



Impact of Online Education During Covid-19 Epidemic Lock-Down on Students' Satisfaction and Mental Health

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Abstract. As the growth of COVID-19, the global effect is multidimensional. This inconvenience not only affects the economic development, but also causes great inconvenience to the society, which mainly affects the education of students. In this situation, a number of nations have adopted lockdown measures, causing students to modify their regular learning routines and adopt online education. Online education presents both opportunities and challenges, and under the situation of revised educational paradigms, its potential concerns cannot be ignored. Therefore, this work will focus on the insights of such impact on students' satisfaction and mental health. By examining online education in India during the pandemic, we discovered that the course schedule of online education influences student course satisfaction and can lead to mental health issues. Additionally, students' perceptions of their online course experience might have a stronger effect on their mental condition.

Keywords: COVID-19 · Online Education · Mental Health

1 Introduction

The global effect of COVID-19 virus is multidimensional. A statewide lock down, a worldwide recession, and associated disruptions in demand and supply chains pose serious risks to the economy [1]. Also, to effectively contain the sickness, a country's economy must cease to operate normally [1]. This increases the likelihood of a serious and protracted global recession. IMF Managing Director Kristalina Georgieva stated on April 9 that in 2020, the coronavirus outbreak might cause the biggest global recession since the 1930s, with more than 170 countries seeing negative GDP per capita growth [2]. COVID-19's huge losses to the tourism industry cannot be ignored either. The effects on tourism will vary in space and time. The expected 78% drop in international tourists might be the greatest decline in economic activity ever recorded, costing an estimated US\$1.2 trillion in export revenue from tourism and directly affecting the jobs of 120 million people [3]. In addition, COVID-19 is a key factor influencing education. Affected by locking down policies, the traditional teaching patterns were replaced by online education. Faculty members had to begin drafting lesson plans for online instruction. Numerous educators in this situation have received training in the use of online

learning platforms as a replacement for or complement to traditional classroom methods of education [4].

The global spread of the COVID-19 epidemic has caused humankind to preserve social separation. It has substantially affected the education sector, which is a key indicator of a nation's economic future. As a primary method of protection against the COVID-19 pandemic, the World Health Organization (WHO) recommended keeping a healthy distance from other people. As a result, the lockdown procedure was used in every nation in order to segregate the infected people. In March of 2020, the Indian government decided to shut down all schools in the country in an effort to halt the spread of the COVID-19 [5]. The educational institutions were forced to close their doors. Many a traditional teaching methods have been adjusted. For instance, offline lessons were canceled, and examinations at schools, colleges, and universities were even postponed. As a result, the lockdown caused disruptions to the schedule-planning of all of the students. In spite of the fact that this unprecedented circumstance has never before occurred in the annals of education, COVID-19 has opened up a plethora of doors that lead the classroom into the digital age. In this situation, such virus has presented a significant number of difficulties and opportunities to educational institutes as well as to students. These challenges and opportunities have also been inspired by the process of teachers and students adapting to this change in teaching style together as a whole.

In the framework of COVID-19, this work will evaluate the influence of online education on pupils. By examining the data collected by Indian students about online classes, it is acknowledged that the schedule of courses might affects students' course satisfaction and can also lead to problems with students' mental health. Due to the limitations of the students' classroom conditions and environment, the students' sense of course experience can greatly affect their mental state during lockdown, which raises a number of questions worth considering. Consequently, this work can assist individuals in the education business to better structure and design their online education programs so that students can derive greater advantage from them.

2 Main Problem

As a result of the lockdown, online training has replaced face-to-face instruction as the major means through which professors provide excellent instruction to students. Both students and instructors have had opportunity to learn new experiences as a result. The flipped classroom is probably the most well-known illustration of the use of online education [6]. In this style of instruction, students have access to readings, videos, and connections to relevant YouTube channels in advance of class. The remainder of the online session is then dedicated to boosting students' and the instructor's understanding via involvement [6].

However, the challenges caused by online infrastructure should not be overlooked. Firstly, educational institutions are the primary means by which students socialize on a regular basis, and online instruction severely restricts this method. Students who are absent from school because of a lockdown have moved heavily to social media and spend a considerable deal of time interacting on social media platforms. However, students' emotional well-being might be negatively impacted by the vast array of information

available on social media. According to a study of 1182 locked-down Indian students, nearly half reported that online education caused them to miss school and friends the most. This demonstrates that the shift in social model does not totally replace the school's role in the socialization of students. In addition, student responses to online instruction have been variable. According to the percentage of student satisfaction, just 30% of students believe that online education can match their learning demands, and the majority of them continue to believe that the funnel of online teaching has caused them learning inconvenience, resulting in a negative experience.

Consequently, this research aims to assess the difficulties associated with online education during the COVID-19 pandemic by focusing on two specific areas: the level of satisfaction that students have with their courses, and the impact that online education has on the mental health of students.

3 Literature Review

3.1 Online Education Impact on Students' Mental Health

Experiments with online instruction in higher education (e.g., undergraduate and graduate programs) over the past two decades have revealed that full-time students and students who are not adapted with online education have faced a number of obstacles that have had an impact on their mental health [7, 8]. The causes of this issue are diverse. In particular, young adults miss interaction with their peers [9]. This peer-to-peer contact is invaluable, especially for pupils who remain at home and only have access to their family, as they will have more in common with their peers and it will be beneficial to their mental health. Although, the Internet and social networks do assist young people connect, communicate, and learn throughout the pandemic, there may be unintended repercussions. According to studies, too much time spent on social media may be stressful, leading to emotional and mental breakdowns [10]. Due to social isolation, students engage in much less physical activity, which may be another factor affecting mental health. Also, lack of physical activities also leads to the mental issues. Researchers in Taiwan looked at the psychological and physiological well-being of students, finding that there is a favorable association between the frequency of students' daily physical exercise and their mood, confirming that physical health is advantageous to mental health [11]. Due to school closures, people may be more likely to be physically inactive during online study sessions, hence increasing their risk of developing mental illness. University students, for example, were predicted to be less physically active during their online learning periods, leading to higher levels of stress and psychological discomfort, in comparison to their in-class learning periods [12].

3.2 Online Education Impact on Students' Satisfaction

According to studies, students' ability to engage with each other in the virtual classroom is a major factor in predicting whether or not they will be satisfied with their online learning experience [13]. High levels of engagement with the instructor, other students, or course material result in high levels of student satisfaction. Similarly, a lack of contact between teachers and students often contributes to poor student engagement and dissatisfaction [14].

4 Research Methods

As a consequence of the preceding debate about the investigation of the process behind the relationship between online education and mental health, it has been determined that, as well as the relationship with studying experience, this study predicts:

H1: The students' daily lives impacted the satisfaction about e-learning during the COVID-19 pandemic.

H2: The students' daily lives impacted the family closeness during the COVID-19 pandemic.

H3: The students' e-learning satisfaction impacted the mental health condition during the COVID-19 pandemic.

H4: Rating of e-learning impacted the level of mental health.

4.1 Information of Research Variables

1) Study Design

In this study, a total of 1182 students from a wide range of schools in Delhi and the surrounding National Capital Region participated in a cross-sectional study. These students were of varying ages and belonged to a variety of age groups.

2) Demographic Information

The demographic information was about region (Delhi-NCR or Outside Delhi-NCR), age (7–52), and education predicted by age.

3) Operationalization of Study Variables

This research chose a total of 19 different variables to investigate students' everyday lives of online education (by hours), including levels of satisfaction with e-learning experience (participants replied on a five-point spectrum from 1—very poor to 5—Excellent), the existence of mental health issues (participants responded on 1—Yes, or 0—No), and other relevant variables.

4.2 Time Spent in Daily Life with Satisfaction of e-learning Experience

Time spent in such research could be divided into six parts: online class, self-study, social media, TV, fitness and sleeping. This study's primary purpose is to analyze the relationship between the length of time students spend in online courses and the evaluations they give for their overall experiences. The number of hours spent online will be divided according to a mean of three as a node, with the portion that is lower than three being counted as zero and the remainder being considered as one. The results of the crosstabs shown in Table 1 claimed that 55.1% of students study for fewer than three hours online each day, whereas 44.9% study for more than or equal to three hours online each day. Regarding their level of contentment with the class, 46.5% of students who studied for fewer than three hours reported that they had a negative impression of the learning experience. On the other hand, only 30.9% of students who studied for more than three hours had the same sentiment.

Table 1. Crosstabs of online class time and student experience ratings [Owner-draw].

			RatingofOnlineClassexperience					Total
			1	2	3	4	5	
Onlins_class	0	Count	280	23	190	112	46	651
		% within Onlins_class	43.0%	3.5%	29.2%	17.2%	7.1%	100.0%
		% within RatingofOnlineClassexperience	64.1%	76.7%	49.1%	48.7%	46.9%	55.1%
	1	Count	157	7	197	118	52	531
		% within Onlins_class	29.6%	1.3%	37.1%	22.2%	9.8%	100.0%
		% within RatingofOnlineClassexperience	35.9%	23.3%	50.9%	51.3%	53.1%	44.9%
Total	Count	437	30	387	230	98	1182	
	% within Onlins_class	37.0%	2.5%	32.7%	19.5%	8.3%	100.0%	
	% within RatingofOnlineClassexperience	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

In this investigation, the findings were put through a chi-square test, and it was previously established that a significance level of $p < 0.05$ was required for the Pearson chi-square test (See Table 2). This demonstrates that the duration of an online education has an effect on the level of pleasure experienced by students. The shorter the duration of their classes, the more likely it is that their students would have a sense of course experience that is less than acceptable.

According to the findings of earlier studies, the social behaviors of students when they are participating in online education may also have an impact on their assessment of the experience of attending an online class. This work will apply univariate analysis to determine the effect of students’ social media usage and platform choices on their course evaluations. As shown in Table 3, firstly the amount of time students spend on social media was divided by the mean of 2. Similarly, the six most popular social media platforms utilized by students were converted into category figures. The social media variable was strongly correlated with the dependent variable, hence the null hypothesis of no association may be rejected. In addition, the interaction impact of the length of social media use and social media choice was not significant by $p > 0.05$, hence the effect was not seen. Similarly, there was no correlation between the duration of social media use and the evaluation of experience perception.

Table 2. Chi-Square test of crosstabs above [Owner-draw].

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.951 ^a	4	.000
Likelihood Ratio	32.532	4	.000
N of Valid Cases	1182		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.48.

Table 3. Tests of between-subjects effects of social media time used and platforms [Owner-draw].

Tests of Between-Subjects Effects					
Dependent Variable: RatingofOnlineClassexperience					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	120.145 ^a	13	9.242	5.173	.000
Intercept	2051.401	1	2051.401	1148.323	.000
socialmedia	5.615	1	5.615	3.143	.077
Preferredsocialmediaplatform	54.402	6	9.067	5.075	.000
socialmedia * Preferredsocialmediaplatform	18.004	6	3.001	1.680	.122
Error	2086.552	1168	1.786		
Total	10170.000	1182			
Corrected Total	2206.697	1181			

a. R Squared = .054 (Adjusted R Squared = .044)

4.3 Time in Daily Life with Family Closeness

Due to the fact that students in the epidemic's at-home Internet classrooms spend the most of their time with their families, the students' performance in the online classes and their mental health may be correlated. On this basis, we conducted an ANOVA analysis of the link between student satisfaction with the course experience and the relationship with families (See Table 4). The ANOVA test revealed that $p < 0.05$, indicating a more significant connection. The post hoc test revealed that the significance was greater between students who expressed less happiness with their experience and those whose experiences were above AVERAGE (See Table 5). Thus, it is known that students' perceptions of their learning experiences impact their familial relationships.

4.4 Time Spent in Daily Life with Mental Health Condition

After analyzing the effect of students' time allocation on experience pleasure, this study will investigate the effect of students' schedules on their mental health. To compare the relationship between these two aspects in a more systematic manner, and based on the notion that exercise contributes to physical and mental health, as stated previously. By adding the time students did not spend on health and rest, we obtained a new variable: 'sitting condition'. This contained four time allocation variables. Based on its mean of 9 h, the variable sitting condition was similarly split into two sections. According to the cross-tabulation (See Table 6), 64% of students with mental health issues had a less fulfilling daily life compared to 36% of students with more than 9 h of daily activities. Moreover, the Pearson chi-square test shown in Table 7 indicates that their time has a substantial relationship with mental health.

Table 4. Tests of ANOVA of experience rating and family closeness [Owner-draw].

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Doyoufindyourselfmoreconnectedwithyourfamilyclosefrie	Based on Mean	41.725	4	1177	.000
	Based on Median	9.690	4	1177	.000
	Based on Median and with adjusted df	9.690	4	1143.753	.000
	Based on trimmed mean	41.725	4	1177	.000
ANOVA					
Doyoufindyourselfmoreconnectedwithyourfamilyclosefrie					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.868	4	1.967	9.690	.000
Within Groups	238.901	1177	.203		
Total	246.769	1181			

Having achieved this conclusion, this study will expand on the students’ daily time and seek to determine if the interaction impacts of online educational time, social time, and both have ripple effects on the students’ mental health. On this basis, we conducted a univariate analysis once more, which was shown in Table 8. According to the data, it is known that online education time has a major effect on students’ mental health, whereas social time does not. Therefore, by integrating the preceding data, we can conclude that the online education time not only influences student pleasure, but also their mental health.

4.5 Relationship Between Rating of Experience and Mental Health Condition

According to the preceding data, the online class experience is always a significant aspect in the study. The connection between this variable and the mental condition of students cannot be ignored. As shown in the ANOVA test (See Table 9), a considerable correlation exists between the mental states of students and their views of their online classroom experiences. And according to the post hoc test in Table 10, there is a bigger significance between students whose mental status is rated as “very poor” or “poor” and those whose mental condition is above average.

Table 5. Post Hoc Tests of experience rating [Owner-draw].

Multiple Comparisons							
Dependent Variable: Doyoufindyourselfmoreconnectedwithyourfamilyclosefrie							
LSD							
(I) RatingofOnlineClassexperience	(J) RatingofOnlineClassexperience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
1	2	-.056	.085	.513	-.22	.11	
	3	-.105*	.031	.001	-.17	-.04	
	4	-.198*	.037	.000	-.27	-.13	
	5	-.216*	.050	.000	-.31	-.12	
2	1	.056	.085	.513	-.11	.22	
	3	-.049	.085	.565	-.22	.12	
	4	-.142	.087	.105	-.31	.03	
	5	-.160	.094	.089	-.34	.02	
3	1	.105*	.031	.001	.04	.17	
	2	.049	.085	.565	-.12	.22	
	4	-.093*	.038	.013	-.17	-.02	
	5	-.111*	.051	.030	-.21	-.01	
4	1	.198*	.037	.000	.13	.27	
	2	.142	.087	.105	-.03	.31	
	3	.093*	.038	.013	.02	.17	
	5	-.018	.054	.743	-.12	.09	
5	1	.216*	.050	.000	.12	.31	
	2	.160	.094	.089	-.02	.34	
	3	.111*	.051	.030	.01	.21	
	4	.018	.054	.743	-.09	.12	

*. The mean difference is significant at the 0.05 level.

4.6 Predictions of Mental Health Condition

Since this work has already investigated the elements that impact the mental condition of students during online classes, decision trees may be utilized to predict the mental status of students during online classes. Seven factors were chosen for categorization, including students' daily schedules during online classes and overall reviews of students' course experiences. In this study, a total of 80% of the raw information was used for training, while the remaining 20% was used for making predictions. And based on the decision tree, we know that the risk of the decision tree is 0.121, and the test set's prediction accuracy corresponds to this risk at 87.9%. By interpreting the tree model, mental health condition was firstly split by time spent on Online Class. When time spent ≤ 1.5 , the tree would be split by online rating experience, while in the range of 1.5–3.5, tree was split by time spent on TV (See Fig. 1).

Table 6. Crosstabulation of sitting condition and mental health issues [Owner-draw].

sittingcondition * Healthissueduringlockdown Crosstabulation					
			Healthissueduringlockdown		Total
			0	1	
sittingcondition	1	Count	512	103	615
		% within sittingcondition	83.3%	16.7%	100.0%
		% within Healthissueduringlockdown	50.1%	64.0%	52.0%
	2	Count	509	58	567
		% within sittingcondition	89.8%	10.2%	100.0%
		% within Healthissueduringlockdown	49.9%	36.0%	48.0%
Total	Count	1021	161	1182	
	% within sittingcondition	86.4%	13.6%	100.0%	
	% within Healthissueduringlockdown	100.0%	100.0%	100.0%	

Table 7. Chi-Square Tests of sitting condition and mental health issues [Owner-draw].

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.655 ^a	1	.001		
Continuity Correction ^b	10.108	1	.001		
Likelihood Ratio	10.806	1	.001		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	10.646	1	.001		
N of Valid Cases	1182				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 77.23.

b. Computed only for a 2 × 2 table

Table 8. Tests of between-subjects effects of social media time used and e-learning time [Owner-draw].

Tests of Between-Subjects Effects					
Dependent Variable: Healthissueduringlockdown					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.943 ^a	3	.648	5.563	.001
Intercept	17.801	1	17.801	152.924	.000
Online_class	1.199	1	1.199	10.302	.001
socialmedia	.023	1	.023	.196	.658
Online_class * socialmedia	.184	1	.184	1.581	.209
Error	137.127	1178	.116		
Total	161.000	1182			
Corrected Total	139.070	1181			

a. R Squared = .014 (Adjusted R Squared = .011)

Table 9. ANOVA tests of mental health condition [Owner-draw].

ANOVA					
Healthissueduringlockdown					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.303	4	.826	7.159	.000
Within Groups	135.767	1177	.115		
Total	139.070	1181			

5 Discussion and Recommendations

Based on the above data analysis, it is evident that the quality of students' online class life influences their experience of online learning, and that their experience of online class life is directly tied to their family relationships. This aspect, in turn, impacts the psychological state of the students. Compared to student life at school, online programs restrict students' ability to make efficient living arrangements and disturb the routines of traditional study. In addition, the impacts of COVID-19 on pupils, such as anxiousness and anxiety, may have an impact on the kids' willingness to learn as well as the quality of their education, which may require schools to modify their instructional strategies. Therefore, schools should modify their course schedules to accommodate the migration of students from traditional to online learning. Online learning is effective only if students are actively involved in the process, and several types of engagement are essential to

Table 10. Post Hoc tests of mental health condition [Owner-draw].

Multiple Comparisons						
Dependent Variable: Healthissueduringlockdown						
LSD						
(I) RatingofOnlineClassexperience	(J) RatingofOnlineClassexperience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-.072	.064	.261	-.20	.05
	3	.089*	.024	.000	.04	.14
	4	.112*	.028	.000	.06	.17
	5	.113*	.038	.003	.04	.19
2	1	.072	.064	.261	-.05	.20
	3	.161*	.064	.013	.03	.29
	4	.184*	.066	.005	.05	.31
	5	.185*	.071	.009	.05	.32
3	1	-.089*	.024	.000	-.14	-.04
	2	-.161*	.064	.013	-.29	-.03
	4	.023	.028	.409	-.03	.08
	5	.024	.038	.527	-.05	.10
4	1	-.112*	.028	.000	-.17	-.06
	2	-.184*	.066	.005	-.31	-.05
	3	-.023	.028	.409	-.08	.03
	5	.001	.041	.981	-.08	.08
5	1	-.113*	.038	.003	-.19	-.04
	2	-.185*	.071	.009	-.32	-.05
	3	-.024	.038	.527	-.10	.05
	4	-.001	.041	.981	-.08	.08

*. The mean difference is significant at the 0.05 level.

achieve this goal [15]. Educational institutions like schools and colleges also might probably offer more various instructional approaches so as to inspire students to produce more fruitful academic outcomes.

Students’ mental health has been influenced, in addition to their perceptions of the quality of the overall course experience they have received from online instruction. In addition, a student’s feeling of experience can have an influence on their mental health. According to prior research, time spent in online courses has a substantial impact on the mental health of students. This is because online education does not help to trace students’ progress in a timely way as well does not offer students with enough academic and spiritual care, which leads to the gradual development of psychological issues. Schools should pay attention to the mental health of students who are teaching online courses because of the potential for this change to make students feel disengaged from their education, for it removes them from the social milieu of traditional face-to-face

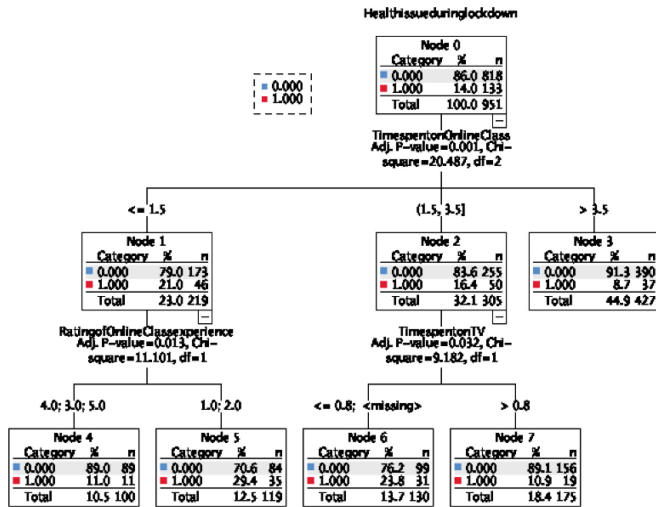


Fig. 1. Decision Tree models of mental health condition [Owner-draw].

classroom instruction. Social support has a favorable impact on mental health, thus a caring school environment is important. Online education should be seen as a welcoming community that provides a safe setting for interactions among students [16]. In this situation, mental health care-related campus activities might be arranged. And practically execute the activities' effects on the pupils. During the semester, for instance, the school can host a variety of events aimed at relieving academic and personal pressures. Or an interactive method of monitoring pupils' mental health and providing timely counseling and prevention of mental issues. Nonetheless, there are still a few limitations with this study. Regarding data collection, information on student learning outcomes was lacking, including classroom performance and final grades, etc.

6 Conclusions

Beginning with COVID-19 for online education, this literature addresses the available data by examining two components of online instruction related to student satisfaction and mental health, demonstrating that online course arrangement during lockdown time will impact both students' class experience and further affect their mental health. On this basis, the curriculum may be modified to accommodate various forms of education. Courses should be designed to be more interactive and engaging for students, hence increasing their course satisfaction and improving their mental health.

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