Students' Perception of Online Class During Covid-19 Pandemic: An Ordered PROBIT Model Estimation

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Abstract
In this study we have examined the students' perception of online class during COVID-19 pandemic based on a telephone survey among 200 public university students in Bangladesh. Our ordered probit model estimation shows that gender, living area, money spending for online classes, academic grade, internet problem, consideration of online class as a good alternative, considering whether teachers are skilled or not significantly affect the students' perception of online class. Students having lower facilities, for example internet problems, living in rural areas, unskilled teachers, lower spending (because of poor economic status) tend to choose a very bad perception of online class. Besides students with lower grades, students who don't consider online classes as a good alternative and female students tend to choose very bad perceptions of online class.
Keywords: COVID-19, Perception, Ordered Probit Model.

Introduction

The first case of COVID-19 appeared in Wuhan city, China in December, 2019 (Azlan *et al.,* 2020; Xiao *et al.,* 2020; Guan *et al.,* 2020; Mizumoto *et al.,* 2020), and rapidly spread not only throughout China but also across the world (Yashavantha and Jayabaskaran, 2020). However, the spreading dynamics of COVID-19 was unexpectedly very high (Huang *et al.,* 2020; Zeng *et al.,* 2020), and the number of cases increased in a very short time. Consequently, the World Health Organization (WHO) announced the COVID-19 as a pandemic on March 11, 2020 (Eroğlu, 2020).

The first case of COVID-19 in Bangladesh was confirmed on March 8, 2020 (Shammi et al., 2020; Anwar *et al.,* 2020). The government declared a lockdown on March 26, 2020 throughout the country since the number of cases increased drastically (Shammi *et al.,* 2020). Due to the

COVID-19 pandemic and lockdown Bangladesh has experienced a significant effect on health, economy, education, tension, depression, loneliness and so on (Sherman *et al.,* 2020; Narayanan *et al.,* 2020; Singh and Singh, 2020). Besides due to closure of all the educational institutions, millions of students found themselves in an inimical position regarding the learning process. To tackle this situation, some of the educational institutes have introduced online learning platforms to keep the academic activities going on (Muthuprasad *et al.,* 2021). Educational institutions and students across the world have preferred and appreciated online learning due to ease of use, learning flexibility, controllable environment and no better alternative (Khan *et al.,* 2021). However, despite its advantages, the concern about the class preparation, designing and effectiveness of e-learning is still not apparently conducive, particularly for a developing country like Bangladesh (Alam, 2020).

The technical constraints like unavailability of smart devices or laptop and undisturbed internet pose a thoughtful challenge for many students in Bangladesh. Many students don't have the ability to sustainably access to the classes (because they reside in rural areas where internet and uninterrupted supply of electricity is still out of service). However, a little portion of students who live in modern towns can benefit from online classes because of steady bandwidth connection. On the other hand, teachers in Bangladesh are not well capable and skilled to conduct class through online, also they may not run the online class according to the specific plan. As a result, this may create a considerable challenge for online education in Bangladesh and hinder the learning process.

Some studies try to assess the online class perception of students during Covid-19 in different developed and emerging countries (Agarwal and Kaushik, 2020; Khan *et al.,* 2020; Nambiar, 2020; Surani and Hamidah, 2020; Agung *et al.,* 2020; Baber, 2020; Chick *et al.,* 2020; Ferrel and Ryan, 2020; Torda *et al.,* 2020; Rajab et al., 2020; Abbasi et al., 2020). However, most of the studies consider the COVID-19 impact on medical education apart from other curricula. Regarding the results, a kind of dissimilar perception has been found for developing and developed countries. Against such a backdrop, this study aims to examine the following research questions-

- What is the students' perception of online class during COVID-19 pandemic in Bangladesh?
- What factors are affecting this perception of online class during COVID-19 pandemic in Bangladesh?

The remaining parts of this paper focus on methodological approach (section 2), explaining data and variables (section 3), discussion about descriptive statistics as well as ordered probit model estimation (section 4) and finally summary and conclusion (section 5).

Methodological Approach

In this study our dependent variable follows the ordered nature. That's why we have selected ordered probit model for our analysis. The ordered probit model was developed by McKlvey and Zavoina (1975). It assumes the error terms ε_i are standard normally distributed (in case of ordered logit model ε_i is logistic distributed). In ordered probit model the latent continuous variable (y_i *) follows the following formula-

y_i * = $x_i b + \varepsilon_i$, $\varepsilon_i \sim N(0, 1)$ (Jackman, 2000)   ----(i)

here, x_i indicates vector of independent explanatory variables, and ε_i is the standard normally distributed error term. In equation (i), it is not possible to observe the continuous latent variable (y_i^*). But it is possible to observe y_i (with k = 1, . . . , K categories and individual-specific thresholds λ_k^i, where $\lambda_k^i < \lambda_{k+1}^i$). So,

$y_i = k \Leftrightarrow \lambda_k^i \leq y_i^* < \lambda_{k+1}^i$ (Geishecker & Riedl, 2010) ----(ii)

Using the threshold parameters λ_0, λ_1,..., λ_k with $\lambda_0 < \lambda_1 < \cdots < \lambda_k$ the latent variable (y_i^*) can be divided in k intervals where the higher values of the latent variable (y_i^*) lead to higher values of y_i.

The marginal effect of the probabilities follows the following formula-

$\frac{\partial Pr[y_i = k]}{\partial x_i} = \{F'(\alpha_{j-1} - x'_k\beta) - F'(\alpha_j - x'_k\beta)\}\beta$ (Cameron & Trivedi, 2005, p. 520)

Data and Variables

The data has been collected by a telephone survey among 200 public university students in Bangladesh. Because of COVID-19 restrictions in Bangladesh all the educational institutions (except the religious education centres) were closed. So, a telephone survey was the easiest way to reach the students than direct survey. We have taken the list of students from different social media groups (where most of the students are involved) and with the cooperation of class representatives of different universities. Then we have randomly selected 200 students for our study.

Dependent Variables

The dependent variable "evaluation of online class" is a categorical variable consisting of 5 categories. The respondents were asked about how they will evaluate online class comparing present class. The respondents answered this question under five categories: "Very bad", "Bad", "Satisfactory", "Good" and "Very good", where this study considers 1 for "Very bad" and similarly "Bad", "Satisfactory", "Good" , "Very good" take respectively 2, 3, 4 and 5.

Explanatory Variables

Variable	Description
Gender	It is a dummy variable taking value 1 if the respondent is male and 0 if respondent is female.
Living	It is a dummy variable taking value 1 if the respondent lives in an urban area and 0 if respondent lives in a rural area.
Spend	It is a continuous variable. It indicates the amount of spending per month to participate in the online classes (this spending basically includes buying internet packages or amount of monthly private WiFi charge.)
Alternative	It is a dummy variable taking value 1 if the respondent thinks that online class is a good alternative in this COVID-19 pandemic and 0 otherwise.
Teachers	It is a dummy variable taking value 1 if the respondent thinks that most of their teachers are well skilled for online class and 0 otherwise.
Int. problem	It is a dummy variable taking value 1 if the respondent faces internet problems during the class and 0 otherwise.
Grade	It is a continuous variable. It indicates the average grade of the respondent until the date when they were surveyed.

Results

The descriptive statistics of all explanatory variables has been represented in Table 1 where we can see the frequencies of the dummy variables as well as the mean and standard deviation of the continuous variables. Table 2 represents the frequencies of dependent variables. It indicates that about 12.50 percent out of the 200 respondents state their perception of online class as "Very bad". "Bad", "Good" and "Very good" perceptions of online class are reported by respectively 20, 23 and 8.50 percent respondents. At the same time, most of our respondents (36 percent) report "Satisfactory" perception of online class.

Table 3 reports the results of ordered probit model for 200 respondents. According to the coefficient of "Gender" (the effect is statistically significant at 1% level of significance), male students have a strong significant positive effect on the choice of "Very good" and a strong significant negative effect on the choice of "Very bad". On the other hand, female students have a strong significantly negative effect on the choice of "Very good" and a strong significantly positive effect on the choice of "Very bad". Similarly, "Living", "Spend", "Alternative", "Grade" have a strong significant positive effect on the choice of "Very good" and a strong significant negative effect on the choice of "Very bad". Besides, "Teachers" has a strong significant positive effect and "Int. problem" has a strong significant negative effect on the choice of "Very good" at 5% level of significance.

Table 4 reports the marginal effect. It provides the direction of the probabilities. For example, if "Spend" increases by 1 unit, the estimated average probability (across all respondents) of considering "Very bad" will be decreased by approximately 0.02 percentage point and the estimated average probability (across all respondents) of considering "Very Good" will be increased by approximately 0.01 percentage point. In case of "Teachers" (taking as an example of dummy variable), the estimated average probability (across all respondents) of considering "Very good" for the students who think most of the teachers are skilled for online class is 4.14 percentage point higher than the students who don't think that most of the teachers are skilled for online class. The marginal effect of the remaining variables can be interpreted in the same manner.

Summary & Conclusion

In this paper we have empirically analysed the evaluation of online class during COVID-19 pandemic. Based on a telephone survey among 200 public university students in Bangladesh we find that although a large share of the students are considering online class as "Satisfactory", but regarding different factors the perception is varying. Students who report lower spending for online classes (for poor economic status), have lower academic grade, live in rural area, are not satisfied with teacher's skill of online class, face internet problem, don't consider online class as a good alternative and also female students have a negative view toward online class (compared to the opposite factors, for example higher spending for online class, high academic grade and so on). The findings satisfy our research question. The findings also suggest that to make online classes more efficient we should take care of these perceptions of students. Taking this result into account we can provide scholarships or any other financial support for the students to make sure that they have sufficient internet packages. As around half of the respondents live in rural areas and 67% students face internet problems and both factors negatively affect their perception, the internet facilities as well as the disadvantages of rural students should be taken under consideration. Besides, teachers should be given proper training to make the online class enjoyable as well as special care should be given to the students having low academic grades. It is also clear that female students have a negative perception compared to male students. We can recommend further study to understand this effect.

Tables

Table 1: Descriptive statistics of explanatory variables:
For dummy variables:

Variables	Frequency	Percentage
Gender: Male	100	50%
Female	100	50%
Living: Rural	114	57%
Urban	86	43%
Alternative: Good alternative	91	45.5%
Not good alternative	109	54.5%
Teachers Teachers are skilled:	103	51.5%
Teacher are not skilled:	97	48.5%
Int. problem Have internet problem:	134	67%
Don't have internet problem:	66	33%

For continuous variables:

Variables	Mean	Standard deviation
Spend	662.935	341.64
Grade	3.3237	0.3123

Table 2: Frequency table of the dependent variable

Evaluation of online class	Frequency	Percentage	Cumulative
Very bad	25	12.50	12.50
Bad	40	20.00	32.50
Satisfactory	72	36.00	68.50
Good	46	23.00	91.50
Very good	17	8.50	100.00

Table 3: Ordered probit model estimation results:

	Coefficients	z	P>|z|
Gender	0.7876	4.51	0.000
Living	0.5657	2.94	0.003
Spend	0.0010	3.55	0.000
Alternative	0.4820	2.57	0.010
Teachers	0.3843	2.17	0.030
Int. problem	-0.4780	-2.55	0.011
Grade	0.8245	2.57	0.010
Log likelihood	-235.98303		
Number of observations	200		
Degrees of freedom	7		
Prob > chi2	0.0000		
Pseudo R2	0.2119		

Table 4: Marginal effects

	Very bad	Bad	Satisfactory	Good	Very good
Gender	-0.1200***	-0.0811***	0.0080	0.1083***	0.0847***
Living	-0.0862***	-0.0582***	0.0057	0.0778***	0.0609***
Spend	-0.0002***	-0.0001***	0.0000	0.0001***	0.0001***
Alternative	-0.0734**	-0.0496**	0.0049	0.0662***	0.0519**
Teachers	-0.0585**	-0.0396**	0.0039	0.0528**	0.0414**
Int. problem	0.0728**	0.0492**	-0.0049	-0.0657**	-0.0514**
Grade	-0.1256***	-0.0849**	0.0084	0.1133**	0.0887**

In the figure above ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

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