

IMPACT OF MASSIVE OPEN ONLINE COURSES (MOOCS) ON BLENDED LEARNING: FROM THE PERSPECTIVE OF FACULTY MEMBERS & STUDENTS

Farhan Ali farhanali.rana862@gmail.com	PhD Scholar, Department of English Language and Linguistics, University of Sargodha, Sargodha, Pakistan.
Dr. Azhar Pervaiz azhar.pervaiz@uos.edu.pk	Associate Professor, Department of English Language & Linguistics, University of Sargodha, Sargodha, Pakistan.
Maria Najam mariya.najam@yahoo.com	PhD Scholar, Department of English Language and Linguistics, University of Sargodha, Sargodha, Pakistan.

Abstract

Revamping sources of knowledge for students through adopting modern technologies is the primary concern in the World especially in developing countries like Pakistan. Massive Open Online Courses (MOOCs) is highly adaptive in the contemporary economic and professional environment, enabling learners to attain education and professional skill at a single platform. MOOCs facilitate the induction of a multidisciplinary audience to acquire skill-based learning activities. The current study utilizes the theory of reasoned action (TRA or ToRA) as a theoretical framework and adopts the Technology Acceptance Model (TAM) as an analytical framework / key foundation to investigate the determinants of teachers' / students' acceptance and use of MOOCs. Hypothesis was developed based on social influence, perceived usefulness, perceived ease of use, content quality, consensus of appropriation, psychological engagement, behavioural engagement, autonomous motivation and perceived satisfaction for adopting MOOCs. The collective impact was measured for attitude towards using MOOCs for blended learning. In the current study, a questionnaire was developed through the selection of variables, Google form was created and data was collected through online mood. The Smart PLS Version 3.0 was utilized to analyze variables adopted from other studies. The findings of the study revealed that the attitude, behavioural engagement, course quality, perceived ease of use and social influence have a significant positive impact on the intention to adopt MOOCs for blended learning. Further, the research study offered strong theoretical, social, contextual and managerial implications for faculty members, learners, policy makers, curriculum developers and heads of educational institutions.

Keywords: *Blended Learning, MOOCs, Smart PLS 3.0, TAM, ToRA, Technology*

Corresponding Author: Farhan Ali (PhD Scholar, Department of English Language and Linguistics, University of Sargodha, Sargodha, Pakistan)
Email: farhanali.rana862@gmail.com

1. Introduction

Emerging trends in higher education demands an integrated learning platform to inculcate students with diverse needs to attain skill based higher education. In the last decade, teaching and learning is transformed; modernization and intervention of AI platforms have reconditioned learning sources. MOOCs aimed to facilitate thousands of students for simultaneous enrollment at low cost or in few instance free of cost and with lenient eligibility criteria. The dominating feature of the program is online sessions across the world through regular lectures, group discussions, reading and assignments-based sessions, open and planned quizzes and practical assignments to gain in depth knowledge.

In MOOCs, lectures were provided through online mode, facilitating quality reading material through material readily available for downloading. The sequencing and grading of the material was accomplished through experts' faculty members and respective field experts. The assessments and evaluations of the program are performed through quizzes, assignments, and practical tasks. The previous research highlights practical gap in the field of Massive Open Online Courses (MOOCs) and highlighted the view that insufficient and scarcity of quality empirical research studies on MOOCs adoption from teachers and Students' perspective in general and particularly at Graduate level in the Pakistan context

Every year, MOOCs attract a large number of learners with a wide variety of cultural backgrounds, experiences, knowledge and skill levels (Mendoza et al., 2017). According to statistics produced by Class Central (www.class-central.com) depicts 23 million registered users. Despite its influential spread around the globe, different constructs required more research work. Information and Communication Technology (ICT) is used in education to enhance the teaching learning process and optimize information delivery (Yalagi P.S et al., 2021). Teachers, as a core element, should step forward for selecting new techniques in teaching learning paradigms. Virtual learning and online learning techniques are more productive than conventional modes of learning. In the 21st century, the teacher has the role of developer of learning skills using the motivational power of individualized active learning programs like ICT, multimedia, and Networks (Demirel, M., 2009).

For adopting the online learning model, MOOCs are the core element for the individual and also provide educational institutions with a variety of learners from different educational systems in collaboration with enhanced information technology facilities. According to the survey, the majority of MOOC learners are students or people who are working, and students have their own courses in learning tasks at school. People who work not only have to work but also have to juggle their family. The conflicts between work and family over time have always been there, and with the study of MOOC, conflicts can become more prominent (Dalipi, F et al., 2018). Teachers' self-efficacy in MOOCs

demands psychosocial determination that is based on behavioural and psychological engagement. Online learning programs (MOOCs) demand self-efficacy for both stakeholders of the educational stream, and recent technological advancements in the mode of education have proved its vitality (Allione, G., & Stein, R. M., 2016).

1.1. Research Objectives

The current study adopts TAM as its key foundation to investigate the determinants of teachers' / students' acceptance and use of MOOCs. Specifically, we examine the influence of social context or factors, perceived usefulness, and perceived ease of use, content quality on the teacher's intentions of adopting. The overarching objective of this study demonstrates that collaborative spirit, task interdependence, and social interaction ties are significantly related to consensus of appropriation and thereby facilitates commitment and learner engagement. In addition, commitment is also confirmed to enhance learner engagement. Further, the research determined the factors that affect the intended use of MOOCs, that underlie the adoption of new technologies or information systems has received considerable attention in scientific literature in recent years.

1.2. Research Questions

The study attempts to explore the following research questions:

RQ1 Which factors influence teachers' / students' intention to adopt MOOCs for blended learning?

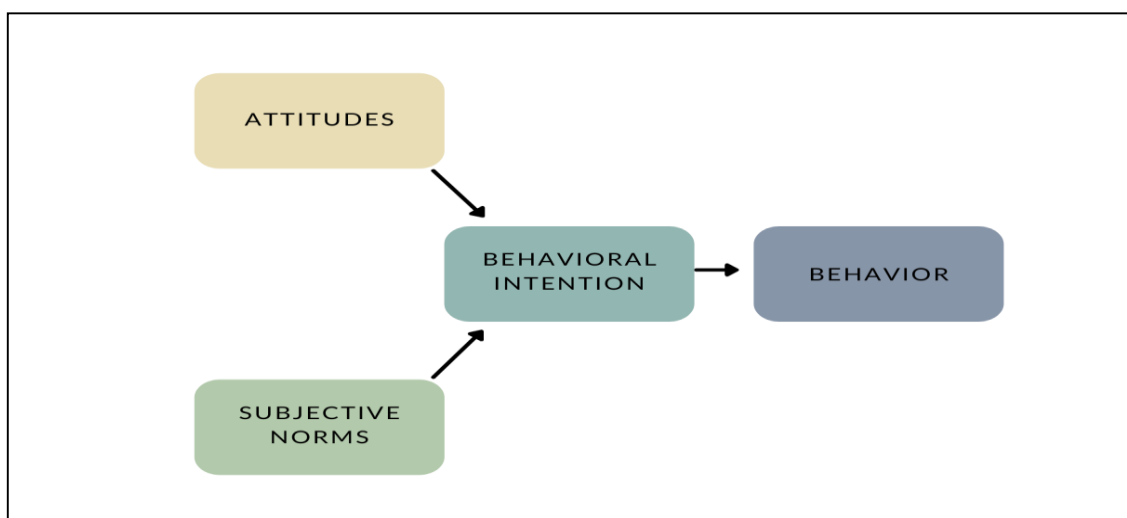
RQ2 What are the implications for adopting MOOCs for blended learning?

The massive and economic nature of MOOCs can bring change in the dynamics of higher education. With the government making so many efforts towards MOOCs, it is imperative to understand the antecedents of its adoption for blended learning and therefore the present study is taken up in the Pakistani context. In recent years, there has been a growing interest in exploring MOOCs, their implementation for blended learning, and the possibilities of using MOOCs to enrich traditionally taught courses in classrooms. It can definitely act as a supplementary resource in achieving the overall goals of teachers as well as students. The study offers both theoretical and practical insights on how to boost MOOC learners' collaboration. In particular, current work is among the first to expound the process of collaboration in MOOCs ingeniously using the concept consensus of appropriation. Such a theorization presents a clear picture of how group learners collaboratively harness technologies to facilitate their learning. Third, the current study also identifies the contextualized characteristics of the MOOC system as the antecedents for consensus of appropriation. The research work contributes to the study of use intention for technologies related to the increasingly popular massive open online courses (MOOCs). The research work, further, provides focus in the study of perceived satisfaction and MOOC use intention by extending the models proposed in previously published literature in this emerging field.

2. Literature Review

2.1. Theory of Reasoned Action

The study utilizes the *theory of reasoned action (TRA or ToRA)* intended to analyze the relationship between attitude and behaviour of human action for the sake of research problems. The theory mainly employed to predict how participants act based on their pre-mature attitudes and behaviour intentions. An individual's decision to engage in a particular behavior is based on the outcomes the individual expects, come as a result of performing the behavior.



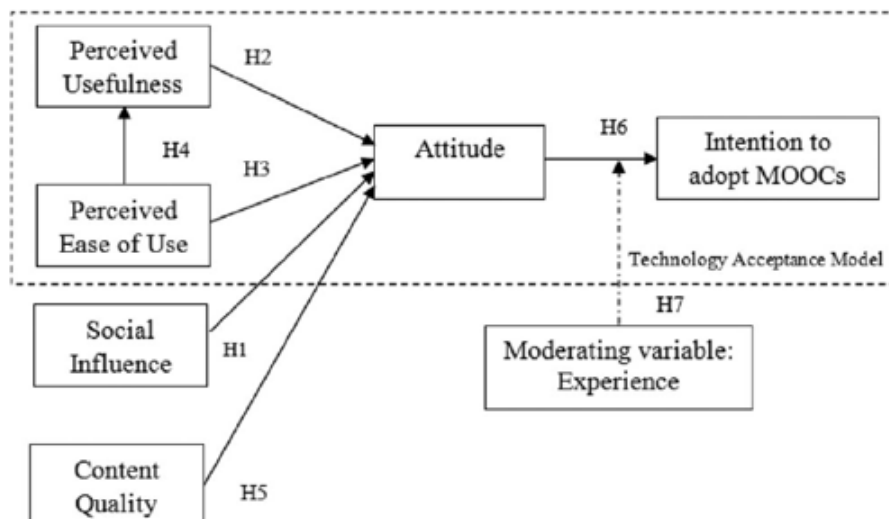
The theory of reasoned action developed by Martin Fishbein and Icek Ajzen in 1967, is derived from the previous research in social psychology, persuasion models, and attitude theories. Fishbein's theories suggested a relationship between attitude and behaviors (the A-B relationship). However, critics estimated that attitude theories were not proving to be good indicators of human behavior. The TRA was later revised and expanded by the two theorists in the following decades to overcome any discrepancies in the A-B relationship with the theory of planned behavior (TPB) and reasoned action approach (RAA). The theory is also used in communication discourse as a theory of understanding.

2.2. Technology Acceptance Model (TAM)

The research paper utilizes the Technology Acceptance Model (TAM) to investigate behaviour and intentions to Adoption of massive open online courses (MOOCs) for blended learning in Indian perspective. The technology acceptance model (TAM) is an information systems theory that models how users come to accept and use technology. TAM is widely used for research on the use of technology for education. Rubaai and Hashim (2019) analyse the lecturers' acceptance of using MOOC for teaching English as the second language. Zhang et al. (2017) conducted a study for e-Learning

implementation using TAM. Chan et al. (2018) examined the behavioural intention to utilize cloud-based tools in MOOC, based on TAM. Wu and Chen (2017) have used TAM as one of the two models for continuance intention to use MOOCs.

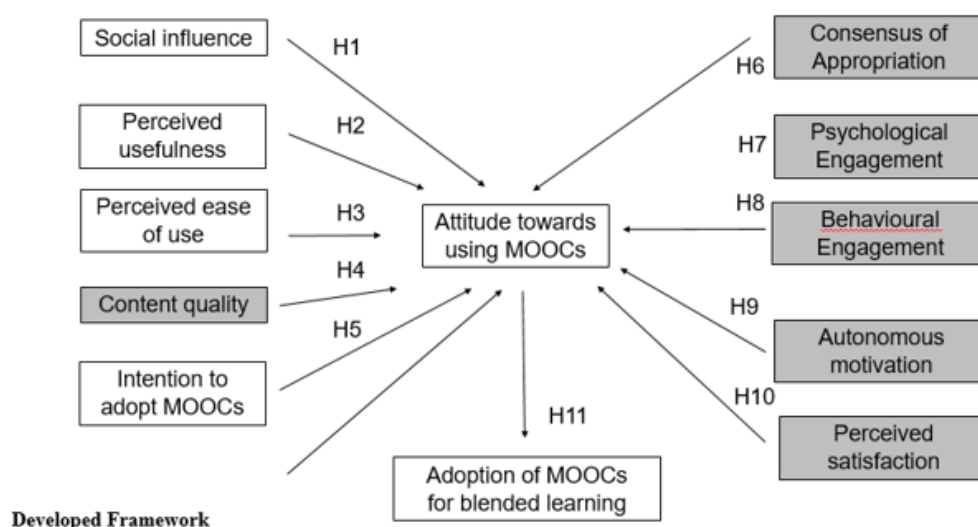
2.3. Formulation of Hypothesis



2.3.1. Perceived usefulness (PU) – This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance their job performance." It means whether or not someone perceives that technology to be useful for what they want to do.

2.3.2. Perceived ease-of-use (PEOU) – Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989). If the technology is easy to use, then the barriers are conquered. If it's not easy to use and the interface is complicated, no one has a positive attitude towards it.

In the current study, the already developed model was modified with additional hypothesis for utilization in the current study.



H1: Impact of Social influence towards using MOOCs.

H2: Role of Perceived usefulness towards using MOOCs.

H3: Effect of Perceived ease of use towards using MOOCs.

H4: Role of the Content quality towards using MOOCs.

H5: Impact of intention to adopt MOOCs.

H6: Role of consensus of appropriation towards using MOOCs

H7: Role of Psychological engagement for adopting MOOCs

H8: Role of Behavioural engagement for adopting MOOCs

H9: Role of Autonomous motivation for adopting MOOCs

H10: Effect of Perceived satisfaction for adopting MOOCs

H11: Attitude towards using MOOCs for blended learning

3. Methodology

The research design outlays the overall strategic domain that research utilizes to integrate the various elements of the research study in a coherent, logical, and persuasive manner. Selection of research design entirely ensures that the researchers were effectively addressing the research problem, and it also constitutes the proposal for collecting data, measurement, and analysis of collected data. In this research study, a descriptive research design is utilized which was focused on systematic collection of data regarding MOOCs for blended learning and its adaption in Pakistani context. Descriptive research is meant to describe systematically and accurately the facts and characteristics of a given population or area of interest (Isaac, S & Michael, WB 1979). Common types of descriptive research are descriptive surveys, descriptive longitudinal studies, descriptive correlational studies, and case studies (Dulock, 1993). Descriptive research design is a very convenient research design for examining research problems in a real social context and benefits the researchers

in conversation of raw data into valuable information. This design is applicable to all stakeholders or contestants involved in a research process. It benefits the researchers in multiple ways, such as remotely gathering information utilizing modern digitalized means of communication and inexpensive research design. Data collected through descriptive research design can be analyzed and presented for future studies to beginners and professional researchers.

3.1. Target Population & Sampling Technique

Population in a research study refers to a specific group of inhabitants selected as participants through a sampling technique. Knowledge of the correct target population is a significant factor in research studies because it provides a road map for the research process. The target population must be clearly specified and described, and the subjects must be representative of the target population (Allen, 2017). The population for this research study constitutes the university teachers and students from Sindh having at least matric education and the ability to learn and understand online courses. In the research process, sampling refers to the selection of appropriate participants from the targeted population. Sampling is a technique (procedure or device) employed by a researchers to systematically select a relatively smaller number of representative items or individuals (a subset) from a pre-defined population to serve as subjects (data source) for observation or experimentation as per the objectives of his or her study (Sharma, 2017).

Purposive sampling, a non-probability sampling technique, was applied for sampling the targeted population. In the purposive sampling technique, maximum variation sampling (maximum heterogeneous sampling) was implemented for the selection of participants. The purpose of selecting maximum variation sampling is to validate that findings reveal different perspectives or differences of findings. Through this technique, pre-defined criteria were established, and the selection of participants became more convenient. Table 2 depicts the demographics.

3.2. Questionnaire development & Data Collection

For executing valid research, a well-managed questionnaire was prepared. Before preparation of the questionnaire, national and international literature was reviewed to cover the objectives, purpose, scope, potential and future challenges of the research study. The finalized questionnaire was sent to two Ph.D. faculty members and three Ph.D. scholars for validation. After validation, the questionnaire was spread through Google form. Items were brought from different sources, and instrumentation sources were tabulated in Table 1.

Data collection is the core element in the research process after selecting participants through the non-probability sampling technique. In 21st-century communication modes have immensely developed, and advancement in technology facilitates researchers to gather widespread data in a limited time frame. Quantitative data

collection is guided by four major objectives such as empiricism, measurement, replicability, and objectivity (Botti, & Endacott, 2005). In this research process, data collection was executed through Google form following Likert Scale. The primarily standardized questionnaire was prepared and finally spread through Google form link to the targeted population. The online form was recorded as responses to the current research and as a source of information for future researchers.

3.3. Data Analysis tools

Data collected through online source (Google forms) was analyzed using SPSS Software Ver 25.0 and Smart PLS Ver 3.0. while far less popular than CB-SEM, PLS-SEM is increasingly applied in marketing and other business disciplines (Henseler et al., 2009; Ringle et al., 2009). Through SPSS software data screening was performed by the following four steps (missing value treatment, out of range data, univariant & multivariant outlier). The statistical data screened from SPSS was further analyzed through Smart PLS to analyze the relationships between different constructs simultaneously. Hypothesis testing was also performed using Smart PLS-SEM (Structural Equation Modelling).

The process of statistical analysis referred to the collection of data through a valid source and its interpretation to find trending patterns and attitudes in a particular field. It constitutes its presence in the data analysis portion of the research work. Mostly its utilization is evident where research interpretations, statistical / research modeling, or designing of surveys and studies are accomplished.

In quantitative research, different techniques used for statistical analysis such as cross-tabulation, descriptive, and inferential types of statistical analysis. Cross-tabulation, a very influential analytic tool of the research market, also known as contingency table analysis, often applied to analyze categorical (nominal measurement scale) data. Mainly cross-tabulation is simply a data table that represents the results of the entire research. In descriptive type of statistical analysis, calculations of central tendency, quartile ranges, standard deviation, variance, and frequency distribution are depicted in graphs. However, inferential includes more complex statistical calculations such as probability-based analysis (Kamakura & Wedel, 1997).

We applied the cross-tabulation technique for the statistical analysis of collected data. Cross tabulation is a statistical analysis method associated with quantitative research to analyze the relationship between different variables. It is also effective in displaying the correlation between two variables. It possesses unique language, using terminology such as “banners”, “stubs”, “Chi-Square Statistic” and “Expected Values.” Typically, Cross-tabulation analysis compares the hypothetical variables. Through the cells of the tables, we can report frequency counts and percentages of respondents. Cross-tabulation is convenient for research based on categorical variables or survey responses.

Ethical considerations are a set of guiding principles for research design and practices. Being researchers' ethical considerations is of immense significance during the research process. These considerations are substantial to maintain the true spirit of the research. The ethical considerations were ensured while conducting the research process. The researchers were responsible for ensuring no physical and psychological damage to the individual and other members associated with the research process. Data collection must be completed in a comfortable and friendly environment. The participants' names, personal life events, social and domestic background were kept in secrecy.

Data Analysis

According to the purposed objectives and research model of the study, data analysis was completed using Smart PLS 3.0. One of the main characteristics of the PLS-SEM is that it is able to estimate a model with a large number of latent variables and indicators even with a small sample size (Chin et al., 2008). As per referred instructions by Hair et al. (2011), the collected data underwent evaluation of outer and inner measurements and finally, hypothesis testing was done.

After reviewing past national and international literature, a questionnaire was developed. Validation obtained from Ph.D. Faculty members of the University and scholars. Sources of items are also tabulated in Table 1.

Table 1: Instrumentation Source

Variables	Items	Source
Social Influence	3	Wu & Zhang, 2014; Wu & Chen, 2017
Perceived usefulness	5	Kim et al., 2010; Wu & Zhang, 2014; Yang et al., 2017
Perceived ease of use	7	Kim et al., 2010; Wu & Zhang, 2014; Yang et al., 2017
Course quality	7	DeLone and McLean, 2003; Chiu et al. 2007; Virani et al., 2020
Attitude towards using MOOCs	3	Kim et al., 2010; Wu & Zhang, 2014
Intention to adopt MOOCs	4	Kim et al., 2010
Consensus of Appropriation	5	Kang et al. 2012
Psychological Engagement	5	Stumpf et al., 2013
Behavioural Engagement	3	Stumpf et al., 2013
Autonomous motivation	5	Zhou 2016
Perceived satisfaction	7	Sun et al., 2008

The research study was conducted in Sindh, a province in Pakistan holding multiple cultures and is multilingual in nature (Eberhard *et al.*, 2021). Table 2 summarizes the demographic features of the sampled population. The acquired sample consisted of 134 valid respondents (Male = 82 & Female = 52).

Table 2: Descriptive Statistics (N=134)

	Demographics	Frequency	Percentage
Gender	Male	82	61.19%
	Female	52	38.81%
Age	Less than 20 yrs	56	12.7%
	20-30 Y	52	41.8%
	30-40 Y	17	38.8%
	Above 40	9	6.7%
Professional Experience	Less than 10 yrs	52	39.7%
	10-20 Y	51	38.9%
	20-30 Y	11	8.4%
	Above 30 Y	1	0.8%
	Other	19	12.2%
Profession	Teachers / Students		
Location (Pakistan)	Sindh		
Last Qualification	Intermediate / Graduates / Post-Graduates Students		
Language Understanding	Monolingual	6	4.8%
	Bilingual	31	24.6%
	Multilingual	53	42.1%
	Other	44	28.5%
Internet Usage Expertise	Very Good	46	34.3%
	Good	40	29.6%
	Neutral	33	24.6%
	Bad	10	7.5%
	Very Bad	5	4.0%
Online Learning Experience	Very Good	33	24.6%
	Good	40	29.9%
	Neutral	33	24.6%
	Bad	17	12.7%
	Very Bad	11	8.2%

3.4. Outer model measurement

The outer measurement model includes reliability testing and evaluating the validity of the collected data from the targeted population. The reliability measures the

internal consistency of the variables, and validity comprises convergent validity and discriminant validity.

3.4.1. Reliability testing

Reliability is referred to consistency (Neuman, 2007). The composite reliability factor determines the reliability and facilitates better reliability than Cronbach's alpha. (Hair et al., 2014). The composite reliability value must be greater than 0.7 for all variables (Hair et al., 2011), and composite reliability values for all variables are depicted in Table 3.

3.4.2. Convergent Validity

Convergent validity measures the extent of the correlation of constructs (Neuman, 2007). Convergent validity is measured by the average variance extracted (Hair et al., 2011) and the threshold value for AVE is 0.5 or greater, and factor loadings for convergent validity should be above 0.7 (Hair et al., 2014). Table 3 shows the values for AVE which are all greater than 0.5. Table 3 also depicts loading of variables which are also greater than 0.7 clearly indicating that a strong average variance extracted (AVE) was established.

3.4.3. Discriminant validity

Discriminant validity is established to measure the difference between the construct of the research model (Hair et al., 2014). To ensure the certainty of the results and to avoid statistical discrepancies, establishing discriminant validity is significant in the analysis process (Henseler et al., 2015). Fornell and Larcker criterion, Heterotrait-Monotrait ratio (HTMT) and crossing loadings criterion were utilized to determine discriminant validity between items (Hair et al., 2014; Henseler et al., 2015).

According to Fornell and Larcker criterion, the specific variable should demonstrate more variance with its particular items rather than with supplementary variables (Hair et al., 2014). Table 4 diagonal values clearly express the correlation matrix, thus confirming the discriminant's validity. It is pertinent to mention that values in diagonal i.e. square root of AVE should be greater than inter-construct correlation (Hair et al., 2011).

Some researchers put forward their grievances on the effectiveness of Fornell and Larcker criterion for measuring discriminant validity. Henseler et al. (2015) proposed a new method to measure discriminant validity, i.e. Heterotrait-Monotrait ratio of correlations (HTMT). According to Henseler et al. (2015), discriminant validity is established if the Heterotrait-Monotrait value is less than 0.9. Table 5 shows HTMT results assuring discriminant validity.

Cross loading of items is also another method to ensure discriminant validity. The cross-loadings of each item in its own construct should be greater than cross-loadings on other constructs (Hair et al., 2011; 2014). The difference should be 0.1 between the cross

loadings on its respective construct and loadings of another construct (Gefen and Straub, 2005). The cross-loading of all variables is depicted in Table 6.

Table 3: Reliability testing and Convergent Validity

Construct	Items	Loadings	P values	CR	AVE
AM	AM1	1.000	0.000	1.000	1.000
AT	AT1	0.879	0.000	0.890	0.729
	AT2	0.863	0.000		
	AT3	0.818	0.000		
BENG	BENG1	0.824	0.000	0.871	0.692
	BENG2	0.825	0.000		
	BENG3	0.847	0.000		
CAP	CAP2	0.861	0.000	0.890	0.729
	CAP3	0.860	0.000		
	CAP4	0.840	0.000		
CQ	CQ1	0.809	0.000	0.923	0.666
	CQ2	0.831	0.000		
	CQ4	0.761	0.000		
	CQ5	0.882	0.000		
	CQ6	0.808	0.000		

	CQ7	0.802	0.000		
IA	IA3	1.000	0.000	1.000	1.000
PENG	PENG4	1.000	0.000	1.000	1.000
PEU	PEU1	0.837	0.000	0.900	0.693
	PEU3	0.848	0.000		
	PEU4	0.845	0.000		
	PEU5	0.799	0.000		
PS	PS4	1.000	0.000	1.000	1.000
PU	PU3	1.000	0.000	1.000	1.000
SI	SI1	0.893	0.000	0.902	0.754
	SI2	0.886	0.000		
	SI3	0.824	0.000		

Table 4: Correlations of Discriminant Validity (Fornell and Larcker criterion)

	AM	AT	BEN G	CA P	CQ	IA	PEN G	PE U	PS	PU	SI
AM	1.000										
AT	0.566	0.854									
BEN G	0.631	0.707	0.832								
CAP	0.497	0.664	0.671	0.854							
CQ	0.664	0.762	0.747	0.699	0.816						

IA	0.56 0	0.57 3	0.587	0.58 2	0.61 2	1.00 0					
PEN G	0.60 9	0.53 6	0.592	0.53 8	0.63 4	0.47 9	1.000				
PEU	0.52 7	0.69 6	0.615	0.69 2	0.77 6	0.65 9	0.540	0.83 3			
PS	0.54 1	0.61 6	0.600	0.55 7	0.55 3	0.52 3	0.407	0.48 6	1.00 0		
PU	0.35 4	0.50 8	0.457	0.52 1	0.58 4	0.48 5	0.423	0.65 4	0.36 0	1.00 0	
SI	0.45 3	0.50 3	0.605	0.59 5	0.65 1	0.58 0	0.503	0.69 3	0.39 1	0.55 7	0.86 8

Table 5: Heterotrait-Monotrait Ratio (HTMT) Results

	AM	AT	BEN G	CAP	CQ	IA	PEN G	PEU	PS	PU	S I
AM											
AT	0.62 8										
BEN G	0.71 4	0.88 9									
CAP	0.55 2	0.81 2	0.837								
CQ	0.70 0	0.89 1	0.887	0.81 4							
IA	0.56 0	0.63 3	0.663	0.64 5	0.64 5						
PEN G	0.60 9	0.59 5	0.669	0.59 9	0.66 9	0.47 9					
PEU	0.57 0	0.83 4	0.747	0.82 5	0.88 3	0.71 3	0.584				
PS	0.54 1	0.68 2	0.678	0.61 8	0.58 3	0.52 3	0.407	0.52 5			
PU	0.35 4	0.56 2	0.514	0.57 3	0.61 7	0.48 5	0.423	0.70 8	0.36 0		
SI	0.48 8	0.60 6	0.747	0.71 6	0.75 0	0.62 9	0.548	0.81 4	0.42 6	0.60 6	

Table 6: Factor Analysis (Cross-loadings)

	AM	AT	BEN G	CA P	CQ	IA	PEN G	PE U	PS	PU	SI
AM1	1.00 0	0.56 6	0.631	0.49 7	0.66 4	0.56 0	0.609	0.52 7	0.54 1	0.35 4	0.45 3

AT1	0.48 3	0.87 9	0.592	0.55 3	0.64 4	0.54 1	0.410	0.61 3	0.57 4	0.48 4	0.43 6
AT2	0.48 9	0.86 3	0.569	0.56 5	0.65 0	0.50 3	0.513	0.61 0	0.50 8	0.41 3	0.42 5
AT3	0.47 8	0.81 8	0.655	0.58 5	0.66 0	0.41 8	0.452	0.55 7	0.49 3	0.40 3	0.42 7
BENG 1	0.54 4	0.61 8	0.824	0.55 4	0.71 7	0.50 3	0.548	0.57 1	0.48 4	0.46 9	0.57 4
BENG 2	0.52 3	0.58 9	0.825	0.62 4	0.62 0	0.53 0	0.463	0.53 5	0.55 5	0.36 1	0.53 9
BENG 3	0.50 6	0.55 4	0.847	0.49 3	0.51 7	0.42 7	0.462	0.41 9	0.45 4	0.30 1	0.38 5
CAP2	0.51 2	0.56 5	0.547	0.86 1	0.59 6	0.56 7	0.497	0.58 9	0.52 3	0.44 8	0.47 0
CAP3	0.40 5	0.51 5	0.551	0.86 0	0.58 4	0.47 2	0.482	0.56 7	0.46 9	0.40 0	0.50 7
CAP4	0.35 9	0.61 1	0.615	0.84 0	0.60 8	0.45 2	0.406	0.61 1	0.43 6	0.47 8	0.54 3
CQ1	0.56 0	0.66 0	0.627	0.64 1	0.80 9	0.49 5	0.477	0.67 5	0.47 1	0.42 0	0.52 0
CQ2	0.52 6	0.61 5	0.574	0.62 4	0.83 1	0.48 7	0.612	0.67 2	0.44 3	0.44 3	0.54 3
CQ4	0.46 5	0.57 5	0.557	0.52 0	0.76 1	0.45 7	0.426	0.50 9	0.43 8	0.50 4	0.57 6
CQ5	0.56 7	0.64 0	0.673	0.55 8	0.88 2	0.56 5	0.549	0.65 7	0.50 4	0.53 1	0.59 3
CQ6	0.59 1	0.60 6	0.613	0.55 9	0.80 8	0.52 6	0.551	0.65 2	0.42 4	0.51 9	0.49 0
CQ7	0.53 8	0.63 1	0.610	0.51 7	0.80 2	0.46 5	0.488	0.62 6	0.42 5	0.44 7	0.46 8
IA3	0.56 0	0.57 3	0.587	0.58 2	0.61 2	1.00 0	0.479	0.65 9	0.52 3	0.48 5	0.58 0
PENG 4	0.60 9	0.53 6	0.592	0.53 8	0.63 4	0.47 9	1.000	0.54 0	0.40 7	0.42 3	0.50 3
PEU1	0.43 0	0.55 5	0.449	0.51 9	0.61 1	0.52 6	0.481	0.83 7	0.32 1	0.51 9	0.60 2
PEU2	0.45 2	0.60 2	0.552	0.62 9	0.65 2	0.55 2	0.511	0.84 8	0.46 1	0.56 9	0.62 0
PEU3	0.38 2	0.56 3	0.469	0.56 3	0.63 1	0.52 4	0.394	0.84 5	0.40 2	0.55 2	0.56 9
PEU5	0.48 7	0.59 4	0.569	0.58 5	0.68 7	0.58 9	0.410	0.79 9	0.42 8	0.53 6	0.51 5

PS4	0.54 1	0.61 6	0.600	0.55 7	0.55 3	0.52 3	0.407	0.48 6	1.00 0	0.36 0	0.39 1
PU3	0.35 4	0.50 8	0.457	0.52 1	0.58 4	0.48 5	0.423	0.65 4	0.36 0	1.00 0	0.55 7
SI2	0.41 3	0.43 3	0.562	0.54 2	0.57 4	0.52 6	0.446	0.60 5	0.29 1	0.47 3	0.89 3
SI3	0.46 6	0.48 2	0.489	0.53 7	0.58 6	0.55 3	0.455	0.66 7	0.38 7	0.52 7	0.88 6
SI1	0.28 3	0.38 6	0.532	0.46 6	0.53 1	0.42 1	0.405	0.51 9	0.33 5	0.44 4	0.82 4

3.5. Inner model measurement and hypotheses testing

After a complete evaluation of the outer model, the data is analyzed for the inner model (Henseler et al., 2009; Hair et al., 2011). The Partial Least Square (PLS) is utilized for testing hypothesis engaging bootstrapping (Haenlein & Kaplan, 2004).

3.5.1. Predictive relevance of the model

In order to evaluate the inner model, primarily the coefficient of determination (R^2) and cross-validated redundancy (Q^2) is examined (Hair et al., 2011, 2014; Henseler et al., 2009).

R^2 signifies the overall influence of independent variables. Sanchez (2013) categorized R square (R^2) at three (3) different tiers as high ($R^2 > 0.6$), moderate ($R^2 = 0.3$ to 0.6) and low ($R^2 < 0.3$) according to its respective values. For assuring model accuracy, cross-validated redundancy (Q^2) is another preference (Hair et al., 2014). Blindfolding is used to measure the Q square (Q^2), and its value should be higher than zero (0). R^2 and Q^2 are shown in Table 7.

Table 7: Predictive power of construct.

Constructs	R Square	Q Square
AT	0.685	0.459
IA	0.328	0.299

3.5.2. Hypotheses testing

The current study was conducted using ten hypotheses and they were examined using structural equation modeling (SEM). Table 8 displayed the results of the tested hypothesis (Figure 1).

Table 8: Hypothesis testing

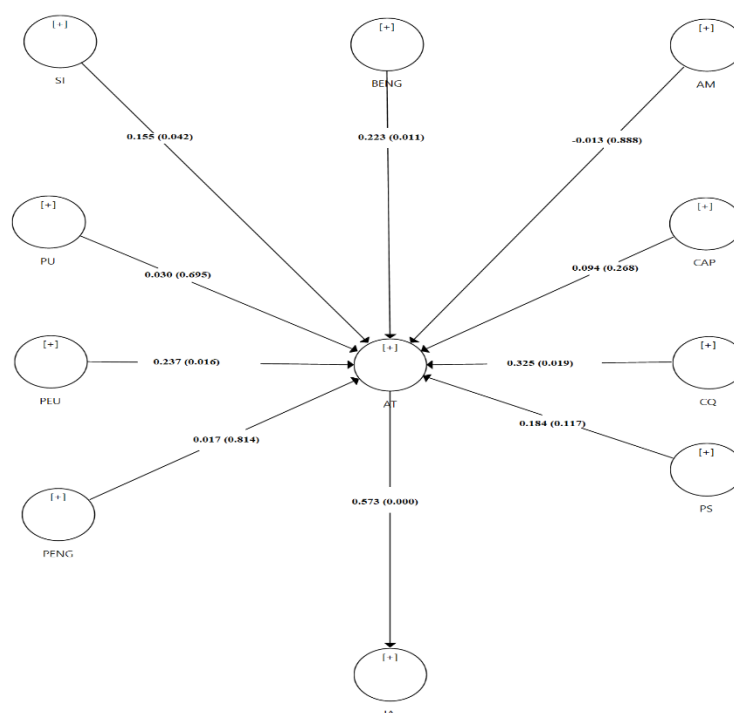
No	Hypothesis	Estimates	S.E	T Statistics	P Values
H1	AM -> AT	-0.013	0.090	0.141	0.888
H2	AT -> IA	0.573	0.077	7.464	0.000
H3	BENG -> AT	0.223	0.087	2.556	0.011

H4	CAP -> AT	0.094	0.085	1.108	0.268
H5	CQ -> AT	0.325	0.138	2.360	0.019
H6	PENG -> AT	0.017	0.073	0.235	0.814
H7	PEU -> AT	0.237	0.098	2.424	0.016
H8	PS -> AT	0.184	0.117	1.569	0.117
H9	PU -> AT	0.030	0.076	0.392	0.695
H10	SI -> AT	0.155	0.076	2.039	0.042

NOTE: Hypothesis rejected, as highlighted P-Values are not upto required limits due to small sample size.

4. Discussions

The result indicates that attitude ($\beta=0.573$, $p < 0.01$), behavioural engagement ($\beta=0.223$, $p < 0.01$), course quality ($\beta=0.325$, $p < 0.01$), perceived ease of use ($\beta=0.237$, $p < 0.01$) and social influence ($\beta=0.155$, $p < 0.01$) have a significant positive impact on the intention to adopt MOOCs for blended learning. Cheung et al., 2015; previous research also proves that behavioural engagement has a positive impact on the adoption of MOOCs. Perceived ease of use has a significant positive impact as indicated in previous studies (Waite et al., 2013; Ross et al., 2014; Christensen et al., 2013; Juhary, 2014; Wu & Chen, 2016).



4.1. Hypotheses testing

The hypothesis testing also indicates that autonomous motivation ($\beta=-0.013$, $p > 0.01$), consensus of appropriation ($\beta=0.094$, $p > 0.01$), psychological engagement ($\beta=0.094$, $p > 0.268$), perceived satisfaction ($\beta=0.184$, $p > 0.117$) and perceived usefulness ($\beta=0.030$, $p > 0.695$) also have significant positive impact on the intentions to adopt MOOCs for blended learning in Pakistan. The findings of autonomous motivation have significant positive impacts and expressed the same results as per previous studies (Xiong et al., 2015; Zhou, 2016; López, I et al., 2021). As per the previous studies (DeSanctis et al. 2008), consensus of appropriation also has a significant positive impact on the research study. Cheung et al., 2015 previous research indicates that psychological engagement has a positive impact on the adoption of MOOCs and findings of the current research also depict the same results. The hypothesis for perceived usefulness also has a significant positive impact on intention to adopt MOOCs, in accordance with previous studies (Pappas et al., 2017).

5. Conclusion

5.1. Theoretical Implications

The theoretical implications related to the model are discussed here. Course quality is considered a core element when designing the whole course. It serves as an embellishment and enhances the overall learning objective and performance of the participants indulged in the respective courses. Previous studies also demonstrated the same results through theoretical analysis (Chauhan, 2017; Li et al., 2012; Teo et al., 2019; Yang et al., 2017). Furthermore, social influence also induces significant positive impact on adopting MOOCs as supported in other studies (Arima et al., 2019; Pynoo et al., 2011; Tseng et al., 2019; Wu & Chen, 2017). Perceived ease of use also imparts a strong influence on its adaptation in the near future as also proved by other studies (Al-Shami et al., 2018; Hong et al., 2009; Wu & Zhang, 2014; Wu & Chen, 2017). The attitude of the learner and behavioural engagement also imparts a significant positive impact on students' learning outcomes. Overall performance in MOOCs environment can be enhanced by dealings with these factors intelligently. The research model can be rearranged as students' innate capabilities and groomed capabilities to adopt MOOCs for blended learning. In the same manner, teacher/instructor innate capabilities versus professionally groomed capabilities to adopt MOOCs for blended learning.

5.2. Managerial Implications

In developing, countries such as Pakistan MOOCs adaptation in the learning environment will transform the understandings of stakeholders toward the developing standards of the modern world. MOOCs for blended learning will enhance the mass literacy rate. Technological implications in the model facilitate teachers' and learners' flexible connectivity and a favourable environment for learning. This study helps all

stakeholders from the education sector adopt the rising trend of MOOCs. It also provides guidelines to policymakers and authorities for the implementation of this program.

Owing to its importance in the learning process, government officials may be approached for policy making and preparing a guideline for admission, certification, and curriculum which indeed reduces the dropout ratio from the MOOCs.

5.3. Social Implications

The current research study was conducted at the root level for adopting MOOCs for blended learning. In the 21st century, the market plays an important role in adopting rising trends worldwide. With the introduction of the concept of industry, the 4.0 market holds an eminent position in building any construct for future research. The research on MOOCs adoption can be accomplished after getting feedback from the industry. Industrial feedback is supportive for MOOCs' adaptation in the social structure of the country.

5.4. Contextual Implications

Future research can be conducted using probability sampling. The participants can be selected from all over the country with different social and contextual settings, and the research may also be programmed in group formation. In the same context, the learning management system (LMS) and blackboard may also be included in the research study selected from the educational context of the higher educational institutions.

6. Limitations / Future Recommendations

A few limitations regarding research are also produced here. As far as concerned by the population of the research study, only one province is considered for research work. However, the conclusion drawn from such a process cannot be applicable to the overall impression of the country or state due to numerous factors such as literacy rate, educational policies, facilities, availability of faculty members, and many hidden constraints. Time is the core element in research work. In this research, a longitudinal study may be arranged in collaboration with other organizations related to the same area of interest.

In this study, researchers mapped out teachers and students as basic participants while a study can be conducted by including the management bodies of higher educational institutes and Government Officials as well. Different dimensions of MOOCs can be considered as subjects for future research such as market worth, jobs index, prestigious scholarships, and stipend amounts from educational institutions. MOOCs is a multi-dimensional learning program that requires a strong infrastructure for proper execution. Future research may include a construct from an infrastructure viewpoint in order to evaluate its significance.

A current research study was conducted with a sample size of 134 and all of the participants belonged to the same province. However, a future study may be conducted by taking a larger sample of participants who belong to different cultural, political, and socioeconomic statuses.

Reference

- Allen, M. (2017). *The sage encyclopedia of communication research methods* (Vols. 1-4). Thousand Oaks, CA: SAGE Publications, Inc DOI: 10.4135/9781483381411
- Al-Shami, S. A., Sedik, S., Rashid, N., & Hussin, H. (2018). An empirical analysis of MOOC adoption from the perspective of institutional theory. *Journal of Advanced Research in Dynamical and Control Systems*, 10(6), 332–343
- Arima, S., Miyakita, G., Yasui, M., & Okawa, K. (2019, October 23–25). Enhancing educators' social presence in MOOCs: Design of daily video blog. *IEEE learning with MOOCs (LWMOOCs)*, Milwaukee, WI, USA, pp. 36–41.
- Botti, M., & Endacott, R. (2005). Clinical research 5: Quantitative data collection and analysis. *Intensive and Critical Care Nursing*, 21(3), 187-193.
- Cheung, C. M. K., Shen, X. L., Lee, Z. W. Y., & Chan, T. K. H. (2015). Promoting sales of online games through customer engagement. *Electronic Commerce Research and Applications*, 14(4), 241–250. <https://doi.org/10.1016/j.eierap.2015.03.001>
- Chin, Wynne W., Robert A. Peterson, and Steven P. Brown. (2008). "Structural Equation Modeling in Marketing: Some Practical Reminders." *The Journal of Marketing Theory and Practice* 16 (4): 287–298.
- Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., Woods, D., & Emanuel, E. (2013). The MOOC phenomenon: Who takes massive open online courses and why? Pennsylvania: University of Pennsylvania. http://www.meducationalliance.org/sites/default/files/the_mooc_phenomenon.pdf
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems*, 19(4), 9-30.
- Dulock, H. L. (1993). Research design: Descriptive research. *Journal of Pediatric Oncology Nursing*, 10(4), 154-157
- Eberhard, D. M., Gary F. Simons, Charles D. Fennig. (2021, Feb). *Ethnologue, Languages of the World*. SIL International. <https://www.ethnologue.com/>
- Haenlein, M., Kaplan, A.M., (2004). A beginner's guide to partial least square analysis. *Underst. Statistics* 3 (4), 283–297.
- Hair Jr, J.F., Sarstedt, M., Hopkins, L., Kuppelwieser V, G., (2014). Partial least squares structural equation modeling (PLS-SEM) an emerging tool in business research. *Eur. Bus. Rev.* 26 (2), 106–121.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- Hair, J.F., Ringle, C.M., Sarstedt, M., (2011). PLS-SEM: Indeed a silver bullet. *J. Market. Theory Practice* 19 (2), 139–152.

- Hair, J.F., Ringle, C.M., Sarstedt, M., (2011). PLS-SEM: indeed a silver bullet. *J. Market. Theory Practice* 19 (2), 139–152.
- Henseler, Christian M. Ringle, and Rudolf R. Sinkovics (2009), “The Use of Partial Least Squares Path Modeling in International Marketing,” *Advances in International Marketing*, vol. 20, Rudolf R. Sinkovics and Pervez N. Ghauri, eds., Bingley, UK: Emerald Group, 277–320.
- Henseler, J., Ringle, C.M., Sarstedt, M., (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* 43 (1), 115–135.
- Henseler, J., Ringle, C.M., Sinkovics, R.R., (2009). The use of partial least squares path modeling in international marketing. *New Challenges to International Marketing*. Emerald Group Publishing Limited, pp. 277–319.
- Hong, J. Y., Suh, E. H., & Kim, S. J. (2009). Context-aware systems: A literature review and classification. *Expert Systems with Applications*, 36(4), 8509–8522.
<https://doi.org/10.1016/j.eswa.2008.10.071>
<https://doi.org/10.1080/0144929X.2014.934291>
- Isaac, S & Michael, WB (1979): *Handbook in Research and Evaluation*. San Diego, CA, Edits Publishers
- Juhary, J. (2014). Perceived usefulness and ease of use of the learning management systems as a learning tool. *International Education Studies*, 7(8), 23-34.
- Kang, S., Lim, K. H., Kim, M. S., & Yang, H.-D. (2012). Research Note—A Multilevel Analysis of the Effect of Group Appropriation on Collaborative Technologies Use and Performance. *Information Systems Research*, 23(1), 214-230.
<https://doi:10.1287/isre.1100.0342>
- Kim, T., Suh, Y. K., Lee, G., & Choi, B. G. (2010). Modelling roles of task-technology fit and self-efficacy in hotel employees usage behaviours of hotel information systems. *International Journal of Tourism Research*, 12(6), 709–725.
<https://doi.org/10.1002/jtr.787>
- Neuman, W.L., (2007). *Basics of Social Research: Qualitative and Quantitative Approaches*. Pearson, Boston, USA
- Pozón-López, I., Higuera-Castillo, E., Muñoz-Leiva, F., & Liébana-Cabanillas, F. (2021). Perceived user satisfaction and intention to use massive open online courses (MOOCs). *Journal of Computing in Higher Education*, 33(1), 85-120.
- Pynoo, B., Devolder, P., Tondeur, J., Van Braak, J., Duyck, W., & Duyck, P. (2011). Predicting secondary school teachers’ acceptance and use of a digital learning environment: A cross-sectional study. *Computers in Human Behavior*, 27(1), 568–575. <https://doi.org/10.1016/j.chb.2010.10.005>

- Ringle, Oliver Götz, Martin Wetzels, and Bradley Wilson (2009), "On the Use of Formative Measurement Specifications in Structural Equation Modeling: A Monte Carlo Simulation Study to Compare Covariance-Based and Partial Least Squares Model Estimation Methodologies," METEOR Research Memoranda RM/09/014, Maastricht University
- Ross, J., Sinclair, C., Knox, J., & Macleod, H. (2014). Teacher experiences and academic identity: The missing components of MOOC pedagogy. *Journal of Online Learning and Teaching*, 10(1), 57-69.
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
- Stumpf, S. A., Tymon, W. G., & van Dam, N. H. M. (2013). Felt and Behavioral Engagement in Workgroups of Professionals. *Journal of Vocational Behavior*, 83(3), 255-264. <https://doi:10.1016/j.jvb.2013.05.006>
- Sun, P. C., Tsai, T. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers and Education*, 50(4), 1183–1202. <https://doi.org/10.1016/j.compe du.2006.11.007>
- Teo, T., Sang, G., Mei, B., & Hoi, C. K. W. (2019). Investigating pre-service teachers' acceptance of Web 2.0 technologies in their future teaching: A Chinese perspective. *Interactive Learning Environments*, 27(4), 530–546 <https://doi.org/10.1080/10494820.2018.1489290>
- Tseng, T. H., Lin, S., Wang, Y. S., & Liu, H. X. (2019). Investigating teachers' adoption of MOOCs: The perspective of UTAUT2. *Interactive Learning Environments*, 27(1), 1–16. <https://doi.org/10.1080/10494820.2019.1674888>
- Virani, S. R., Saini, J. R., & Sharma, S. (2020). Adoption of massive open online courses (MOOCs) for blended learning: the Indian educators' perspective. *Interactive Learning Environments*, 1-17.
- Waite, M., Mackness, J., Roberts, G., & Lovegrove, E. (2013). Liminal participants and skilled orienteers: Learner participation in a MOOC for new lecturers. *Journal of Online Learning and Teaching*, 9(2), 200–215.
- Wu, B., & Chen, X. (2016). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior*, 67, 221-232.
- Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior*, 67, 221–232. <https://doi.org/10.1016/j.chb.2016.10.028>

- Wu, B., & Zhang, C. Y. (2014). Empirical study on continuance intentions towards ELearning 2.0 systems. *Behaviour & Information Technology*, 33(10), 1027–1038.
- Xiong, Y., Li, H., Kornhaber, M. L., Suen, H. K., Pursel, B., & Goins, D. (2015). Examining the relations among student motivation, engagement, and retention in a MOOC: A structural equation modeling approach. *Global Education Review*, 2(3), 23–33.
- Yang, H. H., & Su, C. H. (2017). Learner behaviour in a MOOC practice-oriented course: In empirical study integrating TAM and TPB. *The International Review of Research in Open and Distributed Learning*, 18(5), 35–63.
<https://doi.org/10.19173/irrodl.v18i5.2991>
- Yang, M., Shao, Z., Liu, Q., & Liu, C. (2017). Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs. *Educational Technology Research and Development*, 65(5), 1195–1214.
<https://doi.org/10.1007/s11423-017-9513-6>
- Zhou, M. (2016). Chinese university students' acceptance of MOOCs: A self-determination perspective. *Computers and Education*, 92, 194–203.
<https://doi.org/10.1016/j.compe du.2015.10.012>.