure the quality of student's learning on both Coursera MOOCs and offline mentoring sessions.

Proposed model and hypothesis development

As teaching and learning activities in higher education undergo substantial changes, it is critical to understand the impact of e-learning service quality. Evaluating e-learning service quality is necessary. Previous studies by Pham et al. (2019) and Uppal et al. (2018) employed the SERVQUAL model to assess the quality of the e-learning service.

The SERVQUAL model of Parasuraman et al. (1988) identified five dimensions of service quality: tangibles, reliability, responsiveness, assurance, and empathy. Physical facilities, equipment, and personnel are referred to as tangibles. Reliability means that the provider can reliably and accurately provide the promised service. The willingness of the supplier to assist and provide prompt service is referred to as responsiveness. Assurance is a term that refers to an employee's knowledge, courtesy, and capacity to inspire trust and confidence. Empathy is a term that refers to the caring and personalised attention that a service firm delivers to its clients (Parasuraman et al., 1988). Therefore, we select the SERVQUAL model to investigate service quality factors affecting students' continuance intention and recommendation to others towards blended learning using Coursera MOOCs. To extend service factors, we added the dimension of learning content, which refers to the prompt provision of correct learning materials for students (Uppal et al., 2018).

Coursera MOOCs quality and satisfaction

In previous research investigating the quality of e-learning and MOOCs, Lin (2007) noted that system quality, information quality, and service quality, made e-learning systems successful in Taiwan. The growing conversation around MOOCs reflect concerns about platform service quality and what MOOCs should offer in addition to an underlying online learning platform to improve service quality (Safri & Hanafiah, 2020). MOOC quality can be considered and measured in two dimensions, service quality and information quality. Service quality in this context also involves in the quality of the MOOC's delivery by instructors, the quality of support from information technology staff of the MOOC provider, and the quality of classroom activities from mentors of from the higher education institution (Albelbisi et al., 2021; Machumu & Musabila, 2018).

Satisfaction is the result of comparing what has been obtained to what was expected, and consists of the purchase decision, and the needs and wants associated with the purchase (Otaibi & Yasmeen, 2014). Noticeably, the Delone and McLean (2003) found both information quality and service quality are associated with user satisfaction. Each service quality factor contributes differently to the overall quality of e-learning services, which in turn affects e-learning student satisfaction (Pham et al., 2019). Therefore, the following hypotheses are formulated for this study:

- H1. Learning content positively affects the student satisfaction in Coursera MOOCs.
- H2. Online reliability positively affects the student satisfaction in Coursera MOOCs.
- H3. Online responsiveness positively affects the student satisfaction in Coursera MOOCs.

Offline mentoring quality and classroom activities

In this study, mentoring is defined as a relationship between the mentor and the mentee in which the mentor supports the mentee to promote knowledge and skill development based on their own experience (Panopoulos & Sarri, 2013). The quality of offline mentoring is measured by the dimension of service quality. Service quality in offline programs might be considered as the support offered from the mentor (Albelbisi et al., 2021). It is noted that some MOOCs do not offer mentors, coaches, and guides for students and this leads to lack of opportunities for engagement and connection between students and MOOC instructors (Safri & Hanafiah, 2020). Ultimately, students still need offline mentoring to deal with MOOC issues.

Classroom activities are activities offered to students to strengthen their learning through mentor interaction and peer interaction (Chow & Shi, 2014). Importantly, mentoring, like teaching, works best when it is tailored to the requirements of the mentee. Hobson (2012) noted that there might be a relationship between classroom activities and offline mentor quality. Our further research hypotheses are:

- H4. Empathy positively affects the classroom activities in offline mentoring.
- H5. Assurance positively affects the classroom activities in offline mentoring.
- H6. Classroom reliability positively affects the classroom activities in offline mentoring.
- H7. Tangibles positively affects the classroom activities in offline mentoring.
- H8. Classroom responsiveness positively affects the classroom activities in offline mentoring.

Satisfaction and loyalty

Fida et al. (2020) point out that there is a significant association between three variables: service quality, customer satisfaction, and customer loyalty. Perceived service quality is frequently regarded as a predictor of customer satisfaction (Yee et al., 2011). Customer satisfaction is a critical factor in determining customer loyalty, particularly in the service industry (Belás & Gabčová, 2016). Loyal customers are more likely to buy more products, pay less attention to pricing, and recommend the brand to relatives and friends (Bai et al., 2020). Dağhan and Akkoyunlu (2016) found that satisfaction had the strongest impact on the continuance intention in online learning environments (Dağhan & Akkoyunlu, 2016). We propose the hypothesis:

- H9. Satisfaction with Coursera MOOCs positively affects continuance intention towards blended learning using Coursera MOOCs.

Several studies on traditional services and online services point out that customer satisfaction positively affects customer loyalty (Dehghan et al., 2014; Kilburn et al., 2016; Suchánek & Králová, 2019). In this context, customer loyalty refers to recommending the brand to relatives and friends (Bai et al., 2020). Therefore, we also hypothesise:

- H10. Satisfaction with Coursera MOOCs positively affects recommendation of blended learning using Coursera MOOCs to others.

Classroom activities and loyalty

Li et al, (2021) noted that student-instructor interaction had a positive impact on students' continuance intentions. Therefore, we also hypothesise:

- H11. The classroom activities, in offline mentoring positively affects continuance intention towards blended learning using Coursera MOOCs.

He et al.'s (2017) found that teachers' interaction styles might have influenced the student loyalty and their recommendation to others. Therefore, we hypothesise:

- H12. The classroom activities, in offline mentoring positively affects recommendation of blended learning using Coursera MOOCs to others.

Continuance intention and recommendation to others

Izogo (2016) noted that repurchase intention positively affected willingness to recommend. Lastly, we hypothesise:

- H13. Continuance intention towards blended learning using Coursera MOOCs positively affects recommendation of blended learning using Coursera MOOCs to others.

In summary, the proposed research model is illustrated in Figure 1.

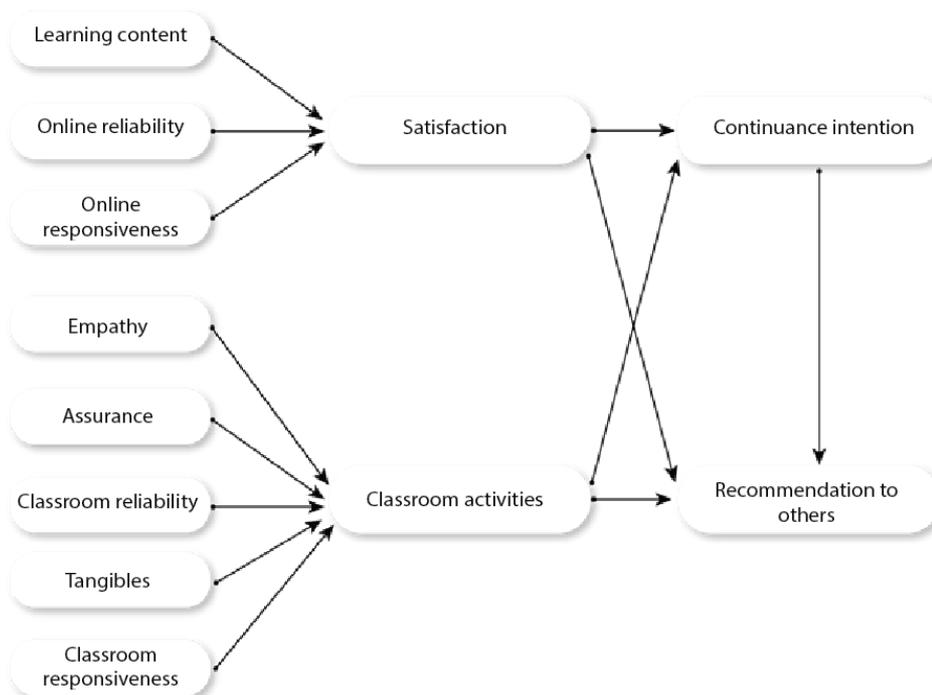


Figure 1. Research model showing the hypotheses relationships

Methods

Informed consent was obtained from all survey participants. The research team ensured that all questions in this survey were answered by selecting the most appropriate answer. Participation was voluntary, and anonymity and confidentiality was ensured.

Research site

The higher education institution in this research was the first private university established by an information and communications technology enterprise in Vietnam. This research investigated six programs run by the institute including information technology, business administration, graphic design, linguistics, multimedia communication, and hospitality management. These programs implemented blended learning using Coursera MOOCs from 2019. The study involved four campuses: Hanoi, Ho Chi Minh City, Da Nang, and Can Tho. There were approximately 21,500 students enrolled across the four campuses. Since September 2019, every student in the six programs the subject of this study has been required to take one Coursera MOOC per semester.

Survey instrument design

To measure the quality of blended learning using Coursera MOOCs, the 72 questions in the survey were divided amongst five sections: (1) Coursera MOOCs quality, (2) offline mentoring quality, (3) students' perception towards Coursera MOOCs, (4) students' perception towards offline mentoring, and (5) students' acceptance towards blended learning using Coursera MOOCs (Table 3). The quality of the Coursera MOOCs was measured using three variables: learning content, reliability, and responsiveness. Items of learning content were adopted and adapted from Yin (2016). Items related to reliability were taken from the studies of Pham et al. (2019) and Udo et al. (2011), and items related to responsiveness are taken from the studies of Pham et al. (2019) and Yin (2016). The quality of offline mentoring was measured using five variables: empathy, assurance, reliability, tangibles, and responsiveness. The items in these variables were taken from the studies of Pham et al. (2019), Yin (2016) and Udo et al. (2011). To measure students' perception towards Coursera MOOCs, we used the variable of satisfaction. Items related to satisfaction were adopted and adapted from Song (2010). To measure students' perception towards offline mentoring, we used the variable of classroom activities. Items related to classroom activities were adopted and adapted from Yin (2016). Lastly, to measure students' acceptance towards blended learning, we used two variables, continuance intention and recommendation to others. Items related to these variables were taken from Song (2010). The students scored their responses to the questions on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Sampling

Because of the large population of undergraduate students in the studied Vietnamese higher education institution, cluster sampling was used (Elfil & Negida, 2017). The researchers conducted the survey across the four campuses (Hanoi, Ho Chi Minh City, Can Tho, and Da Nang) of the Vietnamese higher education institution, using Google forms distributed via the participants' student email addresses. The survey was first pre-tested on 54 students of the higher education institution. Using SPSS version 26 to calculate Cronbach's alpha, we found the Cronbach's alpha values were acceptable ranging from 0.7 to 0.8 (Saidi & Siew, 2019). The survey was then distributed to undergraduate students enrolled in the six programs at the four campuses listed previously. The research was conducted from 2 to 22 June 2021, and 637 usable responses were obtained.

Common method bias

Referring to the study of Rodríguez-Ardura and Meseguer-Artola (2020), this paper employed the following processes to deal with common method bias. First, data was gathered from more than two different sources. In this case, we collected data from four campuses of the Vietnamese higher education institution. Second, the survey was anonymous, and every effort was made to ensure all questions were clear and appropriate. Lastly, with the inclusion both positive and negative worded items on the same scale, survey respondents were prevented from giving identical responses to all questions.

Results

Descriptive characteristics of the respondents

All the respondents were first year, junior, sophomore, and senior students and had experienced at least one Coursera MOOC blended with offline mentoring. The demographic and basic information of the

respondents is depicted in Table 1. Male and female responders accounted for 60.1% and 38.5%, respectively. Only 1.4% of the respondents do not specify their gender. Nearly half of the sample were third year students (42.4%), while the remainder was made up of first year students (25.9%), second year students (17.1%), and final year students (14.6%). Regarding the programs of the respondents, 35.1% were information technology students and 35.0% were business administration students. The remainder were English linguistics, multimedia communication, hospitality management, and graphic design students.

Table 1
Demographic and basic information of respondents

Characteristic	Frequency (n = 637)	%
Gender:		
Female	245	38.5
Male	383	60.1
Not prefer to say	9	1.4
School year:		
First year	165	25.9
Second year	109	17.1
Third year	270	42.4
Final year	93	14.6
Number of Coursera MOOCs		
1	207	32.5
2	153	24.0
3	106	16.7
More than 3	171	26.8
Program:		
Business administration	223	35.0
English linguistics	121	19.0
Graphic design	29	4.6
Hospitality management	14	2.2
Information technology	224	35.1
Multimedia communication	26	4.1
Campus:		
Can Tho	95	14.9
Da Nang	47	7.4
Hanoi	304	47.7
Ho Chi Minh	191	30.0

Results of confirmatory factor analysis

Hair et al. (2012) note that the confirmatory factor analysis approach is used to validate the factor structure of a set of observed variables. All indexes were within acceptable criteria ranges, signifying a good model fit (Table 2). The chi-square value was 2.478, with the range of 2.0 to 5.0 considered as acceptable (Hair et al., 2010). The most frequently used rules for performing the confirmatory factor analysis on a measurement model are that the normed fit index is greater than 0.9, incremental fit index is greater than 0.9, relative fit index is greater than 0.8, Tucker-Lewis index is greater than 0.9, root mean square error of approximation is less than 0.08, and comparative fit index is greater than 0.9 (Hair et al., 2010). Thus, these results demonstrate the goodness of fit of the proposed model.

Table 2
Results of multiple fit indices of the confirmatory factor analysis

Index	Result	Acceptable level
Chi-square/degree of freedom	2.478	< 5
Normed fit index	0.904	> 0.9
Incremental fit index	0.941	> 0.9
Relative fit index	0.895	>0.8
Tucker-Lewis index	0.935	> 0.9
Root mean square error of approximation	0.048	< 0.08
Comparative fix index	0.940	> 0.9

Awang (2015) stated that a factor loading of 0.7 or greater for each item indicates a high degree of convergent validity. Table 3 shows all factor loading values were greater than the ideal threshold of 0.7, thus, demonstrating high validity of the survey results (Awang, 2015).

Table 3
Results of factor loading for confirmatory factor analysis

Items	Factor loading
Learning content	
LC6: Coursera MOOC materials are plentiful.	0.814
LC5: Coursera MOOC materials are up to date.	0.807
LC4: Coursera MOOC materials are easy to use.	0.833
LC2: Coursera MOOC materials are understandable.	0.766
LC1: Coursera MOOC materials are easy to access.	0.801
Online reliability	
OREL6: My Coursera MOOC instructor is knowledgeable.	0.838
OREL5: My Coursera MOOC instructor is trustworthy.	0.849
OREL4: My Coursera MOOC instructor is well-prepared.	0.847
OREL3: My Coursera MOOC instructor provides good online lectures.	0.831
OREL1: My Coursera MOOC instructor is dependable.	0.73
Online responsiveness	
ORES5: Coursera staff deal with my request within the promised deadline.	0.836
ORES4: Coursera staff are willing to help me.	0.870
ORES3: Coursera staff understand my specific needs.	0.849
ORES2: Coursera staff are active in support service.	0.864
ORES1: Coursera staff provide me with prompt support service.	0.864
Empathy	
EMP6: My lecturer provides me with an environment that encourages interactive participation.	0.844
EMP5: My lecturer motivates me to do my best.	0.884
EMP4: My lecturer encourages me to do my best.	0.863
EMP3: My lecturer has my best long-term interest in mind.	0.759
EMP1: My lecturer is genuinely concerned about me.	0.727
Assurance	

ASS3: My lecturer is an expert in his/her field.	0.884
ASS1: My lecturer is knowledgeable in his/her field.	0.888
ASS2: My lecturer is professional in his/her field.	0.919
Tangibles	
TAN6: The content of final exams aligns with course learning outcomes.	0.773
TAN4: Final exams are effective in measuring students' performance.	0.780
TAN2: The difficulty level of final exams is reasonable.	0.777
TAN1: The duration of final exams is reasonable.	0.774
Classroom reliability	
CREL5: My lecturer consistently provides me with good mentoring.	0.897
CREL4: My lecturer reliably corrects information when needed.	0.883
Classroom responsiveness	
CRES6: My lecturer responds to me in a professional manner.	0.838
CRES4: My lecturer effectively answers my questions.	0.877
CRES3: My lecturer responds to my learning needs in a timely manner.	0.860
CRES2: My lecturer is ready to answer my questions.	0.912
CRES1: My lecturer always welcomes my questions and comments.	0.882
Classroom activities	
CA1: The transformation from teacher-centered classroom to student-centered classroom is good for me.	0.764
CA2: Collaborative learning enhances my engagement in the classroom.	0.840
CA3: Active learning is useful for me in the classroom.	0.842
CA4: I enjoy working in groups in the classroom.	0.758
CA5: I have opportunities to have direct interaction with my lecturer in the classroom.	0.755
Satisfaction	
SAT3: My experience with Coursera MOOCs was better than I had expected.	0.848
SAT4: Most of my expectations with the Coursera MOOCs were confirmed.	0.826
SAT5: My tuition fee paid for Coursera MOOCs was worth it.	0.784
SAT6: I am generally satisfied with Coursera MOOCs.	0.882
Continuance intention	
CI2: I am likely to engage in blended courses in the next semester.	0.844
CI4: I plan to spend more time on blended courses in the next semester.	0.875
CI5: I plan to actively engage in blended courses in the next semester.	0.878
CI6: I plan to frequently engage in blended courses in the next semester.	0.887
Recommendation to others	
RTO1: I will recommend blended courses to friends in my program of study.	0.877
RTO2: I will recommend blended courses to friends in other programs of study.	0.885
RTO3: I will recommend blended courses to my family members.	0.887
RTO4: I will post positive things about blended courses on my Facebook.	0.799
RTO6: I will recommend blended courses to anyone.	0.853

All variables in Table 4 have composite reliability > 0.7 and average variance extracted > 0.5 . Maximum shared variance is likewise lower than average variance extracted for all variables. Notably, the square root of average variance extracted (in the cross line) exceeds all inter-construct correlations combined. Thus, the measurement model has convergent and discriminant validity (Hair et al., 2010).

Table 4
Convergent and discriminant validity

	CR	AVE	MSV	LC	OREL	ORES	EMP	ASS	CREL	TAN	CRES	RTO	CI	CA	SAT
LC	0.902	0.647	0.646	0.804											
OREL	0.911	0.673	0.646	0.804 ***	0.820										
ORES	0.932	0.734	0.594	0.771 ***	0.735 ***	0.857									
EMP	0.909	0.669	0.611	0.626 ***	0.733 ***	0.639 ***	0.818								
ASS	0.925	0.805	0.748	0.633 ***	0.761 ***	0.573 ***	0.772 ***	0.897							
CREL	0.884	0.792	0.748	0.639 ***	0.748 ***	0.586 ***	0.781 ***	0.865 ***	0.890						
TAN	0.858	0.602	0.556	0.746 ***	0.713 ***	0.689 ***	0.699 ***	0.650 ***	0.710 ***	0.776					
CRES	0.942	0.764	0.695	0.598 ***	0.725 ***	0.563 ***	0.755 ***	0.823 ***	0.834 ***	0.629 ***	0.874				
RTO	0.934	0.741	0.727	0.601 ***	0.580 ***	0.599 ***	0.582 ***	0.455 ***	0.479 ***	0.706 ***	0.449 ***	0.861			
CI	0.926	0.759	0.727	0.599 ***	0.552 ***	0.578 ***	0.578 ***	0.445 ***	0.452 ***	0.692 ***	0.442 ***	0.852 ***	0.871		
CA	0.894	0.629	0.433	0.634 ***	0.641 ***	0.569 ***	0.654 ***	0.592 ***	0.605 ***	0.658 ***	0.605 ***	0.582 ***	0.575 ***	0.793	
SAT	0.902	0.698	0.512	0.715 ***	0.638 ***	0.631 ***	0.542 ***	0.443 ***	0.451 ***	0.690 ***	0.412 ***	0.702 ***	0.711 ***	0.574 ***	0.836

Note. CR: composite reliability, AVE: average variance extracted, MSV: maximum shared variance, LC: learning content, OREL: online reliability, ORES: online responsiveness, EMP: empathy, ASS: assurance, TAN: tangibles, CREL: classroom reliability, CRES: classroom responsiveness, CA: classroom activities, SAT: satisfaction, CI: continuance intention, RTO: recommendation to others

***Correlation is significant at the 0.001 level

Structural model

The indices measure the model fit for the structural model (Table 5). The values of these indices all fell within the acceptable range, as mentioned in the study of Hair et al. (2010). Chi-square is 3168.770 whereas degree of freedom is 1236. As a result, the chi-square/degree of freedom was 2.564, with a range of 2.0 to 5.0 considered as acceptable (Hair et al., 2010). The most frequently used rules for the structural model are that the normed fit index is greater than 0.9, Tucker-Lewis index is greater than 0.9, root mean square error of approximation is less than 0.08, and comparative fit index is greater than 0.9 (Hair et al., 2010). Thus, these results demonstrated the goodness of fit of the proposed model.

Table 5
Results of multiple fit indices of the structural model

Index	Result	Acceptable level
Chi-square	3168.77 0	-
Degree of freedom	1236	-
Chi-square/degrees of freedom	2.564	< 5
Normed fit index	0.899	> 0.9
Tucker-Lewis index	0.931	> 0.9
Root mean square error of approximation	0.050	< 0.08
Comparative fit index	0.936	> 0.9

Hypothesis testing

Impact of Coursera MOOCs quality on satisfaction

Table 6 shows results of the structural equation modelling. The influence of learning content on satisfaction was both positive and statistically significant ($\beta=0.533$). As a result, hypothesis 1 was supported. Online responsiveness had a substantial effect on satisfaction ($\beta=0.181$, $p=0.001$), corroborating hypothesis 3. On the basis of these findings, it was observed that the effect of learning content on satisfaction was 2.94 times greater than the effect of online responsiveness on satisfaction (0.533 compared to 0.181). This demonstrated the respondents' perception of the significance of MOOC learning content in boosting their satisfaction with MOOCs. Finally, $p=0.232$ indicated that the association between online reliability and satisfaction was negligible. As a result, hypothesis 2 was not supported.

Impact of offline mentor quality on classroom activities

The results of data analysis indicated that empathy had a substantial effect on classroom activities for the respondents ($\beta = 0.269$), therefore, hypothesis 4 was accepted. Similarly, the impact of tangibles on classroom activities was also significant ($\beta = 0.422$), supporting hypothesis 7. Additionally, classroom responsiveness had a statistically significant effect on classroom activities ($\beta = 0.176$, $p = 0.014$). As a result, hypothesis 8 was supported. Lastly, insignificant relationships between the assurance and classroom activities, and between the classroom reliability and classroom activities were observed ($p = 0.515$ and $p = 0.33$). Consequently, both hypothesis 5 and hypothesis 6 were rejected.

Impact of satisfaction with Coursera MOOCs and classroom activities in offline mentoring on continuance intention towards blended learning using Coursera MOOCs

Hypotheses 9 and 11 postulated the relationship between satisfaction and continuance intention, and the relationship between classroom activities and continuance intention respectively. It was found that the effects of class activities in offline mentoring on continuance intention towards blended learning using Coursera MOOCs and satisfaction with Coursera MOOCs on continuance intention towards blended learning using Coursera MOOCs in this study were very strongly significant (β ranging from 0.281 to 0.572). Thus, both hypothesis 9 and hypothesis 11 were accepted. Interestingly, the effect of satisfaction with Coursera MOOCs on continuance intention towards blended learning Coursera MOOCs was 3.56 times as much as the effect of class activities in offline mentoring on continuance intention towards blended learning Coursera MOOCs ($\beta =0.572$ compared to $\beta= 0.281$). This was perhaps as a result of the requirement for students to pass Coursera MOOCs to qualified for taking their final exams. In the meantime, the offline mentoring hours are only optional in the case of students who have any concerns and need support from their higher education institution lecturers.

Impact of satisfaction with Coursera MOOCs, classroom activities in offline mentoring, and continuance intention towards blended learning using Coursera MOOCs on recommendation of blended learning using Coursera MOOCs to others

The results of data analysis showed that satisfaction with Coursera MOOCs had a positive and significant impact on recommendation of blended learning using Coursera MOOCs to others ($\beta=0.176$). Therefore, hypothesis 10 was supported. Similarly, the impact of classroom activities in offline mentoring on recommendation of blended learning using Coursera MOOCs to others was also significant ($\beta=0.112$). Therefore, hypothesis 12 was also supported. Continuance intention towards blended learning using

Coursera MOOCs significantly influenced recommendation of blended learning using Coursera MOOCs to others ($\beta = 0.665$), therefore hypothesis 13 was supported.

Table 6
Results of structural equation model

Dependent variable	β	p	Hypothesis
Satisfaction			
Learning content	0.533	***	H1: supported
Online reliability	0.075	0.232	H2: not Supported
Online responsiveness	0.181	0.001	H3: supported
R^2	55.5%		
Classroom activities			
Empathy	0.269	***	H4: supported
Assurance	0.055	0.515	H5: not supported
Classroom reliability	-0.097	0.33	H6: not supported
Tangibles	0.422	***	H7: supported
Classroom responsiveness	0.176	0.014	H8: supported
R^2	55.0%		
Continuance intention			
Satisfaction	0.572	***	H9: supported
Classroom activities	0.281	***	H11: supported
R^2	55.1%		
Recommendation to others			
Satisfaction	0.176	***	H10: supported
Classroom activities	0.112	***	H12: supported
Continuance intention	0.665	***	H13: supported
R^2	74.6%		

Note. *** significance level 0.001

LC: learning content, OREL: online reliability, ORES: online responsiveness, EMP: empathy, ASS: assurance, TAN: tangibles, CREL: classroom reliability, CRES: classroom responsiveness, CA: classroom activities, SAT: satisfaction, CI: continuance intention, RTO: recommendation to others

Discussion

The results showed that learning content had the greatest impact on student's satisfaction with Coursera MOOCs compared to reliability and responsiveness for the respondents to this survey. This result agrees with previous conclusions by Uppal et al. (2018), Gray and DiLoreto (2016), and Udo et al. (2011). Online content is available 24/7 and can be reviewed by students to reinforce learning and review the knowledge during the course (Gray & DiLoreto, 2016). MOOCs can offer this convenience in terms of scheduling and location, as well as high-quality educational materials and content supplied by a variety of renowned universities (Virani et al., 2020). The higher education institution in this study selected Coursera as a MOOC provider because it was found to be beneficial to students in the following ways: (1) students can acquire the most up-to-date learning content; and (2) students have opportunities to learn via videos by renowned university instructors. Therefore, this research confirms that the learning content of Coursera MOOCs is considered as an important factor for students' satisfaction at the higher education institution. Anh et al.'s (2019) study noted that the learning content of MOOCs is also beneficial to lecturers as they can utilise new content and new instructional methods. This, in conjunction with the results of this study, suggest that the curriculum development office of higher education institution should select Coursera MOOCs that are up-to-date and contain practical content that meets the industries' requirements and students' professional needs. More importantly, this research showed the selection of appropriate Coursera MOOCs could increase students' interested in their own learning. Similarly, Bralić and Divjak (2018) recommended that universities should provide students with a variety of engaging MOOCs to select from, enabling students to achieve their learning needs..

Online responsiveness also had a positive relationship with students' satisfaction with the Coursera MOOCs. This finding aligns with the findings of Uppal et al. (2018), and Udo et al. (2011). In both of their studies with MOOCs, students faced issues such as plagiarism in assignments, obtaining Coursera

certificates, and technical issues. Therefore, there is a need for prompt and effective support from Coursera staff. This can be resolved quickly and professionally by making it part of the terms of agreement between the higher education institution and Coursera.

Online reliability did not significantly affect students' satisfaction with the Coursera MOOCs. This result is consistent with the results of Uppal et al. (2018), and Udo et al. (2011). MOOCs help develop students' autonomy in learning (Bruff et al., 2013). Based on constructivist learning theory, learners create their own meaning in order to learn (Garmston & Wellman, 1994). Thus, it is critical for them to take ownership of their own learning, and to acquire both autonomy and knowledge (Alzahrani, 2015). Consequently, in this context students at the higher education institution did not depend on Coursera instructors. They were active in exploring their own knowledge and looking for support from their online peers (Uppal et al., 2018).

Tangibles, empathy, and classroom responsiveness all had significant impact on classroom activities, with Tangibles illustrating the greatest impact on classroom activities compared to the impacts of both empathy and classroom responsiveness. This revealed that the tangibles variable, the final exam in this study, was perceived as important by the respondents, stimulating them to attend the offline mentoring and interact with higher education institution lecturers in classroom activities. This revealed that grades are very important to responding students at the higher education institution. The final exam is a critical factor in their educational process. The result suggest that the higher education institution should put more effort into improving the quality of the final exams in the following ways: (1) develop questions mapped with the course outcomes and content, (2) check the test bank carefully before generating the final exam questions, and (3) monitor the final exam diligently. Similarly, the caring (empathy) and the willingness to assist (classroom responsiveness) of higher education institution lecturers were considered as motivators for student to engage in offline mentoring and interact with higher education institution lecturers and their peers. It is suggested that the heads of departments should offer Coursera MOOC orientation for full time and part time lecturers, especially for new lecturers. Lecturers need to be aware of ways to care for the students and understand what kinds of classroom activities should be conducted in offline mentoring to respond to students' needs. Most importantly, the higher education institution should organise professional training, pedagogical and psychological workshops to assist lecturers to provide better offline mentoring sessions with students.

There were insignificant relationships between the assurance and classroom activities in offline mentoring, and between the classroom reliability and classroom activities in offline mentoring. This finding agreed with the current practice at the higher education institution. The higher education institution lecturers work not only as mentors but also as facilitators in supporting students with matters related to their Coursera MOOCs. Remarkably, offline mentoring hours are not compulsory for the students. Thus, they only come to class when they seek the support from the higher education institution lecturers. In this situation, the higher education institution lecturers face a big challenge as some students do not find it necessary to attend the offline mentoring sessions, as well as do not highly regard the role of the higher education institution lecturers in these offline sessions. This challenge might result in negative effects on classroom activities in offline mentoring. Such classroom activities might negatively influence continuance intention towards blended learning using Coursera MOOCs and negatively influence recommendation of blended learning using Coursera MOOCs to others.

Satisfaction with Coursera MOOCs significantly affected continuance intention towards blended learning using Coursera MOOCs and recommendation of blended learning using Coursera MOOCs to others. This result agreed with the studies by Cole et al. (2014) and Lu et al. (2019). It confirmed that satisfaction was a critical factor reflecting the effectiveness of MOOCs implementation at the higher education institution for the respondents. There might be implications for the higher education institution from the positive relationship between satisfaction, continuance intention, and recommendation to others. The HEI needs to conduct more and ongoing studies to explore factors that influence students' satisfaction with Coursera MOOCs, besides the learning content and responsiveness mentioned above. Interestingly, Erdem-Aydin (2015) highlighted that learners are willing to attend MOOCs, especially if they are focused on areas they are interested in. This can give hints for which curriculum development office and departments of the higher education institution to link to students' learning needs and select Coursera MOOCs accordingly.

Classroom activities in offline mentoring positively influenced continuance intention towards blended learning using Coursera MOOCs. This result disagreed with the finding by Chow and Shi (2014), who

noted that the impacts of tutor interaction and peer interaction on e-learning continuance intention were not significant. Similarly, classroom activities significantly influenced recommendation of blended learning using Coursera MOOCs to others. In short, these results suggest that it is not only Coursera MOOCs but also classroom activities in offline mentoring that contribute to the student loyalty with blended learning in this situation. The findings might encourage higher education institutions to continuously improve the quality of offline mentoring in general and the quality of classroom activities in particular. It is strongly suggested that higher education institutions should consider increasing the offline mentoring hours, as well as creating diversified classroom activities tailored to students' needs. In addition, the higher education institution lecturers could not only directly mentor in face-to-face classrooms but also use social media tools to mentor students beyond class hours.

The results showed that continuance intention towards blended learning using Coursera MOOCs had the greatest impact on recommendation of blended learning using Coursera MOOCs to others. This finding totally fits with the study by Pham et al. (2019). In fact, as students intended to continue experiencing with blended learning using Coursera MOOCs, they were willing to recommend blended learning using Coursera MOOCs to others including their classmates and friends. This implies that student continuance intention towards blended learning using MOOCs Coursera and willingness to recommend blended learning using MOOCs Coursera to others might be measured as successful indicators in evaluating the quality of blended learning using MOOCs Coursera implementation.

In summary, from a theoretical perspective, the study revealed that the not only the service quality of Coursera MOOCs, but also the service quality of offline mentoring, significantly affected the continuance intention towards blended learning using MOOCs Coursera and recommendation of blended learning using Coursera MOOCs to others at the higher education institution by the respondents. This paper proposes a need for further studies to examine the mechanisms leading to students' continuance intention and willingness to recommend blended learning to others, using a blended learning using MOOCs model. From a practical perspective, such research would provide a case study of a blended learning model between the internationally well-known MOOC provider and locally supported offline mentoring. This might encourage higher education institutions to develop the blended learning using Coursera MOOCs model and the MOOCs policies of Vietnam, for higher education institutions in developing countries.

Conclusion

There are still some gaps in the evaluation of the quality of blended learning. There is little research on the blended learning using MOOCs models generally and the blended learning using Coursera MOOCs model particularly. Very few universities outsource the learning materials from the Coursera and blend it with offline mentoring in traditional classrooms.

The findings of this study showed that the Coursera MOOCs learning content and online responsiveness of Coursera staff had a great effect on student satisfaction. These findings agreed with the findings of Uppal et al. (2018) and Udo et al. (2011). Online reliability had an insignificant effect on student satisfaction with Coursera MOOCs. This result also supports the previous studies of Uppal et al. (2018) and Udo et al. (2011). In offline mentoring, there were also positive correlations between empathy, tangibles, classroom responsiveness, and classroom activities. Additionally, we observed that assurance and classroom reliability had insignificant impacts on classroom activities in offline mentoring. Notably, satisfaction with Coursera MOOCs and class activities in offline mentoring had significant effects on the continuance intention towards blended learning using Coursera MOOCs. These findings agree and disagree with the studies by Lu et al. (2019), and Chow and Shi (2014), respectively. Continuance intention towards blended learning using Coursera MOOCs had a significant relationship with recommendation of blended learning using Coursera MOOCs to others. This conclusion confirms the existing literature (Pham et al., 2019).

This study contains the two following limitations. First, it focused only on undergraduate programs at a single Vietnamese university. Second, it investigated a specific case with the provider Coursera. Consequently, we propose that further research might study other programs such as vocation and postgraduate programs, and examine cases of other popular MOOC providers. To highlight the significance of the blended learning implementation, we will continue investigating how the model of blended learning using Coursera MOOCs affects future student performances at the higher education institution.

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Please cite as: Ho, N. T. T., Pham. H-H., Sivapalan. S, & Dinh,V-H. (2022). The adoption of blended learning using Coursera MOOCs: A case study in a Vietnamese higher education institution. *Australasian Journal of Educational Technology*, 38(6), 121-138. <https://doi.org/10.14742/ajet.7671>