

# Effect of Perceived Fear, Quality, and Self-Determination on Learners' Retention Intention on MOOCs

Xuchen Bai<sup>1</sup>, Md Nahin Hossain<sup>2</sup>, Nilesh Kumar <sup>3</sup>, Md Yahin Hossain <sup>4</sup>

<sup>1</sup>China Institute of Education and Social Development, Beijing Normal University, Beijing, People's Republic of China; <sup>2</sup>Army Institute of Business Administration Savar, Savar, Bangladesh; <sup>3</sup>School of Business Administration, Zhejiang Gongshang University, Hangzhou, People's Republic of China; <sup>4</sup>Department of Business Studies, University of Information Technology and Sciences, Dhaka, Bangladesh

Correspondence: Md Nahin Hossain; Nilesh Kumar, Email md.nahinhossainsaad@yahoo.com; nileshk@live.com

**Purpose:** The purpose of this study is to understand how perceived fear, course quality, and self-determination of learners influence the retention rate of massive open online courses (MOOCs) during the time of pandemic.

**Methodology:** The proposed developed model is comprised of IS success, expectation confirmation and self-determination theories. Data were collected from 284 respondents and the structural equation modeling was applied to interpret and analyze the data. Additionally, importance-performance maps were plotted to prioritize essential findings.

**Findings:** The findings revealed that course quality, identified and integrated regulation (motivation) all significantly affect perceived usefulness and satisfaction to influence learners' retention intention. Moreover, the importance performance map analysis (IPMA) exhibited that integrated regulations and course quality are very significant factors with very limited focus. Therefore, developers should improve the performance of these two factors to overcome the dropout rate.

**Originality:** This research analyzed the effect of the course quality, learners' determination and fear of the pandemic as the determining factors. Besides, the impacts of motivational factors (integrated, identified, introjected and external) from determination theory were also investigated on the learner's satisfaction. Finally, these factors were tested in the context pandemic that gave us new insights, which are not similar to pre-pandemic phase; ie, learners prefer course quality rather than system quality, because they demand new skill and knowledge to increase competitive advantage.

**Keywords:** self-determination theory, higher education, distance education, COVID-19 and MOOCs, perceived fear

## Introduction

Massive open online courses (MOOCs) are attaining prompt acceptance as a method for providing education beyond geographical and social boundaries – enabling students to access world-class teaching and educational resources.<sup>1</sup> As such, students who could not afford to travel and pay tuition fees to attend top universities face-to-face are now benefiting the most from online education. Thereby, a further number of benefits have been acknowledged for online education during COVID-19. Precisely, several studies have shown that COVID-19 has had negative effects on students' psychological status worldwide, ie, causing fear, worry, and a sense of apprehension.<sup>2–5</sup> For the following reasons, over 60 million new learners have taken part in MOOCs to avoid COVID-19 transmission.<sup>4</sup>

Given that, in the pre-pandemic era, there was no way to control the incidence of dropouts in MOOCs offered by MOOC providers.<sup>4</sup> Researchers discovered that paying fees pushed course completion rates to an extent of levels.<sup>4–6</sup> However, this pandemic and post-pandemic era have left a few alternatives for students to avail of education. Thereby, as the demand is increasing, service providers require to consider the determination pattern of learners and should meticulously check the quality issues to ensure positive retention behaviour. Specifically, online education has received hype due to the pandemic, any competitor can seize the opportunity promptly. In other words, students around the world can easily get enrolled in top universities and attain online education with the help of MOOC platform. This categorical

service fulfils substantial learning needs of the students that derive from one’s motivation level.<sup>7,8</sup> In particular, a recent study posited that the majority of the students have strong determination to learn new skills, ideas, and subjects that will help them to become experts in their field of study and profession.<sup>9</sup> However, the inability of MOOC providers to concurrently deliver courses with a wide range of subjects worries some other experts.<sup>10</sup> Although the pandemic situation is pushing people to learn their forgotten essential skills to survive within the worst, increasing content homogeneity would eventually lower students’ interest. Therefore, the quality, motivation, and determinations of learners together open brand-new avenues for researchers to extract insights.

Prior studies of determinants of user intention in the e-learning context showed that quality is a significant factor behind the intention to use the e-learning system.<sup>11,12</sup> Nevertheless, it is essential to identify specific types of quality (eg, course, system and service) that influence the user intention most.<sup>13</sup> It is reasonable to deliberate that a different factor of quality will have different impact on the learning context. Similarly, the impact of motivation can be explained based on different theories. Previous research suggests that the factors (integrated, identified, introjected and external regulation) of self-determination theory successfully explained the learners’ motivation in online learning.<sup>14,15</sup> However, in both cases (motivation and quality), it is not clear from the previous study which factor(s) best explained learners’ retention intention. Hence, it is critical to investigate the specific factors of motivation and factors of quality to understand retention intention.

The current study contributes to the literature in the following ways. Firstly, this study analyzed the strong implications of quality, self-determination, and perceived fear as factors in continuing a course during the end of COVID-19. Although trial research has already covered the pandemic cause, the post-COVID-19 learners’ behaviour is hardly mentioned anywhere. Secondly, it developed a combined conceptual model (see Figure 1) of information system (IS) success, self-determination (SDT) and expectation confirmation (ECT). This unified model helped us to understand the effect of quality and motivational issues on learners’ satisfaction. As such, ECT explained how learners’ satisfaction can improve the retention intention. IS success model investigated the quality factors in MOOCs.<sup>16</sup> Finally, previous research has directly focused on autonomous and controlled behavior.<sup>17</sup> However, to understand the impact of integrated, identified, introjected, and external regulation on the satisfaction in MOOC context is imperative. Such that, it is hard to predict human motivation for self-regulated learning system.<sup>18</sup> Conclusively, the outcomes of this study aim to assist institutions in minimizing the dropout rates and resolving issues in post-COVID-19 era.<sup>19,20</sup>

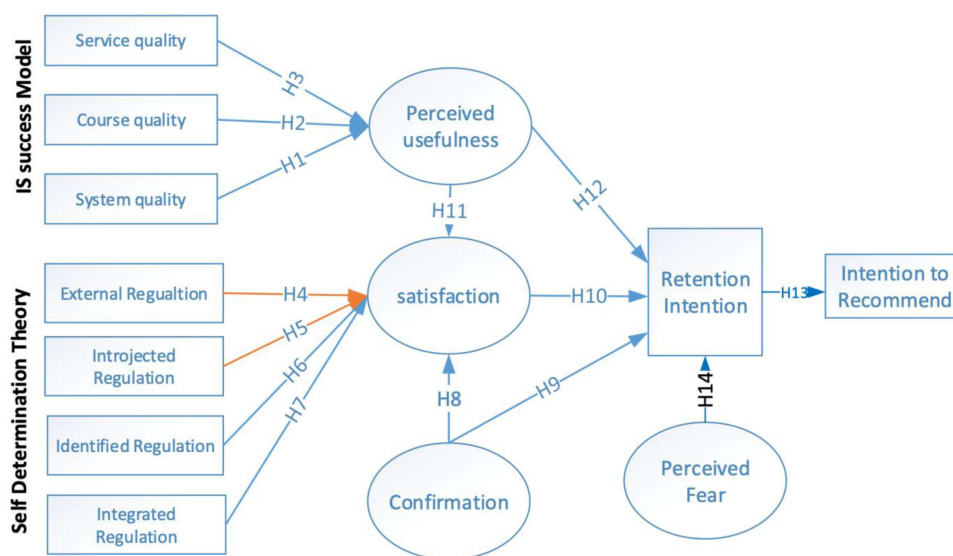


Figure 1 Research model.

## Research Model and Hypotheses Development

### MOOCs Quality and Perceived Usefulness

The terms used in the context of MOOCs include efficiency, course quality, and operation quality that differ from those of a general information system. Calisir, Altin Gumussoy, Bayraktaroglu, Karaali, Manufacturing and Industries<sup>21</sup> discovered that the standard courses always ensure continuity, accuracy, compatibility and scheduling. However, in this study, the relative importance of each element of system accuracy is considered different. This study defined system quality as the integration functions than ensure reliability of the platform. Having effective virtual learning environment confirms the system integrity for the learners. According to Saeed and Kazmierski<sup>22</sup> device performance is a significant predictor of consumer perception and potential online actions. Easy-to-use in the context of e-learning can also be described as the degree to which a user thinks that e-learning seems to be effortless.<sup>23</sup> Users of MOOCs are able to prevent errors if they have problems with security or computer interruptions when using the framework.<sup>24,25</sup> Numerous research has examined the impact of system stability on the usefulness of online learning systems. Calisir, Altin Gumussoy, Bayraktaroglu, Karaali, Manufacturing and Industries,<sup>21</sup> for example, found that higher framework performance led to higher perceived importance of a web-based learning method. Thus, we can hypothesize the following statement.

H1: System quality significantly influence the usefulness of MOOCs.

Online learning can be described as the value of a person to achieve their goals.<sup>26</sup> Course quality, as well as information quality, all have a significant effect on perceived usefulness.<sup>27</sup> Thus, we can state the given proposition.

H2: Course quality has a positive effect on the perceived usefulness of MOOCs.

Furthermore, learners' perceptions on MOOCs efficacy improve as they gain high-quality guidance from the strategic assistance to satisfy their skills needs. Several additional studies show that the service quality of online learning ensures proper skill development of the students. Therefore, they become confident about usefulness of the courses. As a result, it is expected that quality education always improve learners' skill set for the job. This will properly justify the constructive impact of service quality on its practicality. Thus,

H3: The perceived utility of MOOCs is positively influenced by service quality.

### Self-Determination and Satisfaction

According to the self-determination theory (SDT), different external motivations have different autonomous reasons for regulation. This continuum indicates that there are generally three different levels of motivation: motivation, external motivation, and intrinsic motivation. In addition, six forms of motivation are categorized based on regulatory approaches: non-regulation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation.<sup>28</sup> Therefore, much research uses four types of regulation since it is difficult to distinguish between them, which are external regulation, introjected regulation, identified regulation, and integrated regulation.<sup>29</sup>

SDT has been widely adopted to investigate behavioral and psychological aspects of the customer.<sup>30</sup> Published investigations looked at the connection between SDT and students' satisfaction at a Seoul Cyber University in Korea.<sup>31</sup> They found that identified and integrated motivations (autonomous) had a positive effect on satisfaction. On the other hand, external and introjected motivation (controlled) had mixed influence on satisfaction. Some studies found that introjected motivation influences learners to continue online learning those who care social influence. According to Deci, Koestner and Ryan,<sup>32</sup> learning is an individual activity for upgrading oneself and in the end; intrinsically driven people can complete the act. Likewise, external motivation also attracts learners to enroll and continue the course but it cannot ensure the actual satisfaction of learners. However, it is generally believed that external and introjected motivation can influence learners' satisfaction in MOOCs.<sup>33,34</sup> Similarly, in earlier research, researchers looked at 153 adult Chinese learners who took part in studying English, Learners' satisfaction was found to be predicted by identified and integrated

motivation: the higher the motivation, the lower the dropout rate.<sup>35</sup> Thus, we hypothesize that external and introjected, identified and integrated regulation will influence learners' satisfaction status to improve retention intention.

H4: External regulation has favorable effects on satisfaction.

H5: Introjected regulation has an advantageous impact on satisfaction.

H6: Identified Regulation has an advantage over satisfaction.

H7: Satisfaction will increase as a result of Integrated Regulation.

## Confirmation, Satisfaction and Retention Intention

Confirmation represents the commitment of the service provider towards the customers. Users are always aware of their expectation.<sup>36</sup> Customers will not satisfy if there are some discrepancies between offered and actual service. Similar attitude was found in MOOC service.<sup>28</sup> There are many standard MOOC platforms providing the services globally. Learners' have alternatives to compare and select platforms at their will. Thus, based on recent studies<sup>37</sup> it is found that users will satisfy when they have found few differences between their expectation and providers' confirmation. Moreover, this confirmation of the benefits will positively influence learners to continue the courses. Similarly, learners having previous satisfied experience with other courses beyond the confirmation will also show positive attitude to retain new courses.<sup>38</sup> Thus, this research hypothesizes

H8: Confirmation of the service positively influence learners' satisfaction.

H9: Confirmation of the service positively influence learners' retention intention.

H10: Learners Satisfaction about the service positively influence retention intention.

## Usefulness, Satisfaction and Retention Behaviour

Perceived usefulness defines a persons' beliefs that using a particular method, such as online courses, enhances work performance.<sup>16</sup> MOOCs help to teach the practical solutions to their professional career. For instance, programmer, doctor and engineer learn very new knowledge and skill from these platforms. The success rate of those learners generally noticed at public. Therefore, before enrolling in the MOOCs, learners' general perception is always satisfactory. Besides, learners' also expression their commitment to complete the full course when their skills become worthy at their workplace.<sup>36</sup> Therefore, this study hypothesized as follows.

H11: The level of satisfaction is strongly influenced by perceived usefulness.

H12: The perceived value of MOOCs influences students' desire to continue attending courses.

## Learners Intention to Recommend MOOCs

"Community" seems to be the newest term on the Information Superhighway. Recently, a number of well-known Internet firms, like Yahoo and Excite, have introduced clubs and communities to encourage users to establish specialized interest groups around subjects like "parenting" and "stamp collecting".<sup>39</sup> Online communities have earned the moniker "killer apps" for the Internet due to their enormous popularity.<sup>39</sup> Their influence is expanding, affecting everything from educational and social initiatives to strategy and business endeavors. Through interactions between individuals and access to a database, they claimed to enable organizational learning of skills, expertise, and experiences.<sup>40-42</sup> Additionally, they are aggressively forming an online community to disseminate information, create online platforms, encourage brand equity, make purchasing decisions easier, and assure stickiness to entice marketers, advertisers, and Internet users. Thus, this platform becomes the place for learners and educators to share their views and suggestions about MOOCs. Learners having satisfied experience will always recommend their community member to enroll and complete the course. It is very reasonable to think that

learners' retention behavior will always lead them to recommend others to follow their path. This is supported by the theory of WOM (Word-of-mouth) because learners these days are widely pursued by experienced person recommendation when judging new innovative method.<sup>43,44</sup> Therefore, we assume that

H13: Learners MOOCs Retention intention will positively influence learners' intention to recommend others.

## Perceived Fear and MOOCs

The COVID-19 has a strong propensity to produce psychological discomfort, including sadness, anxiety, and fear perception.<sup>45</sup> Understanding the psychological condition of students can help in managing and minimizing the negative effects. Prior studies have shown that socioeconomic variations like educational attainment and psychological aspects (eg, perceived fear to and perceived severity of the diseases) are significantly associated with engagement in protective behaviours.<sup>46-49</sup> Therefore, learners are showing their protective behaviours<sup>50</sup> by attaining online courses. According to Shah,<sup>51</sup> Over 2800 courses, 19 online degrees, 360 micro certificates, and other offerings were released by various platforms. The current MOOC movement has reached 180 million students by the end of its ninth year.<sup>51</sup> Currently, it is essential to understand from an empirical viewpoint of the perceived fear influencing learners' MOOC retention intention, because, before the pandemic, the dropout rate was alarming that was almost 90 percentage.<sup>52</sup> However, during the new normal era learners will not lose the chance of learning and completing new skill development to sustain in the job market. Learners decorate them with new competitive advantage. For instance, Lohr<sup>4</sup> said learners from different background now acquire coding skill and get job as machine-learning engineer. Thus, it is very much certain that learners' perceived fear would positively influence their MOOCs retention intention. The aforementioned hypotheses were put to the test in this investigation:

H14: Learners MOOCs Retention intention will positively influence by learners' Perceived Fear.

## Methodology

### Measures and Determinants

Based on the feedback provided by a focus group discussion with five experts, a survey questionnaire with two sections was developed. The first section consisted of 41 closed-ended questions that were used to assess the model's 13 constructs. The objects that represented each build were translated from literature, with several being changed to fit the study background (see [Appendix A](#)). The questionnaire was designed based on five-point (Likert) scale from 1 to 5. Here, 1 represents a strong disagreement, while 5 denotes strong agreement. The demographic details were the focus of the second episode. The authors performed a test with 30 volunteers. Some students said that when designing queries, they used more common and context-specific terms because they considered them easier to answer. In reaction to their concerns, researchers replaced comparatively uncommon terms with the more familiar words under the condition that the material validity of the construct will not be affected.

We focused the calculation items on previous research and made some changes based on our research context. The items of system, service and course quality were adapted from Yang, Shao and Liu<sup>53</sup> and Chiu, Chiu and Chang<sup>54</sup> study, and the terms "MOOC platform" were applied to the questionnaire to suit our research background. The perceived utility scale elements were translated from previous relevant studies,<sup>55,56</sup> with the terms. Information technology in the basic scale being substituted with the words "MOOCs scheme" on this analysis background. The items of retention behavior of MOOCs are revised.<sup>57,58</sup> We changed the terms "online learning scheme" to "MOOCs" to suit our study background. This study has followed Fryan and Connell's calculation item to determine the degree of students' self-determination.<sup>59</sup> External regulation, introjected regulation, identified regulation, and integrated regulation specifically identified learners' motivational status.<sup>59</sup>

## Data Collection and Sampling

Chinese universities have been developing and promoting MOOC activities. They either cooperate with the foreign mainstream platforms, such as Coursera and edX, or establish their own platforms. For instance, Xuetang X, built by Tsinghua University, had 313 courses and 208,000 subscribers by September 2016.<sup>60,61</sup> Meanwhile, MOOCs have also gained



universal attention in Chinese academic communities, especially with the rapid development and low-cost mobile technologies.<sup>61</sup> We applied a non-probability sampling technique, namely the accidental sampling in which respondents answered the questionnaire according to their availability and willingness.<sup>62,63</sup> We selected this technique as it was quicker and easier to manage – compared to the other techniques that needed more resources (eg, technical resources, time). Also, accidental sampling is a common method used in the data collection process in technology adoption research.<sup>63</sup>

Participants that were already enrolled in MOOCs or had already used MOOCs were the main target respondent. A total of 352 Weibo accounts (China's version of Twitter) received emails inviting them to participate in the online poll. Only 292 students responded in two months, and then eight claimed not having ever participated in a MOOC. These instances removed from data, resulting in a concluding sample size of 284. Following that, we used the SPSS to build a dataset of 284 documents. We used data cleaning to fix the data collection since it included many corrupt or incorrect documents (eg, redundant observations, irrelevant observations, structural errors, defective records, and insufficient data). This study corrected several technical flaws (for example, inconsistent capitalization and mis-labeled classes) and deleted redundant, irrelevant, and incomplete documents. A total of 284 questionnaires were assembled after the data-cleaning phase was completed. [Appendix B](#) shows the demographic breakdown of our samples.

## Non-Response Bias

Similar to Ooi, Hew and Lee,<sup>64</sup> we performed the independent *t*-test to compare all of the major variables included in the study model, and the results showed that no significant differences were found. We performed a chi-squared test for independence as an additional check, and the results revealed that there are no significant differences. Thus, the dataset utilized in this investigation did not include any non-response bias.

## Common Method Bias

Common method bias (CMB) analysis is essential in behavioral study that practices cross-sectional survey information.<sup>65</sup> This study looked at CMB that may pose a danger to the study's findings in the future because all the data were self-reported. We applied the Harman's single-factor test to evaluate CMB. We used principal axis factor analysis (PAF) to determine the number of variables that are essential for the description of variation.<sup>66</sup> The findings showed that a single construct accounted for 38.42% of the overall variance, which is far less than the advised percentage 50%.<sup>65</sup> Additionally, we looked at the constructs' correlation matrix in the measurement instrument and no correlation (greater than 0.90) found. Additionally, we evaluated CMB using values for variation inflation factors (VIF) (see [Appendix C](#)). These numbers fell below the recommended 3.3.<sup>67</sup> Thus, CMB was not a potential threat in this study.

## Analysis of Data

We initially used SEM to check the validity and reliability of the constructs, assess the predictive usefulness of the model, and determine the overall variance explained. After that, we analyze importance-performance map (IPMA) in PLS to observe the importance and the performance of the dependent and independent variable. The variance-based Partial Least Squares (PLS) Structural Equation Modeling (SEM) was considered, since it has the capacity to estimate simultaneous relationships. Other methods are limited to examining the correlations between each concept separately (eg, multiple regression or multivariate analysis of variance).<sup>68</sup>

## Ethical Consideration

This study was approved by the ethics committee of Zhejiang Gongshang University and data collection, involving human participants, adhered to the tenets of the Declaration of Helsinki (202111/IRB/14). All participants read research objectives and gave virtual consent prior to main research questions.

## Structural Equation Modelling Measurement Model Analysis

This study has evaluated measurement model by calculating internal reliability, convergent validity, and discriminant validity.<sup>69</sup> Cronbach's Alpha and Dijkstra-rho Henseler's ( $\rho_A$ ) are the often-used metrics to assess the constructs' dependability. The value of reliability was greater than the suggested value of 0.70 in this study<sup>70</sup> (see Table 1).

We evaluated the item loadings, composite reliability, and average variance (AVE) values to determine the degree of convergent validity. The data shown in Table 1 clearly show that the item loadings and AVE values are higher than the suggested levels of 0.50.<sup>70,71</sup> Similarly, we investigated the discriminant validity by examining the correlations between the measurements of potential underlying factors. The square root of AVE for each variable in this study was higher than the correlation between those variables and other factors (see Table 2). Additionally, all values of HTMT ratio, as shown in Table 3, were <0.85. These measures confirmed the discriminant validity of the studied constructs.<sup>72</sup>

## Structural Model Analysis

The  $R^2$ , which measures the coefficient of determination and the significance level of the path coefficients, evaluates the quality of the structural model.<sup>69</sup> The modified  $R^2$  value for retention intention was 0.823 based on the findings of our study. Therefore, the variables may account for 82.3% of the variation in MOOC retention intention. Similarly, the adjusted  $R^2$  value for Satisfaction and perceived usefulness were 0.67 and 0.56 that implies 67% and 56% of the variance in performance and perceived usefulness can be explained by the MOOC retention intention, respectively. Therefore, the proposed model is statistically valid.

Finally, SmartPLS was used to investigate the structural model. To calculate accurate standard errors or t-values, the bootstrapping approach with the resampling method was utilized to assess the statistical significance of the parameter. Using the path coefficient ( $\beta$ ) and t-statistics, this study examined the connections between endogenous and exogenous factors. Table 4 provides an overview of the outcomes of all hypothesis testing. It has indicated that hypotheses were statistically significant. As such, the connections between perceived usefulness and system, course, and service quality are validated. The effects of identifiable regulation, integrated regulation, introjected regulation, and external regulation on satisfaction are also evaluated. Only two of the four components, identified and interjected, have statistical significance. Likewise, the impact of perceived fear, confirmation, perceived usefulness and satisfaction on MOOC retention intention and intention to recommend are significant. The p-values (>0.05) for hypotheses H4, H5, on the other hand, are not statistically significant.

**Table 1** Construct Reliability and Validity

	Item Loading	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Content Quality	0.716–0.863	0.788	0.743	0.825	0.617
Confirmation	0.829–0.804	0.853	0.855	0.901	0.694
External Regulations	0.829–0.824	0.830	0.838	0.898	0.746
Intention to Recommend	0.785–0.862	0.777	0.783	0.871	0.692
Identified Regulations	0.717–0.841	0.775	0.776	0.869	0.689
Integrated Regulations	0.852–0.856	0.817	0.819	0.891	0.732
Perceived Usefulness	0.811–0.850	0.857	0.861	0.904	0.701
Retention Intention	0.885–0.894	0.880	0.881	0.926	0.807
Introjected Regulations	0.740–0.843	0.726	0.735	0.846	0.648
System Quality	0.817–0.842	0.768	0.768	0.866	0.683
Satisfaction	0.882–0.902	0.875	0.875	0.923	0.800
Service Quality	0.818–0.824	0.771	0.774	0.867	0.685
Perceived Fear	0.885–0.824	0.812	0.771	0.807	0.781

**Table 2** Fornell-Larcker Criterion

	CQ	Con	ER	Int.R	IdentR	InteR	PU	Re.Int	IR	SQ	Sat	SrQ	PF
CQ	0.785												
Con	0.606	0.833											
ER	0.670	0.548	0.864										
Int.R	0.673	0.626	0.629	0.832									
IdentR	0.676	0.617	0.406	0.786	0.830								
InteR	0.603	0.553	0.529	0.679	0.716	0.856							
PU	0.679	0.640	0.340	0.420	0.713	0.663	0.837						
Re.Int	0.639	0.502	0.561	0.507	0.723	0.652	0.829	0.898					
IR	0.583	0.622	0.548	0.313	0.681	0.536	0.651	0.679	0.805				
SQ	0.659	0.518	0.545	0.209	0.554	0.404	0.511	0.448	0.464	0.826			
Sat	0.572	0.673	0.683	0.325	0.674	0.666	0.776	0.772	0.533	0.416	0.895		
SrQ	0.563	0.542	0.581	0.415	0.698	0.618	0.613	0.495	0.516	0.535	0.541	0.828	
PF	0.542	0.456	0.432	0.342	0.432	0.546	0.432	0.234	0.435	0.565	0.421	0.543	0.802

**Abbreviations:** CQ, Content Quality; Con, Confirmation; ER, External Regulations; Int.R, Intention to Recommend; IdentR, Identified Regulations; InteR, Integrated Regulations; PU, Perceived Usefulness; Re.Int, Retention Intention; IR, Introjected Regulations; SQ, System Quality; SAT, Satisfaction; SrQ, Service Quality; PF, Perceived Fear.

**Table 3** Heterotrait–Monotrait Ratio (HTMT)

	CQ	Con	ER	Int.R	IdentR	InteR	PU	Re.Int	IR	SQ	Sat	SrQ
CQ												
Con	0.579											
ER	0.365	0.650										
Int.R	0.670	0.764	0.779									
IdentR	0.760	0.755	0.872	0.675								
InteR	0.769	0.658	0.755	0.765	0.643							
PU	0.754	0.800	0.765	0.798	0.612	0.790						
Re.Int	0.802	0.785	0.759	0.546	0.732	0.765	0.643					
IR	0.818	0.784	0.696	0.807	0.712	0.679	0.621	0.632				
SQ	0.797	0.639	0.687	0.661	0.717	0.505	0.630	0.544	0.618			
Sat	0.721	0.777	0.798	0.757	0.818	0.785	0.754	0.654	0.666	0.507		
SrQ	0.794	0.665	0.721	0.560	0.821	0.775	0.750	0.595	0.676	0.696	0.656	
PF	0.657	0.465	0.675	0.435	0.387	0.584	0.432	0.563	0.456	0.675	0.541	0.452

**Abbreviations:** CQ, Content Quality; Con, Confirmation; ER, External Regulations; Int.R, Intention to Recommend; IdentR, Identified Regulations; InteR, Integrated Regulations; PU, Perceived Usefulness; Re.Int, Retention Intention; IR, Introjected Regulations; SQ, System Quality; SAT, Satisfaction; SrQ, Service Quality; PF, Perceived Fear.

## Importance Performance Map Analysis (IPMA)

The purpose of IPMA is to estimate the significance of the preceding constructs and how well they describe dependent construct (Perceive usefulness, Satisfaction and Retention Intention).<sup>73</sup> This analysis identifies variables with relatively poor performance but a relatively high path coefficient (importance) for the target variable.<sup>68</sup> In IPMA, effects of antecedent constructs represent the importance of determining target construct. Likewise, the average variable scores of the constructs represent their performance.<sup>74</sup> The performance scores were calculated by rescaling the latent construct scores to a range of 1 to 100.

### IPMA for Learners' Perceived Usefulness

The relevance and performance ratings of the preceding constructs were plotted in this study to create a priority map (see Figure 2). From IPMA, we can conclude that course quality and service quality are important for learners' perceived usefulness towards MOOC retention intention than system quality. To improve perceived usefulness and raise the



**Table 4** Hypothesis Testing

Path	Hp.	$\beta$	t-Statistics	p-value
CQ -> PU	H2	0.406	6.314	0.000**
Con -> Re.Int	H9	0.292	5.630	0.000**
Con -> Sat	H8	0.204	4.377	0.000**
ER -> Sat	H4	0.064	1.017	0.345
IR -> Sat	H5	-0.060	1.013	0.311
IdentR -> Sat	H6	0.126	2.154	0.031*
InteR -> Sat	H7	0.189	3.661	0.000**
PU -> Re.Int	H12	0.275	5.144	0.000**
PU -> Sat	H11	0.392	6.345	0.000**
Re.Int -> Int.R	H13	0.097	2.485	0.013*
PF -> Re.Int	H14	0.295	4.878	0.000**
SQ -> PU	H1	0.094	2.555	0.012*
SAT -> Re.Int	H10	0.223	5.629	0.000**
SrQ -> PU	H3	0.312	5.830	0.000**

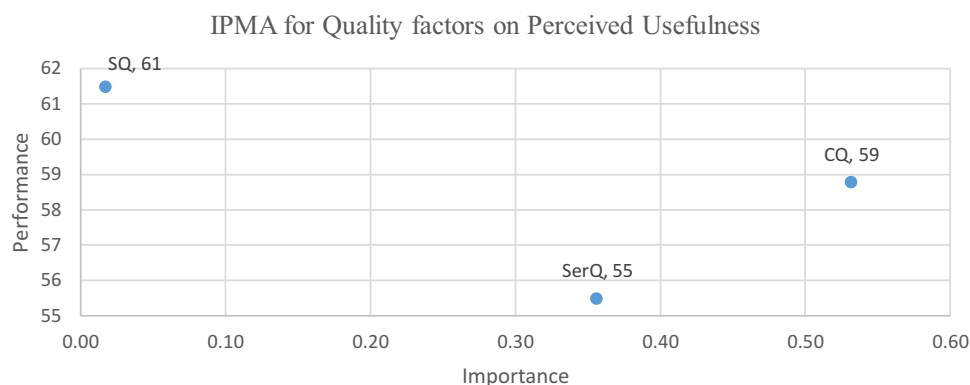
**Notes:** Adjusted  $R^2$  for Re.Int = 0.802, Adjusted  $R^2$  for SAT = 0.639 and Adjusted  $R^2$  for PU = 0.562. \*Significant at  $p < 0.05$ ; \*\*significant at  $p < 0.01$ .

**Abbreviations:** CQ, Content Quality; PU, Perceived Usefulness; Con, Confirmation; SAT, Satisfaction; ER, External Regulations; IR, Introjected Regulations; IdentR, Identified Regulations; InteR, Integrated Regulations; Re.Int, Retention Intention; Int.R, Intention to Recommend; PF, Perceived Fear; SQ, System Quality; SrQ, Service Quality.

retention rate of learners, particular managerial emphasis must be given to course and service quality. On the other side, administrators must lessen their excessive emphasis on system quality because it is less significant in characterizing how valuable MOOCs are seen to be. In order to give higher service quality and guarantee current Course quality and content, managers need to allot additional resources (eg, customize courses, 3D orientation).

### IPMA for Learners' Satisfaction

From the map (as shown in Figure 3), it is noticed that perceived usefulness, confirmation, integrated and identified regulation are vital motivational reasons in determining learners' satisfaction on using MOOCs because, in comparison to other components in the suggested model, they have a considerably greater path coefficient (importance). Conversely, introjected regulation and external regulation have lower importance on learners' satisfaction. Thus, from IPMA, we can say that identified and integrated motivational regulation require specific managerial attention to improve learners' satisfaction towards MOOC retention intention. Consequently, managers may lower special focus on external and introjected motivational regulation as they are less important in describing satisfaction on MOOC retention intention.



**Figure 2** IPMA for quality factors on learners' perceived usefulness.

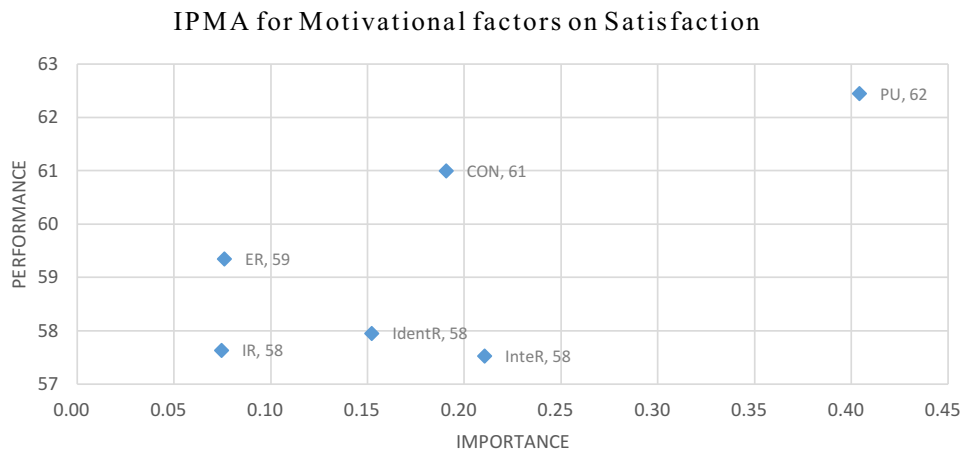


Figure 3 IPMA for motivational factors on learners satisfaction.

Precisely, course designers and managers should budget more resources to give identified and integrated motivational regulation to increase learners’ satisfaction, which will increase MOOCs retention rate.

### IPMA for Learners’ MOOC Retention Intention

Managers should budget more resources to give (as shown in Figure 4) by analyzing the learners’ MOOC retention intention and the value of the predecessor constructs, taking both direct and indirect predecessors into consideration (all construct importance and performance). The map shows that perceived usefulness, integrated regulation, confirmation, and course quality are very important factors in determining MOOC adoption because they have a relatively higher path coefficient (importance) compared to other factors in the proposed model. When compared to other elements (integrated and identifiable regulation, course quality, satisfaction, and service quality), which have lower significance ratings on the graph, system quality, external regulation, and introjected regulation perform better. Perceived fear, perceived usefulness, and confirmation are seen to be at their peak levels, and the developer needs to take necessary action to keep the current policies in place. However, managers and developers must pay special attention to the performance of integrated regulation, course quality, student happiness, service quality, and recognized regulation in order to raise learners’ desire to stick with the material.

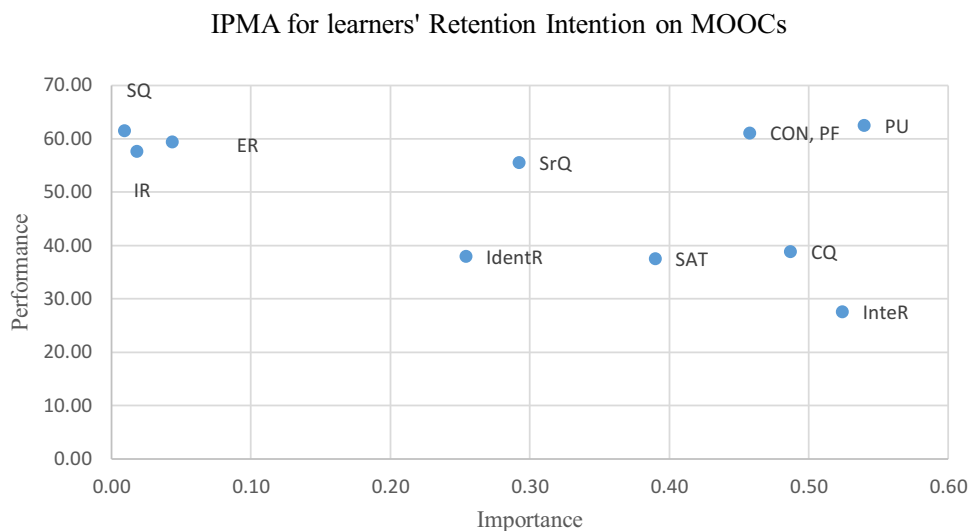


Figure 4 IPMA for learners’ retention intention on MOOCs.

## Discussion

This study intends to look at the motivational and quality aspects that promote learners' intention to stick with MOOCs throughout the period of COVID-19. The analyses revealed that quality factors and motivational factors all positively affect perceived usefulness and satisfaction on MOOC retention intention. However, two factors from SDT, external and introjected regulation did not ensure learners' satisfaction. These findings provided a notable insight. As such, learners attend and continue the MOOCs because of their own survival. In other words, before the pandemic, people were taking online courses as an optional mode of learning. Thereby, it was believed that more external and introjected regulations would reduce the dropout rates.<sup>75</sup> Although, service providers are offering certificates and other recognition, all these stimuli could not stop the dropout rate.

On the contrary, all the components of ECT show the significant impact on MOOC retention behavior. Confirmation, satisfaction, and perceived usefulness are always crucial issues to be considered for measuring learners' retention behavior. Besides, learners now share and recommend others to follow his/her leads with the help of social media platform. If the advice and recommendation are correct, people start following his/her leads. That is how intention to recommend is working – specifically by Word-of-Mouth marketing. Thus, according to the findings in this study, learners' retention behavior always positively influences learners' recommendation intention. This relationship is logically and empirically significant. In other words, this research found that learners reported greater engagement in online education in the form of MOOCs to avoid social gathering. Say that, empirical findings of this study justified positive relationships between perceived fear and MOOCs retention intention. Also, most health workers complete their micro and non-credit courses to get jobs in the hospitals,<sup>76</sup> medical college and emergency utility service providers are purchasing new courses from MOOC developers to keep their doctors and employees up to date. Consequently, learners have to use this mode of learning to reduce the chance of contamination.

In the perspective of quality issues, course quality becomes more important than the service quality and system quality. According to IPMA, course quality is highly significant to shape learners perceived usefulness. Learners now realize that competitiveness can only be gained from learning and skill development. Most of the organizations already switched to skill-based promotional and employment scheme. For example, Udacity has seen the most significant change toward becoming a skills factory. It has created hundreds of courses, both independently and in partnership with businesses like Google, Amazon, and Mercedes.<sup>4,5,51</sup> Earlier researchers<sup>77–79</sup> also supported this applied learning style. However, they could not prioritize the constructs based on their performance and importance during any pandemic era. Thus, this study empirically demonstrated course quality as top priority.

Similarly, in the context of learners' motivational factors, integrated and identified regulation play a vital role compared to internal regulation and external regulation. The reason is, learners are enrolling in the online courses to make them competitive that leads to satisfaction. This finding is supported by pre-COVID-19 studies where learners' self-enjoyment and self-esteem behavior guided them to use online learning system in longer period of time.<sup>80,81</sup> Besides, in IPMA analyses, this research empirically showed priorities of learners' motivational factors in post-COVID-19 era. According to IPMA, integrated regulation (learners' self-enjoyment) ranked higher followed by identified regulation (self-esteem) based on the importance.

## Theoretical Implications

This study provided a thorough framework that combined students' motivational factors, quality issues and recommendation intention while assessing learners' retention intention. The results supported the impact of the course design (course quality) and implementation (identified regulation, integrated regulation) on learners' retention intention in MOOCs. These insights will help to reduce the gap between design and implementation confusion. The results demonstrated can help institutions to understand motives of the learners' determination. As such, these findings have explored psychological factors in an extremely specific manner. Specifically, the sub-factor of autonomous behavior (identified and integrated regulation) and control behavior (external and introjected regulation) has revealed new insights. It observed the learners' satisfaction and retention intention guided by the identified and integrated regulation. Consequently, this study enhanced the significant link in a positive way between MOOCs retention intention and intention to recommend.

Moreover, we executed IPMA in PLS to identify the most important construct. This analysis helped to classify construct based on its importance and performance. Construct with higher path coefficient means important predictor than the lower path coefficient. IPMA identified several critical important constructs that have (content quality, identified regulation, integrated regulation, service quality and satisfaction) higher path coefficient with lower performance. Thus, to increase construct performance, special managerial concentration is needed in terms of spending more resources to accelerate learners' retention intention in MOOCs.

## Practical Implications

This study identifies some significant applications. Notably, course designers must enhance relevant features that might speed up the learning process. For instance, in addition to the standard Q&A module, they may include some more modules with integrated tools to support each user's unique learning requirements. These customized facilities will increase learners' involvement in MOOCs and reduce the dropout rate or switching intention.

Practically, our research shows three basic ideas. First, it demonstrates that identified and integrated regulations have a significant impact for pupils while establishing their plans to remain in MOOCs. Thereby, to encourage student empowerment and participation, MOOC providers should take into account learners' autonomy and facilitate individualized trajectory.<sup>82</sup> By changing their strategy, instructors may better meet the various psychological demands of the students. Second, our research showed that learners' internal or integrated motivation directly influences while planning to enroll in MOOCs. At last, the content in the course should be clear, comprehensive, and pertinent since course quality has a substantial impact on learners' intention to retain learning in MOOCs. For instance, the service provider should give course summaries that include goals, subject lists, materials lists, time schedules, and progress charts in a visual format.

## Conclusion

The purpose of this study was to understand how perceived fear, course quality, and self-determination of learners' influence the retention rate on MOOCs during the pandemic. The proposed developed model was comprised of information system success model, expectation confirmation model, and self-determination continuum. All models were combined to investigate the influence of quality and motivational factors on learners' continuous intention. Data were collected from 284 respondents, and structural equation modeling was applied to interpret and analyze the data. Later, importance-performance maps were plotted to prioritize the most influential factor. The findings revealed that course quality, identified motivation, and integrated motivation significantly affect perceived usefulness and satisfaction that increase retention intention. In addition, this study conducted importance performance map analysis (IPMA) to set priorities among eleven different factors. Findings revealed that integrated motivation and course quality are the most important factors with very limited focus. Finally, COVID-19 has increased the significance of alternate ways of learning and helped learners to realize unnoticed usefulness of MOOCs. Therefore, this research provides applicable policies for MOOC providers to sustain in the market and to retain learners by focusing on quality and users' psychological and motivational demands.

## Disclosure

The authors report no conflicts of interest in this work.

## References

1. Blanco AF, Echaluze MLS, Peñalvo FJG. From massive access to cooperation: lessons learned and proven results of a hybrid xMOOC/cMOOC pedagogical approach to MOOCs. *Int J Educ Technol High Educ.* 2016;2016(13):14.
2. Lai -C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents.* 2020;55(3):105924. doi:10.1016/j.ijantimicag.2020.105924
3. Mbelwa JT, Kimaro HC, Mussa B. *Acceptability and Use of Mobile Health Applications in Health Information Systems: A Case of eIDSR and DHIS2 Touch Mobile Applications in Tanzania.* Springer International Publishing; 2019:579–592.
4. Lohr S. Remember the MOOCs? After near-death, they're booming. *The New York Times*; 2020:1. Available from: <https://www.nytimes.com/2020/05/26/technology/moocs-online-learning.html>. Accessed September 28, 2022.
5. Murphy MPA. COVID-19 and emergency eLearning: consequences of the securitization of higher education for post-pandemic pedagogy. *Contemp Security Policy.* 2020;1–14. doi:10.1080/13523260.2020.1761749

6. Hossain MN, Talukder MS, Khayer A, Bao Y. Investigating the factors driving adult learners' continuous intention to use M-learning application: a fuzzy-set analysis. *J Res Innov Teach Learn.* 2020;14:245–270.
7. García-Peñalvo FJ, Fidalgo-Blanco Á, Sein-Echaluce ML. An adaptive hybrid MOOC model: disrupting the MOOC concept in higher education. *Telemat Info.* 2018;35(4):1018–1030. doi:10.1016/j.tele.2017.09.012
8. Hossain MN, Hossain MY, Bao Y, Kumar N, Hoque M. A proposed model to design MOOCs through the lens of addressing graduate skill gap. *High Educ Skills Work Based Learn.* 2022. doi:10.1108/HESWBL-04-2021-0070
9. McGreal R, Mackintosh W, Cox G, Olcott D. Bridging the gap: micro-credentials for development. *Int Rev Res Open Distributed Learn.* 2022;23(3):288–302.
10. Che X, Luo S, Wang C, Meinel C. An attempt at MOOC localization for Chinese-speaking users. *Int J Info Educ Technol.* 2016;6(2):90. doi:10.7763/IJNET.2016.V6.665
11. Tao D, Fu P, Wang Y, Zhang T, Qu XJ. Key characteristics in designing massive open online courses (MOOCs) for user acceptance: an application of the extended technology acceptance model. *Interact Learn Environ.* 2022;30(5):882–895.
12. Zhou L, Xue S, Li R. Extending the Technology Acceptance Model to explore students' intention to use an online education platform at a University in China. *SAGE Open.* 2022;12(1):21582440221085259. doi:10.1177/21582440221085259
13. Yang H, Kim J, Kelly S, Merrill KJ. Learning in the online classroom: exploring the unique influence of social presence dimensions. *Commun Stud.* 2022;2022:1–18.
14. Moore RL, Blackmon S. From the Learner's perspective: a systematic review of MOOC learner experiences (2008–2021). *Comput Educ.* 2022;190:104596. doi:10.1016/j.compedu.2022.104596
15. Sallam MH, Martín-Monje E, Li YJ. Research trends in language MOOC studies: a systematic review of the published literature (2012–2018). *Biomed Environ Sci.* 2022;35(4):764–791. doi:10.3967/bes2022.100
16. DeLone WH, McLean ER, DeLone T. McLean model of information systems success: a ten-year update. *J Manage Info Syst.* 2003;19(4):9–30.
17. Wei X, Saab N, Admiraal WJ, Education H. Do learners share the same perceived learning outcomes in MOOCs? Identifying the role of motivation, perceived learning support, learning engagement, and self-regulated learning strategies. *Internet High Educ.* 2022;56:100880.
18. Lin T-J, Lin T-C, Potvin P, Tsai CC. Research trends in science education from 2013 to 2017: a systematic content analysis of publications in selected journals. *Int J Sci Educ.* 2019;41(3):367–387.
19. Rui Pérez-Valiente JA. A macro-scale MOOC analysis of the socioeconomic status of learners and their learning outcomes. In: *Socioeconomic Inclusion During an Era of Online Education.* IGI Global; 2022:1–22.
20. Moe WW, Schweidel DA. Online product opinions: incidence, evaluation, and evolution. *Market Sci.* 2012;31(3):372–386. doi:10.1287/mksc.1110.0662
21. Calisir F, Altin Gumussoy C, Bayraktaroglu AE, Karaali D. Predicting the intention to use a web-based learning system: perceived content quality, anxiety, perceived system quality, image, and the technology acceptance model. *Human Factors Ergonom Manuf Service Indust.* 2014;24(5):515–531.
22. Saeed A, Kazmierski M, Khan A, McShane D, Gomez A, Aslam A. Congenital lung lesions: preoperative three-dimensional reconstructed CT scan as the definitive investigation and surgical management. *Eur J Pediatr Surg.* 2013;23(01):053–056. doi:10.1055/s-0033-1333890
23. Lin K-M. e-Learning continuance intention: moderating effects of user e-learning experience. *Educ Info Technol.* 2011;56(2):515–526.
24. Tung F-C, Chang S-C, Chou C-M. An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry. *Int J Med Inform.* 2008;77(5):324–335. doi:10.1016/j.ijmedinf.2007.06.006
25. Lee J-K, Lee W-K. The relationship of e-Learner's self-regulatory efficacy and perception of e-Learning environmental quality. *Comput Human Behav.* 2008;24(1):32–47. doi:10.1016/j.chb.2006.12.001
26. Lin K-MJ. e-Learning continuance intention: moderating effects of user e-learning experience. *Comput Educ.* 2011;56(2):515–526. doi:10.1016/j.compedu.2010.09.017
27. Sun Y, Guo Y, Zhao Y. Understanding the determinants of learner engagement in MOOCs: an adaptive structuration perspective. *Comput Educ.* 2020;157:103963. doi:10.1016/j.compedu.2020.103963
28. Rai L, Chunrao D. Influencing factors of success and failure in MOOC and general analysis of learner behavior. *Int J Info Educ Technol.* 2016;6(4):262. doi:10.7763/IJNET.2016.V6.697
29. Chen K-C, Jang S-J. Motivation in online learning: testing a model of self-determination theory. *Comput Human Behav.* 2010;26(4):741–752. doi:10.1016/j.chb.2010.01.011
30. Deci EL, Koestner R, Ryan RM. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychol Bull.* 1999;125(6):627. doi:10.1037/0033-2909.125.6.627
31. Cho YH, Lee SY, Jeong DW, et al. Analysis of questioning technique during classes in medical education. *BMC Med Educ.* 2012;12(1):1–7. doi:10.1186/1472-6920-12-39
32. Deci EL, Koestner R, Ryan RM. The undermining effect is a reality after all—Extrinsic rewards, task interest, and self-determination: reply to Eisenberger, Pierce, and Cameron (1999) and Lepper, Henderlong, and Gingras (1999). *Psychol Bull.* 1999;125:692–700. doi:10.1037/0033-2909.125.6.692
33. Zhou M. Chinese university students' acceptance of MOOCs: a self-determination perspective. *Comput Educ.* 2016;92:194–203. doi:10.1016/j.compedu.2015.10.012
34. Ryan RM, Deci EL. Self-regulation and the problem of human autonomy: does psychology need choice, self-determination, and will? *J Pers Soc Psychol.* 2006;74(6):1557–1586.
35. Vansteenkiste M, Zhou M, Lens W, Soenens B. Experiences of autonomy and control among Chinese learners: vitalizing or immobilizing? *J Educ Psychol.* 2005;97(3):468. doi:10.1037/0022-0663.97.3.468
36. Giannakos MN, Pappas IO, Jaccheri L, Sampson DG. Understanding student retention in computer science education: the role of environment, gains, barriers and usefulness. journal article. *Educ Info Technol.* 2017;22(5):2365–2382. doi:10.1007/s10639-016-9538-1
37. Oh S, Ji H, Kim J, Park E, Del Pobil AP. Deep learning model based on expectation-confirmation theory to predict customer satisfaction in hospitality service. *Info Technol Tour.* 2022;2022. doi:10.1007/s40558-022-00222-z
38. Oh S, Ji H, Kim J, Park E, Del Pobil AP. Deep learning model based on expectation-confirmation theory to predict customer satisfaction in hospitality service. *Info Technol Tour.* 2022;24(1):109–126.



39. Napoli AR, Wortman PM. Psychosocial factors related to retention and early departure of two-year community college students. *Res High Educ.* 1998;39(4):419–455. doi:10.1023/A:1018789320129
40. Preece J, Maloney-Krichmar D, Abras CJ. History of online communities. *Encyclopedia Commun.* 2003;3(1023–1027):86.
41. Turkle SJW, Nicolson L. Life on the screen: idein the age of the internet. 1995.
42. Wellman B, Salaff J, Dimitrova D, Garton L, Gulia M, Haythornthwaite C. Computer networks as social networks: collaborative work, telework, and virtual community. *Annu Rev Sociol.* 1996;22(1):213–238. doi:10.1146/annurev.soc.22.1.213
43. Venkatesh V, Davis FD. A theoretical extension of the technology acceptance model: four longitudinal field studies. *Manage Sci.* 2000;46(2):186–204. doi:10.1287/mnsc.46.2.186.11926
44. Talukder MS, Chiong R, Bao Y, Malik BH, Systems D. Acceptance and use predictors of fitness wearable technology and intention to recommend. *Industr Manag Data Syst.* 2019;119:170–188. doi:10.1108/IMDS-01-2018-0009
45. Yıldırım M, Geçer E, Akgül Ö. The impacts of vulnerability, perceived risk, and fear on preventive behaviours against COVID-19. *Psychol Health Med.* 2021;26(1):35–43. doi:10.1080/13548506.2020.1776891
46. Bish A, Yardley L, Nicoll A, Michie S. Factors associated with uptake of vaccination against pandemic influenza: a systematic review. *Vaccine.* 2011;29(38):6472–6484. doi:10.1016/j.vaccine.2011.06.107
47. Hossain MN, Hossain MY, Bao Y, Kumar N, Hoque MR. A proposed model to design MOOCs through the lens of addressing graduate skill gap. *High Educ Skills Work Based Learn.* 2022. doi:10.1108/HESWBL-04-2021-0070
48. Khayer A, Talukder SH, Bao Y, Hossain MN. Application-based mobile payment systems: continuance intention and intention to recommend. 2021:1.
49. Kumar N, Hossain MY, Jin Y, Safeer AA, Chen T. Impact of performance lower than expectations on work behaviors: the moderating effect of status mutability and mediating role of regulatory focus. *Psychol Res Behav Manag.* 2021;14:2257–2270. doi:10.2147/prbm.S342562
50. Liao Q, Wu P, Wing Tak Lam W, Cowling BJ, Fielding R. Trajectories of public psycho-behavioural responses relating to influenza A (H7N9) over the winter of 2014–15 in Hong Kong. *Psychol Health.* 2019;34(2):162–180. doi:10.1080/08870446.2018.1515436
51. Shah D. By the numbers: MOOCs in 2020. The Report!; 2020. Available from: <https://www.classcentral.com/report/mooc-stats-2020/>. Accessed September 28, 2022.
52. David S, Shah A. MOOCs, graduate skills gaps, and employability: a qualitative systematic review of the literature. *IRRODL.* 2016;17(5):67–90.
53. Yang M, Shao Z, Liu Q, Liu C. Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs. *Educ Technol Res Dev.* 2017;65(5):1195–1214. doi:10.1007/s11423-017-9513-6
54. Chiu CM, Chiu CS, Chang HC. Examining the integrated influence of fairness and quality on learners' satisfaction and Web-based learning continuance intention. *Info Syst J.* 2007;17(3):271–287. doi:10.1111/j.1365-2575.2007.00238.x
55. Lewis W, Agarwal S, Sambamurthy V. Sources of influence on beliefs about information technology use: an empirical study of knowledge workers. *MIS Quart.* 2003;27:657–678. doi:10.2307/30036552
56. Li B, Wang X, Tan SC. What makes MOOC users persist in completing MOOCs? A perspective from network externalities and human factors. *Comput Human Behav.* 2018;85:385–395. doi:10.1016/j.chb.2018.04.028
57. Bhattacharjee A, Premkumar G. Understanding changes in belief and attitude toward information technology usage: a theoretical model and longitudinal test. *MIS Quart.* 2004;28:229–254. doi:10.2307/25148634
58. Zhang M, Yin S, Luo M. Learner control, user characteristics, platform difference, and their role in adoption intention for MOOC learning in China. *Austral J Educ Technol.* 2017;33(1):15.
59. Ryan RM, Connell JP. Perceived locus of causality and internalization: examining reasons for acting in two domains. *J Pers Soc Psychol.* 1989;57(5):749. doi:10.1037/0022-3514.57.5.749
60. Li X, Chen Y, Gong X. MOOCs in China: a review of literature, 2012–2016. In: *New Ecology for education—communication X Learning*. Springer; 2017:21–32.
61. Law TY, Leung FC, Chiu DK, et al. Mobile learning usage of LIS students in Mainland China. *IJSSOE.* 2019;9(2):12–34.
62. Gravetter FJ, Forzano L-AB. *Research Methods for the Behavioral Sciences*. Cengage Learning; 2018.
63. Sharma SK, Al-Badi AH, Govindaluri SM, Al-Kharusi MH. Predicting motivators of cloud computing adoption: a developing country perspective. *Comp Human Behav.* 2016;62:61–69.
64. Ooi K-B, Hew -J-J, Lee V-H. Could the mobile and social perspectives of mobile social learning platforms motivate learners to learn continuously? *Comput Educ.* 2018;120:127–145. doi:10.1016/j.compedu.2018.01.017
65. Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol.* 2003;88(5):879. doi:10.1037/0021-9010.88.5.879
66. Harman HH. *Modern Factor Analysis*. University of Chicago Press; 1976.
67. Kock N. Common method bias in PLS-SEM: a full collinearity assessment approach. *Int J e-Collaboration.* 2015;11(4):1–10.
68. Hair JF, Hult GTM, Ringle C, Sarstedt M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications; 2016.
69. Hair JF, Hult GTM, Ringle C, Sarstedt M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications; 2013.
70. Henseler J, Ringle CM, Sinkovics RR. The use of partial least squares path modeling in international marketing. *Adv Int Market.* 2009;20(1):277–319.
71. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *J Market Res.* 1981;18:39–50. doi:10.1177/002224378101800104
72. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J Acad Market Sci.* 2014;43(1):115–135. doi:10.1007/s11747-014-0403-8
73. Ringle CM, Sarstedt M. Gain more insight from your PLS-SEM results: the importance-performance map analysis. *Ind Manage Data Syst.* 2016;116(9):1865–1886. doi:10.1108/IMDS-10-2015-0449
74. Aldholay AH, Isaac O, Abdullah Z, Ramayah T. The role of transformational leadership as a mediating variable in DeLone and McLean information system success model: the context of online learning usage in Yemen. *Telemat Inform.* 2018;35(5):1421–1437. doi:10.1016/j.tele.2018.03.012
75. Guthrie D. *MOOCs are Toast or at Least Should Be*. Forbes. 2013.



76. Dost S, Hossain A, Shehab M, Abdelwahed A, Al-Nusair L. Perceptions of medical students towards online teaching during the COVID-19 pandemic: a national cross-sectional survey of 2721 UK medical students. *BMJ open*. 2020;10(11):e042378. doi:10.1136/bmjopen-2020-042378
77. Chang C-S, Chen S-Y, Lan Y-T. Service quality, trust, and patient satisfaction in interpersonal-based medical service encounters. *BMC Health Serv Res*. 2013;13(1):1–11. doi:10.1186/1472-6963-13-22
78. Halawi L, McCarthy R. Measuring faculty perceptions of blackboard using the technology acceptance model. *Issues Info Syst*. 2007;8(2):160.
79. Leclercq T, Hammedi W, Poncin I. The boundaries of gamification for engaging customers: effects of losing a contest in online co-creation communities. *J Interact Market*. 2018;44:82–101. doi:10.1016/j.intmar.2018.04.004
80. Marble RP. A system implementation study: management commitment to project management. *Info Manage Sci*. 2003;41(1):111–123. doi:10.1016/S0378-7206(03)00031-4
81. Chiu C-H, Guu Y-K, Liu C-H, Pan T-M, Cheng W. Immune responses and gene expression in white shrimp, *Litopenaeus vannamei*, induced by *Lactobacillus plantarum*. *Fish Shellfish Immunol*. 2007;23(2):364–377. doi:10.1016/j.fsi.2006.11.010
82. Guàrdia L, Maina M, Sangrà AJ, Carazo B. MOOC design principles: a pedagogical approach from the learner's perspective. *Ginecologia y obstetricia de Mexico*. 2013;81(8):472–476.

## Psychology Research and Behavior Management

Dovepress

### Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>