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Investigation of the Impact of Quality, Openness and Reputation of Massive Open Online Courses MOOCs on an Individual's Satisfaction and Performance

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Abstract

Purpose of the Study: The research objective is to explore the important characteristics of MOOCs that impact an individual user's satisfaction and his/her performance. There is a paucity of understanding if the MOOCs affect the individual performance and what are the various characteristics of MOOCs that determine the same. Therefore, it is important to understand the success of MOOC platform from the user's performance perspective. **Data/Methodology:** Structural equation modelling was used to analyze the data. The instrument or the questionnaire for the study was developed by adapting scales from previous researchers to the Indian context. After the development of the questionnaire, the same was administered to the respondents using systematic sample design. **Findings:** The study found that Information Quality, System Quality and Openness impacts the satisfaction of the user on MOOC platform and further enhances his/her performance. The results of the study provide important insights to the MOOC platforms in identifying the Indian user's perspective. The MOOC platforms need to focus on System, Information Quality and Openness to make their course attractive from Indian user's perspective. **Originality:** There is a paucity of understanding if the MOOCs affect the individual performance and what are the various characteristics of MOOCs that determine the same. It is one of few studies to investigate the quality aspects of the MOOCs from an Indian user's perspective.

Keywords

Massive Open Online Courses (MOOCs), Quality Factors, Openness, Reputation, User Performance

1. Introduction

Massive open online courses (MOOCs) are one of the greatest evolutions in the field of open resources for education. These provide world class teaching resources across the world. This is especially beneficial for students who cannot afford education at prestigious universities and colleges due to tuition, travel and other costs [1]. MOOCs are large in scale and provide open access to free education which is provided by the most reputable universities in the world [2]. edX, Coursera and Udacity are the highly regarded MOOC platforms. Early MOOCs were decentralized, network-based, non-linear structure connecting people to knowledge resources and called as constructivist MOOCs or "cMOOCs" [3]. In 2011, a number of universities started offering MOOCs through online platforms. These MOOCs were hyper-centralized, content-based, and linear. They typically consisted of set of short video-lectures and the automated, multiple-choice testing of learners' understanding of the content and were called as "xMOOCs" [4].

Joo *et al*. [5] integrated the technology acceptance model (TAM), self-determination theory and expectation confirmation theory to explore the impact of self-determination, technology acceptance and user satisfaction on continuous use of the MOOCs in Korea. [2] explored the determinants of continuous intention to use MOOCs by integrating the technology acceptance model (TAM), Task technology fit (TTF) model, social motivation theory and MOOC features of openness and reputation. Alraimi *et al*. [6] extended the IS continuous model to examine the effects of openness, reputation, and confirmation on users' motivation to MOOCs.

MOOCs have low retention rates [1]. Continuing to participate is an important factor to gauge the success and sustainability of the MOOC platform [7]. However, most of the studies investigated the intention to complete or continue [6]. However, an important aspect to gauge the sustainability and success of MOOC as a platform is whether the user is deriving value out of the platform. There is a lack of MOOC research in context of developing countries and lack of perspectives by MOOC non completers. There is a paucity of understanding if the MOOCs affect the individual performance and what are the various characteristics of MOOCs that determine the same [8]. Therefore, it is important to understand the success of MOOC platform from the user's performance perspective.

As previous researchers have focused more the adoption of MOOCs but the research related to quality aspects of MOOCs that in turn may lead to enhancement of performance of an individual is at a nascent stage. Hence, in our study we tried to fill this research gap taking the Indian context The research objective is to explore the important characteristics of MOOCs that impact an individual user's satisfaction and his/her performance. The study shall emphasize on the utility of the MOOCs to gauge if it is able to meet the user needs.

The structure of the research paper is as follows: First a review of the related theories is presented. This is followed by the research hypothesis drawn from the

literature. Next section discusses the research methodology. After this the findings are presented followed by discussion and conclusion.

2. Theoretical Framework

To assess the success of MOOC According to Wang *et al*. [9] proposed a multidimensional model to gauge the success of the e-learning platform. They posited, quality as an important parameter to gauge the success of the MOOC platform. Many researchers have cited The DeLone and McLean model (DandM model) [10] as highly successful to gauges the Information system success. This model takes into consideration Quality factors such as Information quality and system quality and show it impact on both use of the system as well as user satisfaction. Also, several researchers have stressed the importance of reputation and openness as important factors in the success of MOOC as a platform. Reputation of top universities have found to influence users in both the physical space and online platform. Openness impacts newer learning paradigms [11]. Reputation is an important decision criterion for a student while opting for higher education [12]. In this study we have therefore, combined the quality factors with Openness and Reputation to gauge user satisfaction and its impact on the user's performance on the MOOC platform.

2.1. Information Quality

The content of the information along with the information generation source defines Information Quality [13]. In the MOOC platform the quality of information is an important aspect as it may impact student's learning. In the e-learning space it has been found that course quality strongly impacts the use of information systems by the users as well as user's online behavior [14] [15]. The intent of reuse of e-learning platforms is also positively impacted by information quality [7]. Also, it was found course quality has a positive effect on the continuance intention toward participationin MOOCs [16]. Therefore, in our study we are studying the impact of Information Quality on user's satisfaction.

2.2. System Quality

System Quality may be defined as system reliability and stability. It is very important in the MOOC environment for the system to be reliable and proper integration of system functions. System quality is an important factor for the sustainability and continued usage of the MOOC platform by the users. Singh [17] explained that quality of the finished goods can be enhanced by imported intermediate goods and that can improve the overall quality of the finished goods including information technology products. Saeed *et al*. [15] posited system quality as the driving force for user's perception of continued usage of a system. System quality was found to positively impact the continued MOOC platform usage intent of the user [16]. Therefore, we would like to study the impact of system quality on user's satisfaction.

2.3. Service Quality

Service quality as defined by Parasuraman *et al*. [18], "a global judgment or attitude relating to the superiority of a service". The online support, professional guidance and assistance provided to a user on MOOC are termed as Service Quality. Zeithaml *et al*. [19] posited that service quality is an important factor in a user's decision to continue using an Information System platform. Apositive relation was observed between service quality and intention to continue [20]. There are several studies that have reiterated that if the quality of service provided is good the user will be satisfied with the Information System which will lead to the continuous usage [21] [22] [23] [24]. Service quality was found to have positively impacted the intention to use MOOC [16].

2.4. Openness

Openness denotes providing transparency with respect to structure of the curriculum, contents, objectives, sharing of resources. Openness is one of the important characteristics of any MOOC [12]. Openness consist of several essential attributes of free access, adaptation, remixing, sharing and collaboration [25]. A large number of students are attracted to MOOCs due to their open access. Openness is an important differentiator between MOOC providers. Openness significantly impacts the perceived usefulness of a MOOC [12]. Openness is a very important aspect of MOOC, it impacts the continuance intention to use but user satisfaction was not found to be significantly impacted [6]. The improvement in education is possible when the educational content originates from the academic community and are easily accessible [26]. Openess entails educational contents must be freely available [27].

2.5. Reputation

Researchers have studied and found, the reputation of the institute impacts the student's decision to enroll in the institution [28]. Reputation is a major factor that drives the student to a particular course or university [29]. A review of the MOOC platforms indicate all major platforms are currently associated or affiliated with reputed institutes or organizations, this provides the required credibility for the users [30]. Initial trust of the user is influenced by reputation [31] [32] [33]. A significant relationship between reputation and user satisfaction was reported by Alraimi *et al*. [6]. Therefore, the reputation of MOOC platform is an important factor in studying the student performance.

2.6. User Satisfaction

In an online platform environment Satisfaction is defined by user's sense of interest which leads to accomplishment [34]. To continue the usage of Information System by the user Satisfaction is an important factor. Horzum [35] in his study identified Ease of use, course content quality, internet speed, and degree of interactivity as factors that impact user satisfaction. Many studies have reported

a strong relationship between satisfaction and continued usage of the platform [36]. Despite the existing literature the impact of quality factors combined with reputation and Openness has not been explored much. In our study we have tried to understand the impact of the Quality factors, Openness and reputation on user's Satisfaction and its relationship with user's performance.

2.7. MOOC Learner Individual Performance

Alternative indicator for understanding/evaluating the efficacy of the MOOCs.

3. Research Model and Hypothesis Development (Figure 1)

Based on the theoretical framework the following Hypothesis were developed:
  H1a. Information quality positively impacts user satisfaction.
  H1b. System quality positively impacts user satisfaction.
  H1c. Service Quality positively impacts user satisfaction.
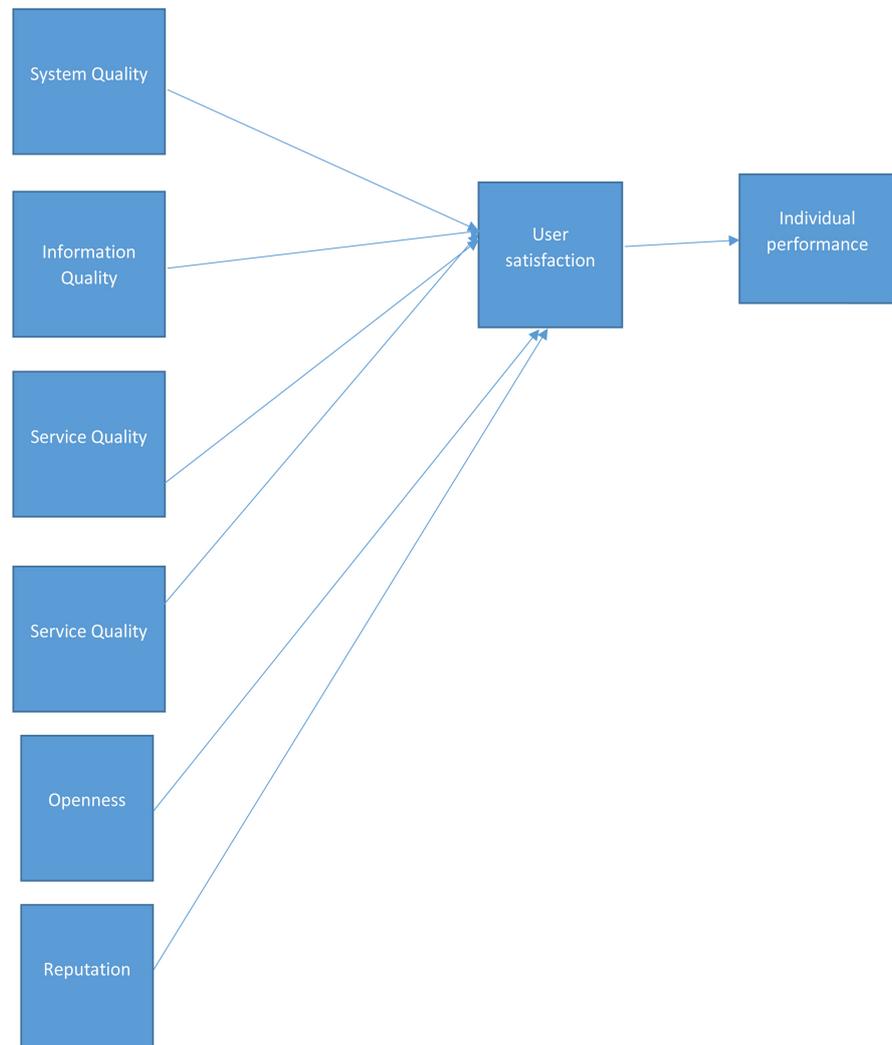 H1d. Openness positively impacts user satisfaction.

Figure 1. The conceptual framework.

H1e. Reputation positively impacts user satisfaction.

H2. User Satisfaction positively impacts individual performance.

4. Research Methodology

4.1. Instrument Development

The instrument or the questionnaire for the study was developed by adapting scales from previous researchers to the Indian context. The scales used in the study are mentioned in Table 1.

4.2. Sample Design

After the development of the questionnaire, the same was administered to the respondents using systematic sample design. For this study, students who were currently a student of any educational institution in the Indian cities of Delhi, Bangalore, Chennai and Kolkata and had completed at least one MOOC were taken as the target population for the study. During the survey, 1000 questionnaires were administered to respondents using online survey. 250 questionnaires were received back. As per the literature, response rate of 20% is considered desirable [42] while the response rate for the research study was 25%. Questionnaire in which a large number of items were not responded to were discarded. After this exercise, 200 responses were observed to be usable.

5. Analysis of Data

5.1. Assessment of Normality

Tests for normality were used to choose an appropriate estimation method in Structural Equation modeling [43]. The mean, minimum, maximum, skewness and kurtosis values were noted. Skewness impacts test of means while kurtosis severely affects the test of variances and covariance [44]. Table 2 gives the descriptive statistics of the 30 measurement items. All the skewness values was lower than the cut-off value of ±3.0 [45]. All kurtosis values were also within the cut-off value of ±7.0 [45]. According to Bollen [46], "if Mardia's coefficient is lower than $p*(p + 2)$ where p = number of observed variables, then the combined distribution of the variables is multivariate normal". For the study sample, Mardia's coefficient 248.681 is lower than $p*(p + 2)$ where p = 30 variables. This indicated that the sample data meets the criteria for univariate and multivariate normality. Hence Maximum Likelihood (ML) method shall be used for estimation.

5.2. Assessment of Measurement Model

Confirmatory Factor analysis (CFA) was used to assess the reliability and validity of the measurement model. The measurement model consisted of the seven first-order constructs of information quality, system quality, service quality, openness, reputation, user satisfaction and Individual performance. Information quality, system quality, service quality, openness, reputation user satisfaction

Table 1. Scales used in the study.

Construct	No. of items		Source
Information Quality	4	- Content provided by MOOC is complete. - Content by MOOC is understandable. - Content provided by MOOC is well represented with text and graphics. - Content provided by MOOC relevant to the topic.	
System Quality	4	- The user interface of the MOOC platform is well designed - The MOOC platform can quickly load all the text and graphics - It is easy to navigate the MOOC platform - The MOOC platform functions well all the time	Chiu *et al.* [21], DeLone *et al.* [37]
Service Quality	4	- The MOOC platform provides prompt response to my request. - The MOOC platform provides right solution to my request - The service provided by MOOC platform attends to individual's learning needs. - The service provided by MOOC platform is reliable.	
Openness	4	- I have the freedom to join any course without prerequisites. - I have the freedom to access and use the course resources and materials for free of charge. - I can reuse the course resources in my work. - I feel free to combine the course materials with others to produce new one.	Alraimi *et al.* [6]
Reputation	4	- Good reputation of MOOCs platform offers course I am interested in. - MOOCs partners universities have a good reputation - MOOCs tend to provide courses by professors from high reputation universities. - MOOCs courses are offered by prestigious universities	Munisamy *et al.* [38]
User Satisfaction	3	- I am satisfied with learning in MOOC - I am pleased to earn credits in MOOC - I am contended with the way to earn credits in MOOC. - Learning in MOOC is a delighting experience	Spreng *et al.* [39]; Bhattacherjee [40]
Individual Performance		- Using MOOC enable me to accomplish tasks more quickly - Using MOOC improve my productivity in learning - Using MOOC improve my academic performance. - Using MOOC enhance my effectiveness in learning - Using MOOC makes it easy to accomplish tasks - Using MOOC is useful for my learning.	Urbach *et al.* [41]
Total	30		

Table 2. Descriptive statistics of measurement items.

S. No.	Items	Skew	Kurtosis
1	IQ1	−0.596	0.227
2	IQ2	−0.887	1.899
3	IQ3	−0.656	0.893
4	IQ4	−0.909	1.501
5	SQ1	−0.415	0.446
6	SQ2	−0.509	0.101
7	SQ3	−0.785	0.815
8	SQ4	−0.29	−0.527
9	SEQ1	−0.35	0.141
10	SEQ2	−0.51	0.646
11	SEQ3	−0.555	0.888
12	SEQ4	−0.626	0.753
13	O1	−0.589	0.136
14	O2	−0.583	−0.22
15	O3	−0.537	0.43
16	O4	−0.425	−0.048
17	R1	−0.727	0.832
18	R2	−0.491	0.489
19	R3	−0.419	0.197
20	R4	−0.449	0.052
21	US1	−0.665	0.691
22	US2	−0.351	0.228
23	US3	−0.444	0.339
24	US4	−0.635	0.655
25	IP1	−0.478	0.485
26	IP2	−0.718	1.166
27	IP3	−0.533	0.452
28	IP4	−0.779	1.242
29	IP5	−0.715	0.977
30	IP6	−0.925	1.66
	Multivariate		248.681

and individual performance were independent variables. The first-order construct of "individual performance" was a dependent variable. The software used for the analysis was AMOS 21. CFA assess the measurement model validity by using two approaches: 1) Model-fit indices and 2) construct validity and reliability [44] [47].

5.2.1. Model Fit
Before analyzing the path estimates for significance, the fit of the model to the

data was assessed. Table 3 presents the model fit results. The Chi-square value was 827.011 with 384 degrees of freedom and a significant p-value. The study had a large sample size of N = 200, hence a significant p-value was likely [47]. The alternative fit indices were examined for fitness. The value for normed χ^2 was 2.154, the value for CFI was 0.868 with an SRMR of 0.06 and RMSEA of 0.08. These results were within acceptable limits. Hence the structural model fit was adequate, and path estimates could be examined for significance.

5.2.2. Convergent and Discriminant Validity

In the study, convergent validity was measured using factor loadings, t-values of the factor loadings, composite reliability (CR) and average variance extracted (AVE). Table 4 presents the convergent validity results. All item loading values within each construct were higher than 0.50 [47]. All the t-values exceeded 1.96 at $p \leq 0.001$ [48]. All CR values were higher than 0.7 and all CR values were higher than AVE values [47]. All AVE values were higher than 0.5 except that of the construct of "openness". According to Malhotra and Dash [49], "AVE is a more conservative measure than CR. On the basis of CR alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error." [49]. Thus convergent validity was sufficiently established. The discriminant validity was measured using the square root of the AVE estimate which was larger than the correlations of a construct to any other constructs [50]. Table 5 presents the discriminant validity results.

5.3. Assessment of Structural Model

After the assessment of the measurement model, the next step was to test the causal relationships. The critical ratio and significance of path coefficients were used to evaluate the proposed hypotheses. When the critical ratio (CR) associated with a regression weight is greater than 1.96, the path is significant at the 0.05 level or lowers [44] [47].

Hypotheses H1 analyzed the link between information quality of MOOCs and user satisfaction. The results show that the link between information quality and

Table 3. Model fit.

FIT Index	Value	Actual Value	Model Fit
Chi-Square/df	<3-Good, <5-Acceptable, >5-Not Acceptable	2.154	Good
CFI	>0.90-Good, >0.80-Acceptable, <0.80-Not acceptable	0.868	Acceptable
SRMR	<0.05-Good, <0.08-Acceptable, <0.10-Mediocre, >0.10-Poor	0.06	Acceptable
RMSEA	<0.05-Good, <0.08-Acceptable, <0.10-Mediocre, >0.10-Poor	0.08	Acceptable

Source: Byrne, 2016; Hair *et al.* 2010; Hu and Bentler, 1999.

Table 4. Convergent validity.

Construct	Factor Loading	T	CR	AVE
Service Quality (SEQ)			0.815	0.526
SEQ1	0.7	7.805		
SEQ2	0.805	8.462		
SEQ3	0.68	-		
SEQ4	0.711	7.892		
Openness (O)			0.788	0.484
O1	0.561	6.93		
O2	0.676	8.268		
O3	0.694	8.453		
O4	0.819	-		
Reputation (R)			0.845	0.580
R1	0.516	6.842		
R2	0.855	11.997		
R3	0.801	11.4		
R4	0.818	-		
User Satisfaction (US)			0.888	0.664
US1	0.824	11.517		
US2	0.718	9.869		
US3	0.707	9.688		
US4	0.795	-		
Individual Performance (IP)			0.922	0.665
IP1	0.725	-		
IP2	0.747	9.865		
IP3	0.746	9.859		
IP4	0.903	11.962		
IP5	0.811	10.745		
IP6	0.817	10.83		
Information Quality (IQ)			0.805	0.513
IQ1	0.592	7.43		
IQ2	0.843	9.738		
IQ3	0.63	7.926		
IQ4	0.771	-		
System Quality (SQ)			0.823	0.539
SQ1	0.76	8.834		
SQ2	0.721	8.483		
SQ3	0.72	-		
SQ4	0.743	8.692		

Table 5. Discriminant validity.

	IP	IQ	SQ	SEQ	O	R	US
IP	**0.815**						
IQ	0.466	**0.716**					
SQ	0.765	0.446	**0.734**				
SEQ	0.623	0.347	0.717	**0.725**			
O	0.660	0.341	0.752	0.659	**0.695**		
R	0.752	0.436	0.754	0.634	0.762	**0.762**	
US	0.683	0.475	0.635	0.411	0.648	0.537	**0.815**

user satisfaction to use mobile wallets was significant (path estimate $\lambda = 0.287$; t = 3.765; p = 0.001).

Hypotheses H2 analyzed the link between system quality of MOOCs and user satisfaction. The results show that system quality had a significant effect on user satisfaction (path estimate $\lambda = 0.389$; t = 4.778, p = 0.001).

Hypotheses H3 analyzed the link between service quality and user satisfaction. The results show that the link between service quality and user satisfaction was not significant (path estimate $\lambda = -0.077$; t = −1.057, p = 0.291).

Hypotheses H4 analyzed the link between openness of MOOCs and user satisfaction. The results show that the link between openness and user satisfaction was significant (path estimate $\lambda = 0.428$; t = 5.221; p = 0.001).

Hypotheses H5 analyzed the link between reputation of MOOCs and user satisfaction. The results show that the link between reputation and user satisfaction was not significant (path estimate $\lambda = 0.138$; t = −1.929; p = 0.054).

Hypotheses H6 analyzed the link between user satisfaction and individual performance. The results show that the link between user satisfaction and individual performance was significant (path estimate $\lambda = 0.677$; t = 7.478; p = 0.001) (Table 6).

5.4. Common Methods Variance

To minimize common methods variance, precautions were taken while designing and administering the questionnaire. Respondents were assured of the anonymity and confidentiality of the study. It was explained to the respondents that there were no right or wrong answers. Also, the respondents were requested to provide honest answers to the survey questions. As the survey was administered through google forms, it was convenient to shuffle the order of the questions. Due to this step, the respondents were not able to cognitively relate the items of the various constructs thereby reducing the likelihood of common method variance between independent and dependent variables.

6. Discussion & Implications

The objective of the study was to identify the factors that impact the performance of the user on any MOOC platform by integrating the quality factors

provided by the D and M model along with Reputation and Openness. The study found that (**Figure 2**) Information Quality, System Quality and Openness impacts the satisfaction of the user on MOOC platform and further enhances his/her performance. The study found that Information Quality and System Quality impacts the user's satisfaction derived from the MOOC platform which is in synch with Yang *et al.* findings [9]. Our study found that the Service Quality has no significant impact on user satisfaction the reasons for which may be further explored in future study. Openness according to our study impacts the user's satisfaction on the MOOC platform which is in continuation to finding by other researchers. Openness significantly impacts the perceived usefulness of a MOOC when mediated by perceived ease of use [2]. Alraimi *et al.* [6] found that openness significantly impacts the user satisfaction. However, our study did not find any significant impact of reputation on user's perceived satisfaction which can be further explored in future study.

The results of the study provide important insights to the MOOC platforms in identifying the Indian user's perspective. The MOOC platforms need to focus on System, Information Quality and Openness to make their course attractive from Indian user's perspective. Also, it will be interesting in future to understand the

Table 6. Hypotheses testing results.

	Dependent Variable	Independent Variable	Regression Estimate	t	Sig
H1	User Satisfaction	Information Quality	0.287	3.765	***
H2	User Satisfaction	System Quality	0.389	4.778	***
H3	User Satisfaction	Service Quality	−0.077	−1.057	ns
H4	User Satisfaction	Openness	0.428	5.221	***
H5	User Satisfaction	Reputation	0.138	1.929	ns
H6	Individual Performance	User Satisfaction	0.677	7.478	***

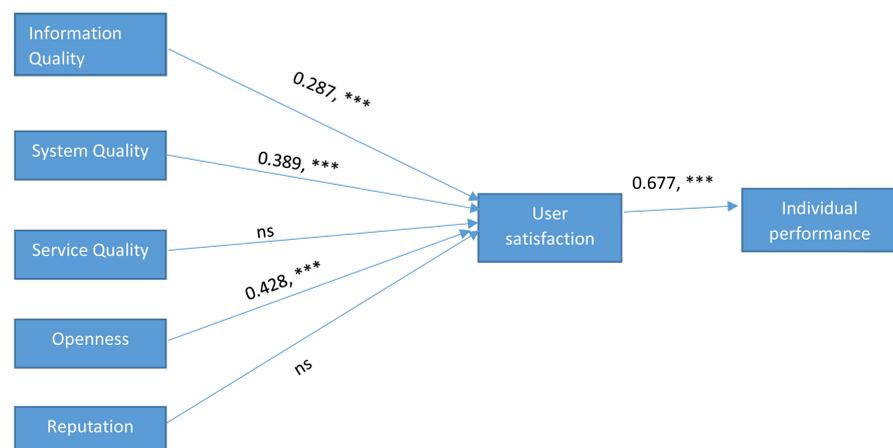***=p < 0.001; **=p < 0.05. ns = Non-Significant.

Figure 2. Structural model analysis.

reason of Indian user's for joining the MOOC platforms. The future research can further explore the other antecedents impacting the MOOC platform usage and its impact on performance of the individual.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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