

Acceptance of E-Learning Among University Students During Covid-19 Crisis: Bangladesh Perspective

<https://doi.org/10.3991/ijet.v17i06.28033>

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Abstract—COVID-19 pandemic has dramatically transformed the global education system to a great extent. In a short period, e-learning has been adopted globally as an alternative teaching-learning medium. However, this sudden transition raises many concerns about e-learning acceptability. To make a clear inference, this study investigated the acceptance of e-learning (perceived usefulness, and perceived ease of use) among university-level students using the Technology Acceptance Model (TAM). The empirical analysis was performed on a sample of 694 university students in Bangladesh during the COVID-19 crisis. Findings revealed that students' overall e-learning acceptability was not adequate (32.8%), a significant number of students (46.8%) were not satisfied with e-learning experience and that majority (70.2%) of students preferred face-to-face education systems for their future study. The study also highlighted the underlying factors that negatively affect students' e-learning acceptance such as lack of technological skills, less familiarity with e-learning, lack of simplicity, low productivity, inefficiency, and so on. The overall findings of this study are intended to assist stakeholders to understand the gaps that need to be addressed immediately to increase students' e-learning acceptability in the future.

Keywords—e-learning, acceptance, satisfaction, COVID-19, Technology Acceptance Model (TAM), developing country

1 Introduction

On December 31, 2019, the World Health Organization (WHO) was informed about a few cases of pneumonia in Wuhan City, Hubei Province, China [1]. Later, a novel coronavirus (SARS-CoV-2) was identified as the cause of those cases of pneumonia. Due to the rapid transmission of this virus in more than 114 countries, WHO declared the outbreak as a pandemic on 11 March 2020 [2]. Consequently, governments around the world have started to follow strict public health measures (e.g., travel restrictions, quarantine, nationwide lockdown, restrictions of mass gathering, social distancing, remote office, etc.) to curb the spread of the virus [3-5]. As part of this, e-learning has been adopted as an alternative teaching-learning strategy in almost every country [6]. Although e-learning is not new and is commonly accepted as an effective means of

delivering high-quality education, developing countries are still at an incipient stage of adopting such technologies [7]. This is because, in pre-pandemic times, most of those countries relied on conventional face-to-face education systems [8]. However, this abrupt adoption of e-learning has placed all stakeholders such as students, teachers, management, and policymakers in an uncomfortable situation, particularly those living in developing countries. Bangladesh is such a developing country where all levels of educational institutions (primary, secondary, and university) are traditionally accustomed to face-to-face schooling. Most of the universities in Bangladesh did not have the technical infrastructure to transition to an online mode. So, shifting educational practices to a new environment supported by communication technologies remained a key challenge due to adopting appropriate technologies, lack of familiarity with learning management systems (LMS), design and delivery of content, and engagement of the students in an e-learning platform [9], [10].

Moreover, all those challenges have raised concerns about the consequences for e-learning acceptability among university students in Bangladesh. Considering this deliberation, this study will apply Technology Acceptance Model (TAM) to discern the acceptance level among the university students.

2 Literature review

In Bangladesh, a country-wide lockdown was imposed on 26 March 2020 [11]. At the same time, all educational institutions stopped their face-to-face activities and moved to online platforms overnight. Resulting, nearly 36 million students from pre-primary to tertiary levels were affected by this unexpected transmission [12]. To deal with such unwanted situations, Bangladesh Television (BTV), started broadcasting an educational program, called "My School at My Home" for students of grades six to ten [13]. However, this sudden transition poses many challenges, especially for university students in Bangladesh. The newly introduced remote instructions were found unfavorable to most of the students in Bangladesh due to technical problems, understanding resources, absence of proper motivation, and so on [14]. Moreover, lack of concentration, apathy, and dissatisfaction towards e-learning played an important role in the psychological sufferings (depression and anxiety) [14]. The studies [15], [16] also found that students perceived serious psychological distress and dissatisfaction with online learning during this COVID-19 pandemic. Moreover, a substantial negative association between psychological distress and e-learning satisfaction were also revealed. Another study [17] pointed out that e-learning helped students to enhance their overall academic performance. However, students faced difficulties with the LMS and poor internet connectivity. Nevertheless, the students perceived substantial mental pressure than the course instructors. Several studies revealed that [18-21] disruption of internet and electricity, lack of attentiveness of students, problems of understanding of the online lectures were the main barriers to online learning.

Due to those above issues, e-learning adaptability of students assumed to be low [22] as well as the majority of university students of Bangladesh are uncomfortable with

distance learning and prefer traditional face-to-face learning [23]. However, the studies did not present any quantitative data to support their claim.

The previous studies have mainly documented the advantages, challenges, and technical barriers to e-learning implementation, there is a lack of investigation on e-learning acceptance and satisfaction among university students in Bangladesh. This study is aimed at addressing the above-mentioned gaps by considering the following specific research objectives:

1. Measuring the satisfaction level of university students in e-learning during the COVID-19 crisis.
2. Exploring e-learning acceptance using the Technology Acceptance Model (TAM).

3 Research methodology

3.1 Study design and settings

A quantitative cross-sectional study was conducted between the 3rd August and 11th September, 2021 at Daffodil International University, Dhaka, Bangladesh.

3.2 Study participants and sample size

The key participants of this study were university students who were actively involved in distance learning supported by a LMS during the study period. To determine the required sample size, we used Cochran's sample size formula (see formula 1) [24]. The sample size was calculated to be 385 students assuming a precision of 5%, a confidence level of 95%, Z value 1.96, and an estimated proportion of the population of 50%. However, for better inferences about the target population, we tried to gather as many responses as possible. Initially, 718 responses were gathered, where 56% were male and 44% were female. After removing the incomplete and inconsistent responses, the final sample size of this study was 694 (male=55.9%, female=44.1%).

$$N = \frac{Z^2 * p * q}{e^2} \quad (1)$$

Here, Z (at 95% confidence level) = 1.96, p (estimated proportion of the population) = 0.5, q = 1 – p = 0.5 & e (desired level of precision) = .05.

3.3 Data collection instrument

Participants were contacted via university email containing the link of an electronic questionnaire. The questionnaire consisted of 20 closed-ended questions which were mainly divided into the following two parts:

Part 1: Demographic information. In this part, participants were asked about 8 closed-ended questions related to their demographic information such as gender, age, level of education, area of living, spending hours in e-learning activities, pre-pandemic

familiarity with e-learning, satisfaction, and their preference of future educational practice (face-to-face/ e-learning/blended).

Part 2: Technology Acceptance Model (TAM). In this part, participants were asked about 12 closed-ended questions based on the Technology Acceptance Model (TAM) [25]. The participants responded to each question using a 5-points Likert scale ranging from strongly agree to strongly disagree. TAM is considered as one of the most tested, prominent, and influential models of technology adoption, with two key influencing factors that trigger individuals' intention to use new technology: (i) perceived usefulness and (ii) perceived ease of use [26], [27]. The objective of using the TAM model was to measure the acceptance and use of e-learning as a learning tool based in university-level students.

3.4 Pilot study

Before mass distribution, the questionnaire was tested on 25 students. Based on their feedback, the necessary modifications were made to ensure the clarity and understanding of all questions. At the same time, the items' internal consistency of the TAM model was estimated by Cronbach's alpha (α) (see formula 2) [28].

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N-1)\bar{c}} \quad (2)$$

Here, α = Cronbach's alpha, N = number of items, \bar{c} = average inter-item covariance, \bar{v} = average variance.

Findings showed that the Cronbach's alpha of the TAM model was =.93, indicating those 12-items of the model had a good internal consistency.

3.5 Data collection procedure

An electronic questionnaire having 20 closed-ended questions was designed on Google forms and distributed among tertiary level students of Daffodil International University, Dhaka, Bangladesh in between 3rd August 2021 and 11th September 2021. To increase the response rate, two reminders were sent to the participant's email address via the research coordinators of the corresponding departments.

3.6 Data analysis

Data were analyzed using Python 3.9 and IBM SPSS Statistics 26. Several python libraries (e.g., Pandas, NumPy, etc.) were used to preprocess (e.g., removing null value & inconsistent record) the raw data. For data visualization, Microsoft Excel was mainly used. Descriptive analysis (e.g., mean, standard deviation) was carried out for quantitative data exploration. At the same time, frequencies, percentages, and other statistical measures were used to analyze the categorical data. To ensure the reliability of the TAM model, Cronbach's alpha was used.

3.7 Ethical considerations

Necessary permission was obtained from Daffodil International University Review Board (Ref: Ethics/fouad (3)/2021). To avoid confidentiality issues, the participants' privacy, ethical factors, and confidentiality were adequately addressed. For example, any kind of personal information was not collected and participants were fully informed of the study objectives prior to data collection. Moreover, the electronic questionnaire was fully anonymous.

4 Results & discussion

The sample of this study comprised 694 university-level students in Bangladesh. Table 1 displays the detailed demographic background of the participants. About 55.9% of the students were male while 44.1% were female. Most of the participants were aged between 21 and 25. The majority (91.1%) of the students were at the undergraduate level while 8.5% were at the graduate and only 0.4% were at the doctoral level. Almost half (49.3%) of the students participated from the urban areas while 25.5% participated from sub-urban and the rest (25.2%) from the rural area. The findings of the study also revealed that students are spending a significant amount of time with e-learning during the ongoing COVID-19 crisis (see Table 1). The study also found that the majority of the students (68.2%) had no pre-pandemic familiarity with online teaching-learning activities, followed by 31.8% of students who agreed about their insolvency with e-learning prior to the COVID-19 pandemic. Participants were also questioned on their preferred learning platforms in the future, the majority (70.2%) of students voted for face-to-face education systems while 16.4% preferred blended and only 13.4% of students preferred online education systems.

Table 1. Demographic details of the respondents

Profile	Frequency (N=694)	Percentage (%)
Gender		
Male	388	55.9%
Female	306	44.1%
Age		
20 <=	97	14%
21-25	549	79.1%
26-30	31	4.5%
31-35	8	1.2%
>=36	9	1.3%
Level of Education		
Bachelor's Degree	632	91.1%
Master's Degree	59	8.5%
Doctoral Degree	3	0.4%
Area of Living		
Rural	175	25.2%

Sub-urban	177	25.5%
Urban	342	49.3%
Spending Time on E-learning (Hour)		
2<=	38	5.5%
2-5	305	43.9%
6-9	237	34.1%
13>=	27	3.9%
Pre-pandemic Familiarity of E-learning		
Yes	221	31.8%
No	473	68.2%
Preferred educational system		
Online	93	13.4%
Face-to-face	487	70.2%
Blended	114	16.4%

Descriptive analysis was carried out to evaluate the students' satisfaction with e-learning compared to traditional face-to-face learning. Findings showed that almost half of the students (46.8%) were not satisfied while 29.2% of students were satisfied and 24.1% of students were neutral.

I am satisfied with e-learning experience during COVID-19 Crisis

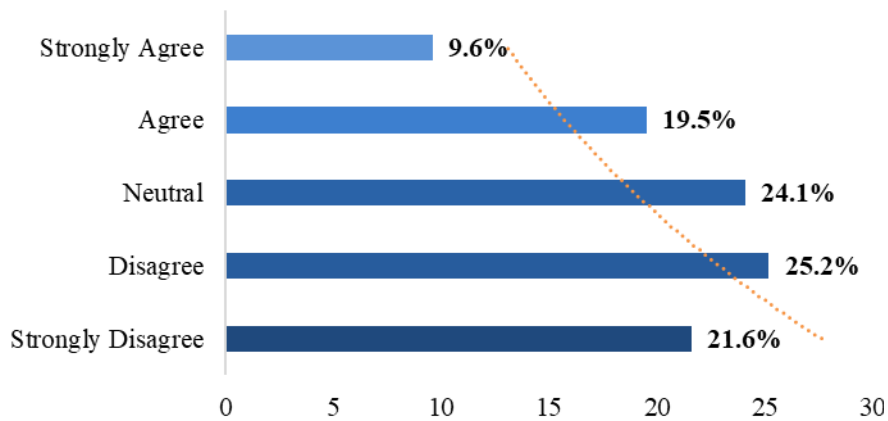


Fig. 1. Students' satisfaction with e-learning

In this study, students' acceptability of e-learning activities during COVID-19 was measured by Technology Acceptance Model (TAM). Findings revealed that the percentage of respondents' feedback on e-learning acceptance was only 32.8%, while a significant number of students (40.05%) disagreed on e-learning acceptance and the rest (25.2%) were neutral. This means that most university-level students find e-learning not conducive to the improvement and progress of the educational process. The

percentage of respondents' answers on perceived usefulness was 30.1% (strongly agree = 11.5% & agree = 26.8%), while 46.8% respondents disagreed (strongly disagree = 20.4% & disagree = 26.4%) about the usefulness of e-learning. This means that the majority of university-level students find e-learning not useful compared to the face-to-face education system. On the other hand, the percentage of respondents to the perceived ease of use was 35.5% (strongly agree = 12.4% & agree = 23.1%) while 41.3% find e-learning difficult to operate and the rest (23.2%) were neutral.

Table 2. Results of the Technology Acceptance Model (TAM)

Items	Questions	Percentage of responses				
		<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Perceived usefulness	Accelerate work	14.6	18.5	26.5	24.1	16.3
	Improve performance	9.7	18.2	21.6	30	20.5
	Increase productivity	10.7	21.0	22.6	25.4	20.3
	Effective	9.9	14.3	23.3	28.7	23.8
	Simplify work	12.5	23.9	22.5	23.5	17.6
	Helpful	11.8	15.7	22	26.6	23.9
	Average	11.5	18.6	23.1	26.4	20.4
Perceived Ease of Use	Easy to learn	12.7	26.8	18.6	23.6	18.3
	Can be Controlled easily	14.7	28.7	21	21.8	13.8
	Clear and understandable	9.8	15.7	24.8	27.7	22.0
	Flexible	12.7	23.3	23.2	24.9	15.9
	Easy to use	12.8	23.8	24.4	21.6	17.4
	Easy to be skilled	11.4	20.5	27.5	22.3	18.3
	Average	12.4	23.1	23.3	23.7	17.6
Acceptance of E-learning		11.95	20.85	23.2	25.05	19.00

In terms of gender differences, t-test revealed that there was a significant Mean Difference (MD =2.274) between men's and women's acceptability of e-learning. Study findings also showed that e-learning acceptance is slightly higher in men than women (see Table 3).

Table 3. Acceptance of e-learning based on gender

Gender	N	Mean	St. Dev.	t	df	MD	Sig.(2-tailed)
Male	388	34.81	±12.98	2.24	692	2.274	0.023
Female	306	32.53	±13.1	-			

E-learning is still in its infancy in developing countries like Bangladesh [29]. Previous studies [9], [14-15], [17-18], [30-33] have documented the advantages, challenges, and technical barriers to the implementation of e-learning, but the acceptance and satisfaction of e-learning among university students in Bangladesh were not clear. In the face of these existing gaps, this study draws the contemplative conclusions that lack of

acquaintance with online instruction, insufficient technological skills, lack of simplicity, low productivity, inefficiency, and insufficient flexibility are revealed as the primary reasons that negatively impact university students' acceptance of e-learning. As a consequence, overall learners' acceptability was low and a significant number of students were not satisfied with e-learning experiences during the COVID-19 crisis.

5 Conclusion

Due to the rapid spread of the deadly COVID-19, almost all countries were compelled to discontinue face-to-face teaching-learning strategies and adopt e-learning to continue educational activities. Although e-learning is not a new phenomenon, it was underutilized in developing countries due to various technological, infrastructural, and pedagogical constraints. Like other developing countries, Bangladesh is also going through various challenges and uncertainties. Under these circumstances, this study explores e-learning acceptance (perceived usefulness, perceived ease of use) among university-level students using the Technology Acceptance Model (TAM). In addition, the current study reveals the factors that harm university students' acceptance and e-learning satisfaction during the Covid-19 crisis. The overall results of this study are expected to help stakeholders understand the gaps that need to be addressed immediately to increase students' e-learning acceptability in the future.

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Article submitted 2021-11-03. Resubmitted 2021-12-23. Final acceptance 2021-12-26. Final version published as submitted by the authors.