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A study of learner's satisfaction from MOOCs through a mediation model

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Abstract

The present focused on understanding the satisfaction of the learners from the massive open online courses (MOOCs). The objective of the present study has been to analyse the factors affecting the satisfaction of the learners from the MOOCs. The structured questionnaire has been adapted from the existing studies on satisfaction of online teaching. The satisfaction from the MOOCs has been studied on four parameters i.e. course delivery, course assessment, and course support. The overall satisfaction has been measured by a five-point scale. It has been found that course assessment, course content and course delivery significantly affect the overall satisfaction level from the MOOCs. However, course support was not found to be insignificant in impacting the overall satisfaction. It has also been concluded course assessment mediates the relationship between course content and overall satisfaction. On the other hand, course support does not mediate the relationship between course delivery and overall satisfaction.

Keywords:Assessment; Course Delivery; e-Content; Mediation; SEM

1. Introduction

The 21st century has witnessed a shift in the educational paradigm because of the widespread use of Information and Communication Technologies (ICT). The open, online and flexible learning has shifted from the tangent of mainstream education with the expansion of ICT. The quality of the delivery of the academic content has also improved. The system of open education has evolved overtime in various forms (Weller, 2014). Continuing the trend

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of open learning, the concept of Massive Open Online Courses (MOOCs) are a recent development which is grabbing the attention from academic as well as corporate world.

Comprehending the term Massive Open Online Courses or MOOCs where massive implies an initiative which is meant for people in large. Open implies free or at nominal charges, across various sections of the society belonging to different categories of age, gender, educational & financial background etc. Online means that the courses can be easily accessed through internet from anywhere [1]; [2]. [3] defines a MOOC as "an online course with the option of free and open registration, a publicly shared curriculum and open-ended outcomes". MOOCs have become the buzzword for higher education [4]. Many universities namely, Harvard, MIT, Stanford and others, have been collaborating with MOOC providers like Coursera, edX, Udacity, FutureLearn to provide online courses for free/minimal cost. However, a lot of research is required, to understand the learners needs and expectations. This research would further aid in designing and delivering the course contents successfully across various domains and subjects, thus ultimately meeting the objective of quality education to masses [5].

MOOCs focus on academic as well as skill-based learning [6]. They accommodate the needs of 'knowledge workers' in keeping them updated with the skills required for their professional development [7]. Using internet based collaborative experiences [8], MOOCs have become a popular platform for self-learning. With the ease of access, it has been observed that more and more employed, educated and even unemployed people are further taking up MOOCs for their skill development and better career opportunities [9]. They offer an advantage to pursue one's interests even while he/she is still at job. A person with basic infrastructure like mobile or PC and internet connection can easily access MOOCs, available all across the world. It offers flexibility with respect to time and pace. MOOCs are economical and certification can be obtained by a nominal payment in most of cases. The working professional today prefer MOOCs over traditional classroom trainings for upgrading their skills which is turning out to be more efficient and effective [10].

In the recent years, researchers have shown interest in this talk of the town platform of learning. Various research studies have been conducted analyzing the factors responsible for existence of MOOCs, and motivation factors for enrolling in them. However, there are dearth of studies addressing the needs of MOOC learnings, the factors that led to satisfaction among the learners and the reason of not completing the course in due time or leaving in between.

2. Literature Review

There exist enormous opportunities of research in the area focusing on the factors that affects a learners' satisfaction to continue the MOOCs. Need arises to study these factors because non-fulfillment of these factors ultimately leads to discontinuance or dropouts. However, the literature is limited with respect to focusing on the factors and the reasons for not involving into MOOCs. One can observe, the maximum adoption of MOOCs in tech savvy companies, where it is convenient for the employees. Technology companies today are developing MOOCS to train their employees [11] and motivating them to pursue courses online; the organizations, where the employees are not digitally literate, may find difficultly in using MOOCs for the benefit of organization development [10]. With very high drop-out rate, on an average, less than ten percent of the enrollees actually end up completing the MOOCs [12]; [13]; [14]. The present study has tried to highlight the studies related to MOOCs in three major verticals i.e. studies which pertain to reasons for not enrolling in MOOCs; reasons for discontinuance of MOOCs; factors related to satisfaction from the MOOCs. The studies from the period of 2001 till 2019 have been included in this review.

2.1. The possible reasons for not enrolling in MOOCs

MOOCs are intended to increase the access to non-traditional participants who could not have an access to higher education due to various reasons [15]; [1]. However, assessing the demographics of the MOOC participants, it was observed that the participants enrolled were generally young, well-educated with high levels of formal education and residing in the developed nations [16].

In 2002, a major step towards e-learning was initiated with a tie-up between IITs and IISC with its program NPTEL. As a part of the 'Digital India' initiative, Government of India launched SWAYAM which covers higher education as well as skill-based courses. The workforce today lacks the skill which is required for a job which

creates a gap between the higher education and the expectations of the employer [17]. This gap can be filled with the help of MOOCs which focuses on teaching a skill which is demanded at the workplace. The courses are facilitated by professionals and experts who are experienced in their areas; hence learners get more practical exposure instead of just theoretical concepts.

Online learning though is growing exponentially, however, classroom teaching with face-to-face interaction still dominates as the primary teaching environment for learning [18]. In the absence of live discussion and guidance students are actually not aware of whether they are on the right path or not. Learner gets to know this, once the course is completed, based on the result. [19] through their study have identified the reasons for non-enrollments. These include unfamiliarity with the system of online learning, preferring physical classrooms over online environment, lacking face-to-face interaction, absence of group discussions in real time and fear of operating MOOCs. Because of these reasons, MOOCs have a negative influence on student motivation.

2.2. The reasons for possible non continuance of the MOOCs

Based on the previous researches, it can be observed that the initial enrollment in the MOOC courses is very high, however, less than 10% of the participants actually complete the course [20]. Researchers have tried to identify the reasons for the same. People who are self-oriented, motivated and disciplined can only successfully complete the courses [21].

A person who lacks such skills either don't enroll for MOOCs or eventually drops it in between. Thus, one can conclude that MOOCs are only meant for a niche segment who want to make the most of it and upgrade their skills [22]. The participants prefer MOOCs wherein they can have face to face interaction with the facilitators otherwise they tend to lose interest and ultimately drop in between [23]. Similarly, [24] observed that the students are dissatisfied with the MOOCs because of the lack of interaction with the instructor. Consequently, they suggested some strategies to improve the instructor-student interaction.

[25] analyzed patterns of engagement and disengagement in three MOOCs and categorized the learners into four categories: completing learners who completed the majority of assessments; auditing learners who watched most of the videos but were not frequent in completing the assessments; disengaging learners who completed assessments at the start of the course, then reduced their engagement; and sampling learners who explored some course videos.

Similarly, [26] have identified eight factors that lead to dropouts which include high workload, challenging course content, lack of time, pressure and a sense of community, social influence, lengthy course start-up, and learning on demand. Similarly, [27] have also found out a number of reasons for student drop out. The reasons identified by them were (a) real intention to complete, (b) lack of time, (c) course difficulty and lack of support, (d) lack of digital skills or learning skills, (e) bad experiences, (f) expectations, (g) starting late, and (h) peer review. [4] himself points out three significant concerns about MOOCs and puts the onus on facilitator to address those concerns. They were a) high drop outs and declining participation as courses progress, b) requirement of high degree of technical skills, and c) scaling social learning by increasing opportunities for peers to help each other.

2.3. The factors affecting satisfaction level from MOOCs

With the advent of technology development and ease of access to the infrastructure i.e. mobile devices, internet and others, the adoption of new technology for social, personal and professional learning [28] and enhancing one's performance [29], has been strongly influenced. Enabling learning with the help of technology is rising, which has been evident from the way the current courses have been developed. The learners themselves demonstrate how adopting the technology has led to successful learning. The term "Open" & "Online" in MOOCs is linked in its true sense to this concept [28].

Learning through the digital mode is gaining popularity day by day and professionals are preferring it to upgrade their skill and knowledge [30]. Being an alternate mode of learning, it has witnessed an exponential growth of more than 10 times compared to the other education models [31]. [19] based on his study concluded with adoption of MOOCs, the participants' satisfaction & performance has been improved by 15%.

Based on literature review of the studies conducted during 2012 to 2015, [32] identified the factors the affect a MOOC learner's satisfaction. These factors were summarized as interaction, collaboration, motivation, network

opportunities, pedagogy, content, assessment, usability, technology and supports from learners. These factors effectively contribute to the satisfaction and learning through MOOCs [32].

Access to high speed internet and smart devices positively influences a learner towards MOOC. Similarly, interactive and open channels, sharing of feedbacks, social learnings also positively influence one towards MOOCs [33]. [34] while investigating the primary goals of MOOC participants, observed that personal interests and lifelong learning were the main factors that affected a student's engagement in MOOC. According to [23], interaction with the MOOC instructor was considered to be the major factor for learner's retention.

The literature review has highlighted that research in MOOC has been limited. The major objectives studied by the existing researchers are continuance intention, purpose of certifications and satisfaction. Very few of the researchers have worked upon the interlinkages between continuance, satisfaction and reasons for enrolling in MOOCs. The present research has been focused on analyzing the satisfaction level from the MOOCs with respect to its different performance parameters. The limited number of studies have dealt with the satisfaction factors responsible for encouraging the enrollee to complete the course and enroll in others. Hence the objectives of the study were (i) to study the possible reasons for not enrolling in MOOCs; (ii) to investigate the reasons for possible non continuance of the MOOCs; and (iii) to analyze the factors affecting satisfaction level from MOOCs.

3. Research Methodology

The concept of MOOCs is relatively new and not much research is done in this area. The research design is exploratory in nature, analyzing the satisfaction level of respondents from MOOCs. The overall objective of analyzing the satisfaction level with respect to MOOCs has been framed with the help of the various theories of satisfaction. In order to study the objective, the research has laid out a path to gather crucial information and generate quantitative data. The non-probability sampling has been used to select the sample for the study, i.e. combination of convenience and snowball sampling. The MOOC portals which have been taken into consideration for the present study are namely SWAYAM, Coursera, Edx, Udemy and Future Learn. This study will help to understand how satisfied the participants are with the various MOOCs offered on the government and private platforms.

The sample selection process has been explained by way of figure 1. First the respondent had been asked whether he has been aware about the MOOCs or not. If the respondent has not been aware about the MOOC then they were dropped from the data collection. Moving forward if the respondent is familiar with the MOOCs, then whether he is enrolled in one at present or in the past has been enquired. If he hasn't enrolled in the MOOC, then the respondent has been asked about possible reasons of not enrolling in the MOOCs and afterwards the survey finishes for such respondents. However, if the respondent is enrolled or has been enrolled earlier then whether he has completed that course and earned the certificate or not is asked. If he has not been able to complete the certification, then the possible reasons for non-continuance of the MOOCs has been enquired. The final sample of the study consisted of respondents, who has completed the MOOCs and earned the certificate. They have been given structured questionnaire to study their satisfaction level from MOOCs. The sample consisted of the students & academicians who have pursued any MOOC(s). The data collection has been done through structured questionnaire.

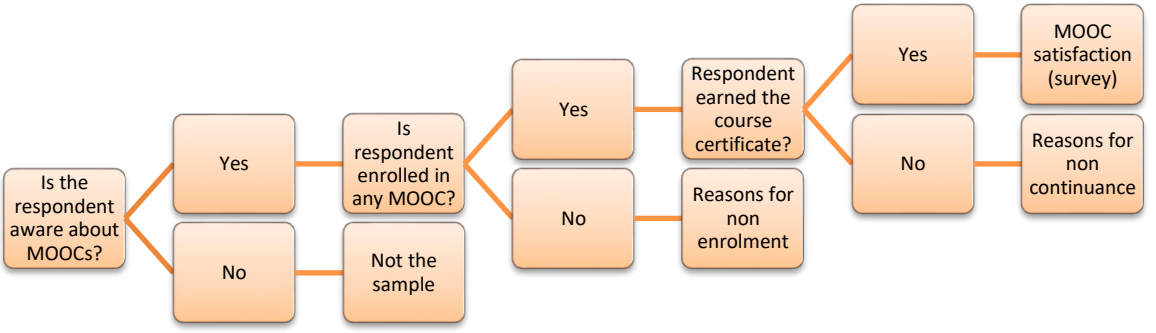

Fig. 1. Sample Selection

present study has adapted the structured questionnaire recommended by the Kirkpatrick Partners in the New World Reaction Sheets and Bhattacherjee's (2001). Opinions with respect to their satisfaction has been rated on the scale of 1 – 5, with 1 being strongly disagree and 5 being strongly agree. The satisfaction from the MOOC has been categorized in five categories i.e. course objectives (CO), course materials (CM), support (CS), course delivery (CD), and course assessment (CA). Questionnaire consisted of 23 scale items and five multiple choice questions. In total 1000 respondents have been contacted from various states of India. However, only 300 responses were received. After initial cleaning of raw data, 223 responses remained valid and hence the data analysis was done on 22% of the total sample.

Data screening & factor analysis has been carried out in IBM SPSS 21. Since the model involved formative variables, thus smart PLS software has been used to test the various hypothesis. EFA confirmed the reliability of the constructs (4 not 5). Initially five parameters have been adopted however, those five factors have been merged in four. Thus, the final model used for analyzing the factors of satisfaction from MOOCs are (i) Course Content - CC (6 items) (ii) Course Delivery - CD (4 items) (iii) Course Assessment - CA (4 items) (iv) Course Support - CS (3 items). The CC was obtained by combining the parameters of course objectives and course material. These constructs showed high face & discriminant validity & high reliability. Overall satisfaction (OS) has been included as a key dependent variable, since it represents the main focus of current study. For the purpose of present study, OS has been measured as a scale variable & not the dichotomous variable.

The measurement model (figure 2) has first focused on testing the hypothesis related to impact of four constructs i.e. CA, CC, CD and CS on the overall satisfaction (OS). In other words, direct relationship between the independent (four variables) and dependent variable. The next two hypotheses have been framed to analyze the impact of indirect relationship of the constructs on the overall satisfaction.

H1: CC (Course Content) has significant positive impact on the OS (Overall Satisfaction) from the MOOC.

H2: CD (Course Delivery) has significant positive impact on the OS (Overall Satisfaction) from the MOOC

H3: CA (Course Assessment) has significant positive impact on the OS (Overall Satisfaction) from the MOOC.

H4: CS (Course Support) has significant positive impact on the OS (Overall Satisfaction) from the MOOC.

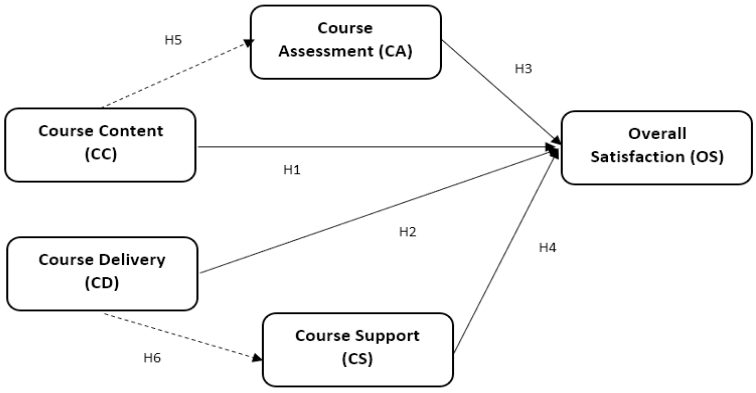

Fig. 2. Measurement Model

The background of the course along with the theoretical base is explained and covered by the course content. However, in some of the cases, it has been observed that, the quiz covered the questions which were more application based. Many of these applications-based examples have not been covered by the content of the course. Thus, outcome of the course i.e. course assessment cannot be effective. The main reason behind this ineffective assessment of the participation is weakly defined course content. Hence, the present research would be analyzing this impact of CC on the CA and will this relation effect the overall satisfaction in turn.

H5: CA (Course Assessment) significantly mediates the relationship between CC (Course Content) and OS (Overall Satisfaction)

Course delivery relates to the timely uploading of content, pace of the course content i.e. neither too fast nor too slow, delivery of the content by the instructor and others. On the other hand, course support related to the easy and

user-friendly navigation of the course site, interaction in forums, clarification of doubts/queries in timely manner on the portal and responses to key course issues by the instructor. If course delivery is in an organized & effective manner, then satisfaction of the participation can be ensured to a greater extent. Also, a well-organized course delivery leads to better course support. Hence, researcher wants to analyze the possible relationship between CD and CS and how this relationship effects the OS from the MOOC.

H6: CS (Course Support) significantly mediates the relationship between CD (Course Delivery) and OS (Overall satisfaction).

4. Analysis & Discussion

Demographic data was collected on age, gender, and occupation. Out of 223 participants of the survey, most preferred MOOC portals were Swayam and Coursera i.e. 145 respondents (65%), followed by Edx (15%), Udacity (10%) and FutureLearn (5%). The sample included 109 males (49%) and 114 females (51%). Majority were aged in range of 17 – 20 years, 89 participants (40%) followed by 29% of participants in the age group of 21 – 31 years. 55 participants were aged between 32 & 45 years and rest 6% of participants were above the 50 years' age.

The survey has recorded additional 40 responses, which have been excluded from the final sample for not completing the MOOC i.e. non continuance of course. These respondents have been asked the possible reasons for discontinuance. Based on the responses, the reasons may be categorized as: lack of motivation and passion to continue the course, lack of interaction with instructor as it leads to loss of interests in the course, lack of technical support and other priorities to be fulfilled.

Table 1 presents the reliability and validity of the final constructs selected as the factors of satisfaction of the MOOCs. The Composite reliability (CR) of CA, CC, CD, CS and OS are shown to be 0.856, 0.919, 0.917, 0.884 and 0.862 respectively. These outputs indicate high internal consistency reliability [35]. All of model constructs have the high level (threshold level of 0.50) of AVE, thus they confirm the convergent validity.

Table 1. Reliability and Validity.

Construct	Items	Item Loading	AVE	CR	α
Course Assessment (CA)	V13 V14 V15 V16	0.777 0.820 0.748 0.746	0.598	0.856	0.777
Course Content (CC)	V2 V4 V5 V6 V7 V8	0.794 0.843 0.846 0.803 0.819 0744	0.654	0.919	0.894
Course Delivery (CD)	V22 V23 V24 V25	0.844 0.814 0.904 0.862	0.733	0.917	0.879
Course Support (CS)	V17 V18 V19	0.859 0.836 0.847	0.718	0.884	0.804
Overall Satisfaction (OS)	V10 V11 V12	0.834 0.822 0.811	0.676	0.862	0.760

The structural model analysis has been presented in figure 3. The overall PLS model explained 79.1% variance in the overall satisfaction (OS), 47.2% in course assessment and 15.4% in course support. This r square of OS is found to be strong, as [36] suggested the threshold value of 0.25, 0.5 and 0.7 can be described as a weak, moderate, and strong coefficient of determination. In other words, CC, CA, CS, and CD can jointly explain the 79% variation in the overall satisfaction of MOOCs.

The significant relationships in the model has been shown in table 2 along with the hypothesis results. The results of the survey suggested that there is significant positive impact of CC, CD and CA on the overall satisfaction of the participants. Hence, if the course content is helpful and beneficial to the participant, then it leads to greater overall satisfaction from the course. Results of the study confirm with the findings of [32], who said that assessment, content, and support play a greater role in MOOC satisfaction. Similarly, if the course delivery is remarkable and well-defined then the participants would be encouraged more to complete the full course, thereby increasing their satisfaction. [27] & [4] concluded that course delivery or instructor/ facilitator support and content are the major factors of participant satisfaction towards MOOC, thus confirming with the results of this study.

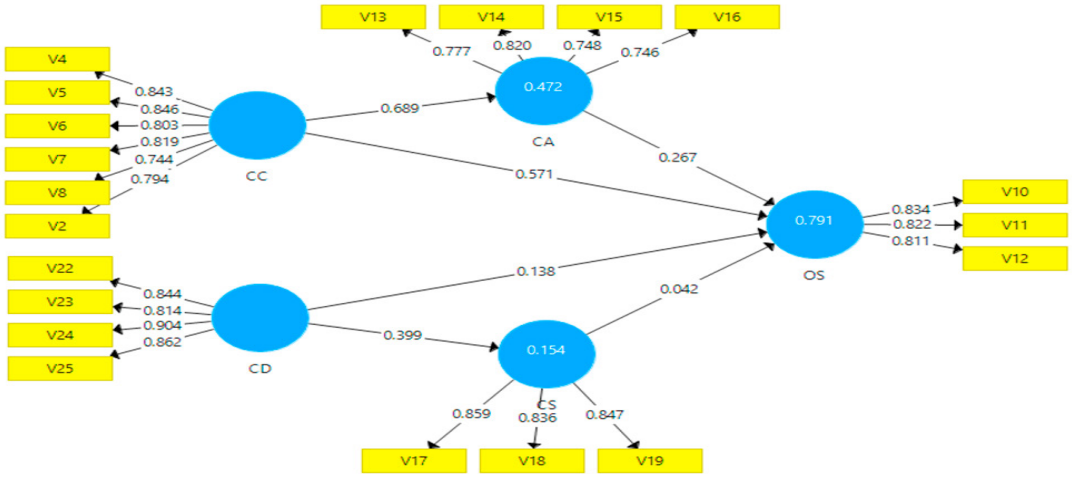

Fig. 3. Structural Model

However, as the H4 has been rejected by the results i.e. course support doesn't have significant impact on the overall satisfaction. Our results don't confirm with studies of [34], [23] and [37]. They have concluded that interaction on portals is a key factor of satisfaction for online courses participants. Overall, hypothesis H1, H2, and H3 have supported by the results of the survey. Thus, MOOC providers should focus more on building great course content, ensuring timely and flawless delivery of the lectures along with appropriate course assessment, covering the correct information from the course content. This way satisfaction of participants can be achieved and they can be encouraged to further enroll in other courses along with completing the current course.

Table 2. Significant Relationships

Hypothesis	Path coefficients	T statistics	P value	Result
H1: Course Content -> Overall Satisfaction	0.571	11.722	**0.000***	Fail to reject
H2: Course Delivery -> Overall Satisfaction	0.138	2.897	**0.004***	Fail to reject
H3: Course Assessment -> Overall Satisfaction	0.267	4.541	**0.000***	Fail to reject
H4: Course Support -> Overall Satisfaction	0.042	0.694	0.488	Rejected

*significant at 5% level of confidence

The model also examined the relation between course content and course assessment; course delivery and course support. H5 & H6 focused on these and final results have concluded that we have fail to reject the null hypothesis.

In other words, course content significantly impacts the course assessment and course delivery significantly impacts the course support and there is a presence of mediation also. Thus, results show that there is a presence of mediation effect of CA in the relationship of CC and OS. However, CS is not mediating the relationship between CD and OS. The strength of the mediator can be established by TE (total effect) and VAF (variance account for). The VAF of 0.244 explains that 24.4% of course content effect on overall satisfaction can be explained via course assessment mediator. Hence, as per [36], if the VAF exceeds 0.20, then partial mediation is confirmed by the model. Thus, magnitude of mediator CA can be considered partial in the relationship of CC and OS. This study also builds on previous research by suggesting that the effect of course content on overall satisfaction is mediated by course assessment, an issue that has not been much researched in the previous studies. However, in the other mediation model of CS as mediator, no significant mediation effect has been observed as VAF is merely 11%. Thus, CS doesn't mediate the relationship between CD and OS. These results highlight the findings of [24], who observed that the students are dissatisfied with the MOOCs because of the lack of interaction with the instructor. It was observed in the study that only 65% of the MOOC participants were satisfied. However, they also found participants' interaction with their facilitator play an important role in satisfaction with respect to MOOC. This can be the reason that course support is not significant in impacting the course delivery relationship with overall satisfaction.

Table 3. Mediation Effect Results

Hypothesis	Effect	Path	Path coeff.	Indirect effect	STDEV	TE	VAF	T value	P value	Result
H5	Direct	CC -> OS	0.570					8.615	0.000*	Accepted
	Indirect	CC -> OS	0.571	N/A		0.755	0.244	4.548	0.000*	
		CC -> CA	0.689	0.184	0.041					
		CA -> OS	0.267							
H6	Direct	CD -> OS	0.137					2.647	0.008*	Rejected
	Indirect	CD -> OS	0.138	N/A		0.154	0.110	0.635	0.525	
		CD -> CS	0.399	0.017	0.026					
		CS -> OS	0.042							

5. Conclusion

The present study analyzed the satisfaction level of the participants from the MOOC run by Swayam, Coursera, FutureLearn and Edx. The satisfaction from the MOOCs has been studied on four parameters i.e. course delivery, course assessment, and course support. The qualitative results highlighted that the participants have gained knowledge from the course and 65% of them preferred Swayam and Coursera MOOC portals. The overall findings revealed that participants were more satisfied than dissatisfied from the MOOC. The direct relationship along with the mediation relationships has been tested between the five constructs. It has been found that course assessment, course content and course delivery significantly affect the overall satisfaction level from the MOOCs. However, course support was not found to be significant in impacting the overall satisfaction. The course content has the most significant impact on the participants' satisfaction level from online course. The model also tested the presence of mediation effect of course assessment and course support on the relationship of course content and course delivery with overall satisfaction. The final mediation results concluded that there has been a presence of mediation effect of course assessment in the relationship of course content and overall satisfaction. However, course support has not been mediating the relationship between course delivery and overall satisfaction. Thus, MOOC providers should focus more on building great course content, ensuring timely and flawless delivery of the lectures along with appropriate course assessment, covering the correct information from the course content. Hence, the satisfaction of participants can be achieved and they can be encouraged to further enroll in other courses along with completing the current course.

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