

IMPACT OF ONLINE EDUCATION ON STUDENT SATISFACTION

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ABSTRACT

Due to the pandemic and worldwide shutdown online education has become more prevalent than ever. However, due to the unprecedented nature of the situation and limitation of time for pre-preparedness the 'Satisfaction level of Students' has been impacted. The study tries to bring out factors that impact the satisfaction level of the student from online classes. Factors like interaction, motivation, interconnectedness among peers, online pedagogy, student's comfort with using technology, and motivation were analyzed. Satisfaction from online education was found to be significantly dependent on motivation of a student to attend an online class and online pedagogy of the professor. Also, the interaction level in the class was found to have high positive correlation with peer-to-peer learning and motivation of the students to attend an online class. On running the T-test, it was also found that Gender of the student also impacted comfort with technology, satisfaction from online education, motivation to attend online classes and peer to peer connection. A rank analysis was also performed to find out that male students preferred interaction via their cameras while females did not and tried to avoid the same. The study then comprises qualitative research and is concluded by giving suggestions for what can be done to improve the overall satisfaction from online education.

Keyword:- Online pedagogy, Virtual education, Student Satisfaction, Student motivation, Peer to Peer Interactiveness

1. INTRODUCTION:

The pandemic has put various restrictions on humans: from practicing social distancing to not stepping out of our homes. This forced the educational institutions to shift to online education. Being the need of the hour, students as well as professors have accepted online education as the new normal, however, it has significantly impacted the interaction between the professor and the students (Dr. Pravat Kumar Jena, 2020)^[5]. The foundational structure of online education was laid down by Massive Open Online Courses (MOOC). MOOC was tested to be effective for the learners as they were able to understand a certain topic taught and apply it in real life. (Goh W.W., Wong S.Y., Ayub E, 2018)^[6]. However, MOOC being an old concept has had many studies around it and criticisms have been dealt with by implementing a blend of offline-online i.e., hybrid medium, by introduction of Learning Management Systems etc.

However, online education prevalent today is totally different from MOOC. This is due to the unprecedented situation that the novel coronavirus put the institutions in. Some of the challenges (Mahyoob, Mohammad, 2020)^[1] faced by the students as well as the professors during an online class include: adaptability, technical issues, lack of self-motivation, time management and communication gap. Lack of training, Network issues and lack of awareness were stated to be the major challenges faced by the educators (Amit Kumar Arora, R. Srinivasan, 2020)^[7]. Thus, unlike the prevailing high-standards of MOOCs, the pandemic-induced virtual classes were unable to incorporate even the prevalent best practices. The institutions are trying to increase the engagement through interactive online assessments and online tools to engage peers etc.

India being a developing country, has an internet penetration of merely 43% (as per the ICUBE 2020 report). Thus, there is also a Digital Divide in Indian society that was underscored during the pandemic. This Digital Divide exists in 2 ways: On the basis of gender and rural-urban basis. Due to paucity of time, the present study focuses only on the digital divide due to gender and how it impacts overall student satisfaction. The study also analyzes factors like: *Student motivation to attend online classes, peer-to-peer interconnectedness, level of interaction in the class, the preference of medium of interaction (chat/video/audio), and how all these factors impact students' satisfaction from online education.*

2. LITERATURE REVIEW:

Massive Open Online Courses (MOOC) lay the foundational structure of online education. MOOC was tested to be effective for the learners who wanted to gain knowledge about a particular subject in their spare time from their jobs (Goh W.W., Wong S.Y., Ayub E, 2018) ^[6]. However, MOOC is a concept that was first tossed in 2008 by Dave Cormier, and various researches have been done in these 13+ years to determine an effective framework. However, due to the pandemic, even the colleges with no prior online teaching experience had to make a quick transition as virtual education was the only way forward. Thus, there are various shortcomings that need to be addressed, presently. Lack of training, Network issues and lack of awareness were stated to be the major challenges faced by the educators (Amit Kumar Arora, R. Srinivasan, 2020) ^[7]. Thus, the stakeholders lacked training, and the quick transition only allowed the same offline-method of teaching to be delivered via virtual means. Tools like Learning Management System (LMS), Personal Learning environment (PLE), Course Management System (CMS), Virtual Learning Environment (VLE), and E-Learning Courseware (Chaubey and Bhattachary, 2015) ^[14] form an essential part in online education. However, these are not inculcated at the grassroot level, thus the *pandemic-induced online education became a huge challenge for all the stakeholders.* Virtual classes also sacrificed the precious student-professor interaction and peer-to-peer learning. This makes a student feel alienated and isolated. This factor plays a huge part especially during pandemic as the option of 'Hybrid' mode of education is no longer available due to travel restrictions.

3. HYPOTHESIS FORMATION:

3.1 TESTING VIA LINEAR REGRESSION

- **Satisfaction from online education as a dependent variable:** Past studies have said that a student's attitude is positive towards online education when there is sufficient instructor-student interaction (Knowles, E., & Kerkman, D., 2007) ^[15]. The present study measures satisfaction from online education w.r.t. *online pedagogy and student's motivation to attend an online class.*

H₀: Satisfaction from online classes is not dependent on online pedagogy and student's motivation to attend an online class.

H₁: Satisfaction from online classes is dependent on online pedagogy and student's motivation to attend an online class.

3.2 TESTING VIA CORRELATION

- **Interactiveness during online classes and Motivation:** Educational experience comes from various factors combined, but more emphasis has been on interaction amongst student-student and student-

instructor (Karen Swan, 2001) ^[20]. Such discussions and interactions during lectures can act as an influencing factor on a student's motivation levels.

H0₂: Class interactiveness has no significant impact on Student's motivation level

H1₂: Class interactiveness has significant impact on Student's motivation level

- **Interactiveness during online classes and peer to peer connection:** 'Perceived isolation' is the most common issue faced by students, which has been rising due to the online mode of learning. In the present study, we try to illustrate how deeply peer-to-peer interconnectedness is impacted by class interactiveness.

H0₃: Significant relation does not exist between interactiveness during online classes and peer-peer connection

H1₃: Significant relation exists between interactiveness during online classes and peer-peer connection

3.3 TESTING VIA T-TEST

- **Gender and comfort with technology:** The concept of online education is very highly dependent on the assumption that the student involved is well versed with technology. India being prey to the 'Digital Divide', needs to understand how gender could play a role in the level of comfortness with technology. This factor would help understand possible hurdles respondents face with technology (DeBourgh, Gregory A, 1999) ^[21].

H0₄: No significant relation between gender and comfort with technology

H1₄: Significant relation between gender and comfort with technology

- **Gender and Satisfaction from online education:** The satisfaction element in online education is a crucial aspect in promoting successful education pedagogy. As there is rapid adoption of new teaching/learning modalities and a growing sense of student agency for raising their opinions about the course, the factor of satisfaction is to be dealt with very carefully (Dziuban, Charles; Moskal, Patsy; Thompson, Jessica; Kramer, Lauren; DeCantis, Genevieve; Hermsdorfer, Andrea, 2015) ^[9]. There is a possibility that male and female students react differently to online classes and their satisfaction level could differ accordingly

H0₅: Significant relation does not exist between gender and satisfaction

H1₅: Significant relation exists between gender and satisfaction

- **Gender and Motivation:** There are various intrinsic and extrinsic factors that define the motivation level of students while attending online classes. It is generally noticed that extrinsic motivation encourages students to commit more and achieve better (Selvi. K.,2010) ^[16]. Understanding if motivation factors would differ across genders would be a significant factor in restructuring online lecture formats.

H0₆: Significant relation does not exist between gender and motivation

H1₆: Significant relation exists between gender and motivation

- **Gender and connection with peers:** During an online session there are no more than a handful of ways to facilitate interaction. One important aspect is peer to peer interactions, as it is a vital factor in development of self-concept, self-esteem and identity amongst children. It would be interesting to explore if a factor such as gender could have a role in peer interaction level during online lectures.

H0₇: No significant relation between gender and connection with peers

H1₇: Significant relation between gender and connection with peers

3.4 RESULTS VIA RANK ANALYSIS:

- **Impact of gender on mode of interaction:** Online education has become the norm since COVID-19 pandemic has crept in. This has left students with no choice but rather has forced all to shift to e-learning for continuing their academics. In previous studies, it was observed that females could achieve positive learning outcomes due to their commitment as compared to males (Zhonggen Yu, 2021)^[8]. These online learning platforms have various modes of interactions such as video, audio and chat. Students have their preferences to interact during lectures as per their comfort and concerns. One major concern of students is their appearance due to which they are hesitant to switch on their camera (Frank R. Castelli, Mark A. Sarvary, 2020)^[10]. It would be interesting to explore if a factor such as gender could have a role in deciding the most preferable mode of interaction for e-learning.

H0₈: Gender does not impact the preferred mode of interaction during online lectures.

H1₈: Gender impacts the preferred mode of interaction during online lectures.

4. METHODOLOGY:

4.1 Sampling -

The present study was conducted on students pursuing a Master's degree (pan India), demographics of which are given in Table 1. Total of 150 responses were received from students. The respondents were randomly selected from reputed institutes in India. Due to the pandemic and travel restrictions, we initially conducted telephonic interviews to help frame our questionnaire.

Table -1: Demographics of the sample collected from the student's questionnaire

VARIABLE	FREQUENCY	PERCENTAGE(%)
Gender:		
Male	76	50.66
Female	74	49.33
Age Groups:		
20-22	57	38
23-25	70	46.6
26-28	23	15.3

4.2 Research Design-

A structured questionnaire was used as the primary instrument to collect data. It was directed towards students pursuing masters in India. Along with this focus interviews were conducted to understand student preferences.

4.3 Measurement and scales-

The study measures various parameters influencing Satisfaction level of students in online classes. Likert scale ranging from 1-5 where 1 being the lowest and 5 being the highest rank was used to measure satisfaction, motivation, technology know-how and interactivensess of the class.

Table -2: Reliability of data: Internal consistency method

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	132.371 ^a	16	<.001
Likelihood Ratio	90.680	16	<.001
Linear-by-Linear Association	56.818	1	<.001
N of Valid Cases	150		

a. 17 cells (68.0%) have expected count less than 5. The minimum expected count is .40.

To check the reliability of data, an internal consistency method was used. Two questions- 'Rate your satisfaction level with professor's current style of teaching' and 'Rate your satisfaction level with respect to online classes (please answer this question w.r.t. the pedagogy followed by your professor)' were asked and the Chi-square Test of Independence was used. The P-value received was less than 0.05. Thus, it can be concluded that the data sets are dependent on each other. *Therefore, the data collected is reliable.*

5. DATA ANALYSIS:

5.1 QUANTITATIVE ANALYSIS

5.1.1. RESULTS VIA LINEAR REGRESSION:

Table -3: P-values of the variables considered in the linear regression model

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.48737977	0.207528019	2.34850106	0.02007164
Rate your satisfaction level with professor's online pedagogy	0.34611715	0.072550802	4.77068675	4.1078E-06
Rate your motivation level with respect to attending online classes	0.49869581	0.063195134	7.89136414	4.4404E-13

The above Linear regression examines the Satisfaction from online education is dependent on Professor's online pedagogy (Coefficient value= 0.34, P-value= 4.10E-06) and student's motivation to attend the online class (Coefficient value= 0.49, P-value= 4.4E-13).

As the P-values are less than α (i.e., 0.05), therefore it can be concluded that **Satisfaction from online education is dependent on Satisfaction from the professor's online pedagogy and Motivation to attend online classes.**

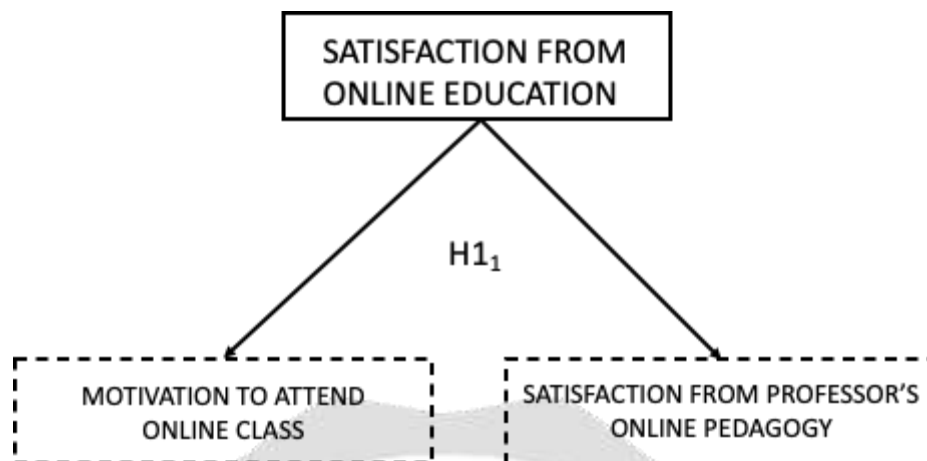


Fig 1:- Dependent and independent variables

5.1.2 RESULTS VIA CORRELATION ANALYSIS:

Hypothesis	X and Y	Correlation coefficient	P-value	Decision
H ₁₂	<i>Interactiveness during online class → Motivation to attend online class</i>	0.62	5.4E-19	Accepted
H ₁₃	<i>Interactiveness during online class → Peer to Peer connection of an individual</i>	0.51	1.5E-06	Accepted

The above Correlation analysis examines *Interactiveness during online class → Motivation to attend online class* (Correlation coefficient= 0.62, P-value= 5.4E-19) and *Interactiveness during online class → Peer to Peer connection of an individual* (Correlation coefficient= 0.51, P-value= 1.5E-06).

As the P-values are less than α (i.e., 0.05) and correlation is positive and moderate to strong in nature, therefore it can be concluded that **both H₁₂ and H₁₃** are accepted.

5.1.3 RESULTS VIA T-TEST:

Hypotheses	Alternate Hypothesis	T-test Significance value (2-tailed)	Significance threshold P-value	Decision
H ₁₄	Gender → comfort with technology	0.009	0.05	Accepted
H ₁₅	Gender → satisfaction	0.014	0.05	Accepted

H_{16}	Gender → motivation	0.011	0.05	Accepted
H_{17}	Gender → connection with peers	0.002	0.05	Accepted

Results of T-test examines: Gender → comfort with technology (t-test value = 0.009, P-value = 0.05| Mean: Male = 4.28, Female = 3.86); Gender → satisfaction (t-test value = 0.014, P-value = 0.05| Mean: Male = 3.28, Female = 2.86); Gender → motivation (t-test value = 0.011, P-value = 0.05| Mean: Male = 3.12, Female = 2.67); Gender → connection with peers (t-test value = 0.002, P-value = 0.05| Mean: Male = 3.53, Female = 2.89). As the t-test values are lesser than the P-values for all four hypotheses, we reject the null hypothesis and accept the alternate hypothesis.

5.1.4 RESULTS VIA RANK ANALYSIS:

Table -4: Mode of interaction gender-wise rank analysis

Mode of Interaction	Male Rank	Female Rank
Audio + Video	1	3
Only Audio (Mic)	2	1
Via Chat box (Visible only to the professor)	4	4
Via Chat box (Visible to everyone)	3	2

The observation from the table emphasizes the relationship between gender and the preferred mode of interaction in online classes. Male students have opted for the 'Audio + Video' option whereas female student's first preference is 'Only Audio'. It can be deduced from the insights gathered via telephonic interviews that females are image-conscious while males do not bother much about the same. As per the table it can be concluded that gender impacts the preferred mode of interaction.

Hypotheses	Alternate Hypothesis	Decision
H_{18}	Gender → Mode of interaction	Accepted

5.2 QUALITATIVE ANALYSIS

There are 4 major modes of interaction in an online class. Upon analysis, it was seen that students prefer a particular mode for specific reasons as well as situations they face on a daily basis. Most students prefer the **Only Audio (Mic)** option due to the '**feasibility**' factor, as they do not have to worry about their background and they can put forth their point and get a clear explanation too from the professor. Students prefer the **Audio video** option due to the '**feel**' factor. While using this mode they feel more connected and less distracted in the class as they are more focused.

Then comes the non-audio modes of interaction i.e., the use of **Chat Box**. The most common reason for the use of this mode is bandwidth issues. The chat box which is visible to everyone is used due to the '**ease**' factor. This mode seems very convenient and interactive to students as it causes less disturbance in the flow of the lecture. The option

of a chat box being visible only to the professor is used due to the ‘**anonymity**’ factor. Since many students are shy and feel they might be judged, this mode helps them communicate and voice out their opinions or doubts more openly.

Mode of interaction is greatly influenced by the gender of the student. Males opt for audio and video mode while females prefer the chat feature. This choice of mode is directly influenced by comfort in the use of technology. Males find it easier to interact via online modes while females find it slightly difficult. Factors like how they appear in the class; their background and bandwidth also influence the choice of mode of interaction.

6. RESULTS AND DISCUSSION:

The findings of the study indicate the relationship between student’s perception with various factors such as satisfaction, motivation, interactiveness, etc. As per previous studies, due to Covid 19, students adopted and accepted technology for online learning (A.PatriciaAguilera-Hermida, 2020)^[18]. They could grasp the use of technology and trends most quickly and thus can get accustomed to technology by getting hands-on experience of using various apps and platforms. Platforms can add quick help video tutorials, In-built assistance (voice commands) and more collaborative tools which will make the experience seamless for both students as well as professors.

Online mode has been a challenge for all, not only getting accustomed with the technology but forming a network with peers. The importance of peer-to-peer interaction is in line with most of the previous research conducted by Bude Su Curtis J. Bonk Richard J. Magjuka Xiaojing Liu Seung-hee Lee (2005)^[19], Arora, A., & Srinivasan, R. (2020)^[7] and Mahyob, Mohammad (2020)^[1]. In order to boost connections and bonds, students need to be proactive learners. Professors can also include more group-based activities such as case study discussions, group assignments, etc. This can be facilitated by tools like ‘Breakout Rooms’ or even via Trello and Interactive learning tools can be added on the platform. Fastest finger first game along with Menti’s (collaborative tool) scoreboard can be included to increase participation and overall interaction levels. Staying motivated and staying attentive are some challenges the student needs to overcome as online or hybrid is the future. To achieve interaction as well as motivation, professors need to show empathy and use the right tools to engage and connect students.

After analyzing the data, the results indicated the importance of the impact of gender on other factors, which was similar to studies conducted by Yu, Z (2021)^[8], Frank R. Castelli and Mark A. Sarvary (2021)^[10]. It was seen that males are more comfortable using technology when compared to females. Thus, females need to get more exposure to technology to cope well with males, which would further break the Digital divide. Satisfaction and motivation factors play a vital role while attending online classes as per Baber, Hasnan (2020)^[13], Dziuban, C., Moskal, P., Thompson, J., Kramer, L., DeCantis, G., & Hermsdorfer, A. (2015)^[17] and Selvi, K. (2010)^[16]. It was observed that the gender of the student and satisfaction with online classes is positively linked. While males are more motivated and satisfied with the online mode, females aren’t. Further, it can also be observed that females find maintaining a strong connection with their batchmates as a major challenge during online lectures than their male counterparts. To curb these hurdles, female students could be given assurance through online platforms about their privacy (Screenshot alerts) and more team-building activities would be conducted to break the discomfort they have while attending online lectures. Noteworthy findings include a high positive correlation between *interactiveness during online class* with *peer-to-peer interaction* and *students’ motivation level to attend an online class*. The study was also able to find that satisfaction from online education was significantly dependent on motivation of the student and online pedagogy followed. Focusing on improving the satisfaction and motivation level of students through various engaging ways can increase students’ involvement and enhance their online learning experience.

7. CONCLUSION:

Online education has become an inseparable part of our lives today. We can do nothing but embrace it, along with its various intricacies. The study evaluated the responses of students pursuing a Masters Degree and the professors. Statistical techniques like linear regression, correlation and T-test were used. The study illustrates that *satisfaction from online education* significantly depends on the motivation of the student and *the online pedagogy followed by*

the professor. High positive correlation of *interactiveness during online class* with *students' motivation* and *peer-to-peer connectedness* underscores the importance of interaction during online classes. The impact of demographic variables such as gender has a significant impact on comfort with technology, satisfaction and motivation level, and connection with peers. Male students preferred video audio to interact during classes, however female students abstained from doing so. On being asked, it was concluded that female students were 'image conscious' and 'how they look'. Male students, also, were more comfortable with technology (mean= 4.28) than the female students (mean= 3,86). This highlights the fact that there is a *Digital Divide* on the basis of gender that prevails in India. This finding is totally in sync with the statistics that were found during the secondary research. Only 14.9% of women were reported to be using the Internet (according to Global System for Mobile Communications), and this calls for an urgent attention since there is no expiration date on the pandemic, and inability to access the internet might broaden the gap between the male and female literacy rates.

8. LIMITATIONS AND FUTURE SCOPE:

The study provides information from the students' perspective regarding learning through online mediums. However, the study has certain limitations. One limitation is represented by the fact that the study was carried out only on Master's students. Thus, this parameter restricted the findings due to which the results cannot be generalized to all the students of various age groups studying through an online medium. Furthermore, the research was conducted only via questionnaires and short telephonic interviews which might not have given enough qualitative insights to many important variables related to online mode of studying.

The present scope of the study did not explore the geographical barriers a student faces. An in-depth study can be carried out just focusing on how well-equipped students from various areas are when it comes to studying online. Another important area that can be covered is how family income influences the students and their comfort with various platforms used for education.

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