



Research Paper

Public and Private University Students' Perceptions towards Online Learning during COVID-19 Pandemic in Rajshahi, Bangladesh

Islam, M S¹, Mahmud, A K M F²

Genetics & Molecular Biology Laboratory, Department of Zoology,
University of Rajshahi, Rajshahi 6205, Bangladesh

¹Corresponding author: saifulzoo.ru@gmail.com; ²MS student

Abstract

This study was conducted from May 11 to September 17, 2021 on 329 male and 161 female students from Rajshahi University (RU), a public university (n=490 from 10 departments) and 130 males and 72 females (n=202 from 4 departments) from three private universities viz., Varendra University (VU), North-South University (NSU) and Asian International University of Bangladesh (AIUB). Each respondent was interviewed personally to collect desired information for the present study. A total of 1164 lectures from 82 courses and 286 lectures from 26 courses were delivered by the public and private universities, respectively. Attendance for the male and female students from RU was found to be 88.31% and 85.39% in comparison with 83.91% and 85.31% from the private universities. Irrespective of the gender, 48.77% RU students liked (L) the online method of teaching, 34.08% disliked (DL), 12.44% undecided (UD), 2.65% strongly disliked (SDL) and 2.44% strongly liked (SL) the online courses during the pandemic. In contrast, 50.00% students of the private universities liked (L), 35.64% disliked (DL), 6.44% each undecided (UD) strongly disliked (SDL) and 1.48% strongly liked (SL) the virtual courses. In RU, 60.62% males and 32.40% females used mobile phones (MP) for learning, while only 0.2% males each used laptop (LT) and desktop (DT) computers, but 6.13% male and 2.45% female respondents used both mobile phones and laptop computers (MP+LT) for their online learning. This scenario is different for the learners of the public universities, where 30.69% males and 31.18% females used their MPs and 22.27% males and 6.53% females used MP+LT devices for attending the online deliveries. Findings of this cross-sectional study revealed the public and private university students' perceptions towards online teaching and learning during COVID-19 pandemic in Rajshahi Metropolis, Bangladesh, which might provide an essential guideline for the government policymakers, technology developers and university authorities for making better policy choices in the future. Moreover, the study might also be helpful for the policy makers such as top government personnel, ministry of higher education and University Grants Commission (UGC) of Bangladesh in designing the policies and programmes on e-learning portal success in the country.

KEYWORDS: Students' perception, Online learning, COVID-19 pandemic, Public and private universities.

Received 12 Sep, 2022; Revised 25 Sep., 2022; Accepted 28 Sep., 2022 © The author(s) 2022.

Published with open access at www.questjournals.org

I. INTRODUCTION

Since the novel corona virus disease 2019 (COVID-19), originated in Wuhan City of China, began to spread rapidly around the world, sending billions of people into lockdown, the World Health Organization (WHO) declared the corona virus epidemic a pandemic. In light of rising concern about the COVID-19 pandemic, a growing number of universities across the world either postponed or canceled all campus events such as workshops, conferences, sports, and other activities. Universities took intensive measures to prevent and protect all students and staff members from the highly infectious disease. So, the Faculty Members started the process of transforming physical (offline) to online (virtual) teaching platforms (Sahu, 2020).

As COVID-19 was announced as a pandemic, all countries of the world started trying to control the situation with technological advancement in the medical sector, educational progress, and in the continuity of productions. As most of the educational institutions were closed since March 2020 and the learning process in

higher education moved online, so the developing countries like Bangladesh struggled to continue classes through the online platform with a lack of technological resources, readiness, and inclusiveness from the perspective of the students (Al-Amin *et al.*, 2021).

A brief review of literature is presented below to get an overview of the scenario during COVID-19 pandemic in Bangladesh and elsewhere in the world. Adnan & Anwar (2020) examined the attitudes of higher education students towards compulsory digital and distance learning university courses amid COVID-19 pandemic in **Pakistan**. Undergraduate and postgraduate were surveyed to find their perspectives about online education in Pakistan. Basilaia & Kvavadze (2020) reported the situation in general education in **Georgia** (former USSR) has changed in the spring semester of 2020, when the first case of coronavirus COVID-19 infection was detected rising to 211 local and more than 1,5 million infection cases worldwide by the April 8, 2020. Georgia became one of 188 countries worldwide that has suspended the education process. The paper studies the capacities of the country and its population to continue the education process at the schools in the online form of distance learning, study reviews the different available platforms and indicates the ones that were used by the support of the government, such as online portal, TV School and Microsoft teams for public schools and the alternatives like Zoom, Slack and Google Meet, EduPage platform that can be used for online education and live communication and gives examples of their usage.

Impact of COVID-19 on primary and secondary education in **Bangladesh** was assessed in 16 Districts under 6 Divisions of the country during 4-7 May 2020 (BRAC, 2020). It sampled 1,938 respondents, where 90% of students washed their hands with soap and water or use sanitizers, and 82% of students stayed home all the time. 16% of the students expressed anxiety and panic due to the pandemic. With a total of 31 million school-going children, the number can be as many as 5 million panic-stricken children in the country. The children with disabilities (29%), female students (17%), students of secondary schools (17%), students living in rural areas (17%), and Madrasa students (17%) are more in fear compared to the rest. 34% of the panic-stricken students became cranky, showed tantrums or remain agitated most of the time. 28% of them lost enthusiasm to study or played while 25% felt hesitant to speak to outsiders. 20% of them suffered from monophobia, and 28% felt scared of seeing outsiders. An impact of COVID-19 pandemic on tertiary education in **Bangladesh** through the students' perspectives by using a qualitative research design was investigated by Dutta & Smita (2020). The participants were 50 university students who took part in semi-structured interviews. The thematic analysis method was used for data analysis. Numerous unprecedented disruptions in students' learning, decrease in motivation and study hours, and various physical, mental, and economic problems regarding academic studies were prominent.

The COVID-19 has affected worldwide education sectors by shutting down many institutes and temporarily pushing the majority of students out of school. Most countries have temporarily closed their educational institutions to control the COVID-19 pandemic. In **Bangladesh**, nearly 40 million students are now out of school, until the epidemic returns to normal. Besides this universal disruption, out-school learning deprivation varies depending on the socio-economic status of the mass population, their access to technology, parental capabilities, and so on. Most countries are using online or satellite television platforms to deliver education during the pandemic, which is not enough to meet the contrasting levels. Although, developed countries (first and second world) are making good strides with online teaching while struggles are seen in rest (third-world countries). This article highlights how COVID-19 is affecting the education sector and students in Bangladesh. Undoubtedly, the most immediate impact of the Covid-19 on students of Bangladesh is abruptions in learning opportunities with multiple other aspects. Despite earnest government attempts, COVID-19 is adversely affecting students in Bangladesh for several significant reasons (Emon *et al.*, 2020).

In the **Netherlands**, Janssen *et al.* (2020) investigated if the COVID-19 pandemic affected positive and negative effects on parents and adolescents and parenting behaviours such as warmth and criticism. Multilevel analyses showed that only parents' negative affect increased as compared to the period before the pandemic, whereas this was not the case for adolescents' negative affect, positive affect and parenting behaviors (from both the adolescent and parent perspective). In general, intolerance of uncertainty was linked to adolescents' and parents' negative affect and adolescents' positive affect. However, neither intolerance of uncertainty, nor any pandemic related characteristics (*i.e.* living surface, income, relatives with COVID-19, hours of working at home, helping children with school and contact with COVID-19 patients at work) were linked to the increase of parents' negative affect during COVID-19.

According to Khanom *et al.* (2020) an abrupt shutdown of educational institutions due to COVID pandemic had created historical impact on educational system all over the world. the situation had been more challenging in undergraduate medical teaching. Moving smoothly from an environment of conventional education to virtual platform could not happen overnight. They presented results of a cross-sectional study conducted from 13th July to 20th July, 2020 on MBBS students of **Chittagong** International Medical College, a non-Government Medical College of Bangladesh, exploring students' views on online classes. Mollah & Parvin (2020) recognized that education is one of the vital indicators that have been lockdown during the COVID-19

pandemic globally for primary to higher education and Bangladesh is not out of this. Finding no other alternative, the online education system has been introduced by internet-based video classes like zoom, Facebook, Google class, and many others. Though higher education is very important and mainly based on classroom, lab tests, and field visits but during this pandemic, due to lockdown it has been continuing by the online system. **Rajshahi University** has started online classes *via* zoom since July 2020. However, several benefits, problems, and few prospects have been found in this study.

E-learning has become the mandatory component of all educational institutions like schools, colleges, and universities in **India** and around the world due to the pandemic crisis of COVID-19 (Radha *et al.*, 2020). This deadly situation has flipped out the offline teaching process. E-learning provided an effective teaching method that brings out the best in students. To find out the student's attitude towards e-learning, primary data has been collected from national and international wise through Google forms which include the student community from various schools, colleges, and universities of **India**. According to Reimers *et al.* (2020), the e-learning resources can be grouped into three broad sections as follows: (1) Curriculum resources: These include lessons, videos, interactive learning modules and any other resources that directly support students in acquiring knowledge and skills. We present 72 resources, which include several repositories of resources; (2) Professional development resources: These are resources which can support teachers or parents in supporting learners, guiding them to content, developing their skills to teach remotely, or more generally augmenting their capacity to support learners now learning more independently and at home, rather than at school. They presented 21 professional development resources; and (3) Tools: These included tools that can help manage teaching and learning, such as communication tools, learning management systems or other tools that teachers, parents or students can use to create or access educational content. They evaluated 20 professional development resources. Within each of these categories they presented the resources arranged by the language in which they are available for curriculum and professional development.

The United Nations proposed reconstructing education and accelerated changes in teaching and learning **throughout the globe** (UN, 2020). The massive efforts made in a short time to respond to the shocks to education systems remind us that change is possible. We should seize the opportunity to find new ways to address the learning crisis and bring about a set of solutions previously considered difficult or impossible to implement. The following entry points could be to the fore of our efforts: focus on addressing learning losses and preventing dropouts, particularly of marginalized groups; offer skills for employability programmes; support the teaching profession and teachers' readiness; expand the definition of the right to education to include connectivity; remove barriers to connectivity; strengthen data and monitoring of learning; strengthen the articulation and flexibility across levels and types of education and training. According to Al-Amin *et al.* (2021), in the present era of technology, every time the world confronts any kind of crisis or challenge, we use technology as a weapon. Like other emergencies, as COVID-19 was announced as a pandemic, all countries have started trying to control the situation with technological advancement in the medical sector, educational progress, and in the continuity of productions. As most of the educational institutions have been closed since March and the learning process in higher education has moved online, therefore, developing countries like **Bangladesh** are also trying to continue classes through the online platform with a lack of technological resources, readiness, and inclusiveness from the perspective of the students.

In a recent report by Al Mamun *et al.* (2021), the prevalence rates of mild to severe symptoms of depression, anxiety, and stress ranged from 46.92% to 82.4%, 26.6% to 96.82%, and 28.5% to 70.1%, respectively were observed during corona virus pandemic in **Bangladesh**. The risk factors concerning mental health problems included the factors related to (i) socio demographic parameters such as younger age, gender, lower educational grade, urban residence, family size, currently living with family/parents, and having children in the family, (ii) behaviour and health including smoking status, lack of physical exercise, more internet browsing time, and dissatisfaction with sleep, (iii) COVID-19 pandemic-related symptoms, perceptions, and fear of corona virus infection, (iv) miscellaneous such as losing part-time teaching job, lack of study concentration, agitation, fear of getting assaulted or humiliated on the way to the hospital or home, financial problems, academic dissatisfaction, inadequate food supply, higher exposure to COVID-19 social and mass media, engaging with more recreational activities, and performing more household chores.

In keeping with nation-wide efforts to contain the spread of COVID-19, University of **Brunei Darussalam** (UBD) transformed fully its pedagogical delivery to online mode, where Idris *et al.* (2021) investigated teaching and learning experiences, physical and mental health of undergraduate students and lecturers during the COVID-19 pandemic. However, studying at home caused students to feel more distracted (72.0%) with a feeling of uncertainty towards examinations (66.7%), while lecturers felt that students' laboratory skills were compromised (44.6%). Even though online delivery of assessments enabled lecturers to explore all options (50.0%), they found it difficult to maintain appropriate questions (41.1%) and fair assessments (37.5%). Majority of students missed eating out (68.8%) and felt a lack of participation in extracurricular activities (64.9%), while lecturers reported more time for exercise (51.8%), despite having more

screen time (50.0%) and computer related physical stress (44.6%). In terms of mental health, increased stress in students was reported (64.9%), though they had more time for self reflection (54.8%). Although lecturers reported a closer relationship with family (44.6%), they also felt more stressed due to deadlines, unexpected disruptions and higher workloads (44.6%) as well as concerns related to work, family and self (39.3%). Islam *et al.* (2021) conducted a study to determine how many people of **Dhaka City** have suffered from stress, depression, and chronic disease during this pandemic of COVID-19. Majority men participated in this survey (61%), were still in the City, and the aim result of 74.2% was depressed, 34.8% chronic disease where high blood pressure was the highest that people were affected during this pandemic. They were able to collect this information through online surveys. They also observed that 32.9% were mentally broken or fell stress during COVID-19 pandemic. Among these people, 35.4% took anti-depressant drugs, 16.7% antipsychotic drugs and 21.7% anti-anesthetic drugs. Mahmud *et al.* (2021) explored the current status of online education and COVID-19 impacts on the educational system in **Bangladesh**. They presented systematically by incorporating comprehensive literature on COVID-19 and education in Bangladesh from numerous secondary data sources. During the lockdown, the Bangladesh government has taken initiatives to continue classes through television and other online platforms. Rouf *et al.* (2021) assessed the perception of different respondents' groups related to the factors that influence the online learning for higher education in **Dhaka, Bangladesh** during the COVID-19 pandemic. A survey through a structured questionnaire was conducted to gather qualitative information from the 250 respondents including university students, faculty members and administrative officers. Similar data on students from **Islamic University, Kustia**, were collected through online survey (Sarkar *et al.*, 2021).

In response to the emerging problems of COVID-19 outbreak in educational institutions, Shahzad *et al.* (2021) proposed a theoretical framework based on literature and model to determine e-learning portal success in different **universities of Malaysia**. The study compared males and females to e-learning portal usage to check the difference between male and female e-learning portals' accessibility among the students' perspective. The study included service quality, system quality, information quality, user satisfaction, system use, and e-learning portal success. They presented empirical data of 280 students participated from the different universities through Google surveys. Keeping the aforesaid reviews in mind, the present study was designed to: (a) assess the participation and attendance of male and female students from a renowned public university (RU) and three private universities (*viz.*, VU, NSU and AIUB) in Rajshahi Metropolis during COVID-19 pandemic; (b) evaluate the respondents' perceptions towards online teaching and learning; and (c) estimate the uses of various devices in online learning during the survey period.

II. METHODOLOGY

This cross-sectional study was conducted from May 11 to September 17, 2021. A thorough survey of literature, mostly from online published sources from home and abroad, was performed. However, the study population comprised non-medical students only. For collecting experimental data, the following factors were taken into account.

University types: As a public university, Rajshahi University (RU) was considered as the main target institution. Students from RU and three private universities *viz.*, Varendra University (VU), North-South University (NSU) and Asian International University of Bangladesh (AIUB) were surveyed for collecting information for the present investigation.

Faculty/Departments: Ten departments *viz.*, History, Geography and Environmental Studies, Marketing, Information Science and Library Management, Statistics, Philosophy, Bangla, Zoology, Islamic History and Culture and Law were chosen at random for the study.

Number of respondents: Faculty/Department-wise male and female students were interviewed for collecting various data on the number of courses/lectures delivered and the number of courses/lectures attended.

Students' perception towards online teaching qualities: These were ranked into strongly liked (SL), liked (L), undecided (UD), disliked (DL) and strongly disliked (SDL)

Devices used by students in online learning: The common devices that were used by the students were mobile phone (MP), laptop (LT), desktop (DT) and both mobile phone and laptop (MP+LT).

Questionnaire and instruments: A structured questionnaire was designed to collect desired data on the proposed research. In the first part, prospective respondents were asked to put their demographic information including University name, gender, educational level, semester/year and device(s) used. In the second part, students were asked to give their answers regarding a set of close ended questions, by choosing one option from them. This

type of questions obtained information about students' knowledge as well as perceptions regarding e-learning during COVID-19 pandemic in the study area (Appendices 1-3).

Analysis of data: Primary data in this study are the results of in-depth interviews with research subjects. Information gathered was categorized into Faculty/Department and gender-wise percentages which were finally arranged in a set of tables.

III. RESULTS AND DISCUSSION

Students' participation and attendance

University-wise participation and attendance of 459 males and 233 females (total= 692) respondents in online classes are presented in Tables 1 and 1a. A total of 329 male and 161 female students were interviewed from 10 Faculty/Departments of the public university (RU). The students belonged to 12 year/semesters ranging from the 1st to 4th and masters. The Faculty/Departments offered 82 courses during the survey period, where a total of 1164 lectures were delivered. Overall, the male students attended 88.31% lectures ($1028 \times 100 \div 1164$) compared to 85.39% lectures ($994 \times 100 \div 1164$) attended by their female counterparts.

In contrast to a large number of public university students (n= 490), 202 students (130 males and 72 females) from three private universities, viz., VU, NSU and AIUB were interviewed from 4 Faculty/Departments, where 1st, 2nd and the 4th year/semester students were available for collecting their opinions. A total of 26 courses were offered and 286 lectures were delivered. Male students attended 83.91% lectures ($240 \times 100 \div 286$) in comparison with the female students who attended 85.31% lectures ($244 \times 100 \div 286$).

Table 1. Attendance (%) of the public and private university students in the courses offered and lectures attended during COVID-19 pandemic in Rajshahi.

Univ. Types	No. Courses/ Lectures delivered	No. Courses/ Lectures attended
Public (RU)	No. Courses= 82 No. Lectures= 1164	Males= 1028 = 88.31% Females= 994 = 85.39%
Private (VU, NSU, AIUB)	No. Courses= 26 No. Lectures= 286	Males= 240 = 83.39% Females= 244 = 85.31%

Students' perceptions towards online teaching

As mentioned above (Table 1), 490 respondents (329 males + 161 females) from RU and 202 respondents (130 males + 72 females) from VU, NSU and AIUB were included in the present study.

The public university (RU) had 67.15% males and 32.85% female students who passed their opinions, whereas 52.97% males and 47.03% females of the three private universities opined about their perceptions towards online teaching during the pandemic. Irrespective of the gender and in order of preference, 48.77% students liked (L), 34.08% students disliked (DL), 12.44% students were undecided (UD), 2.65% students strongly disliked (SDL) and 2.44% students strongly liked (SL) the online method of teaching (Appendix 1).

In contrast to the public university students, however, only 1.48% respondents of the private universities strongly liked (SL), 50.00% just liked (L), 6.44% were undecided (UD), 35.64% disliked (DL) and 6.44% strongly disliked (SDL) the offered courses taken online during the pandemic (Table 2; Appendix 2).

Table 2. Students' perceptions towards online teaching during COVID-19 pandemic in Rajshahi

Univ. Types	No. Respondents	SL%	L%	UD%	DL%	SDL%
Public (RU)	Males= 329 Females= 161	2.44	48.77	12.44	34.08	2.65
Private (VU, NSU, AIUB)	Males= 130 Females= 72	1.48	50.00	6.44	35.64	6.44

RU= Rajshahi University; VU= Varendra University; NSU= North-South University; AIUB= Asian International University of Bangladesh; Students' perceptions towards online teaching qualities; SL= Strongly liked; L= Liked; UD= Undecided; DL= Disliked; SDL= Strongly disliked.

Devices used in online learning

In RU, 60.62% males and 32.40% females used mobile phones (MP) for learning, while only 0.2% males each used laptop (LT) and desktop (DT) computers, but 6.13% male and 2.45% female respondents used both mobile phones and laptop computers (MP+LT) at their online learning (Table 3; Appendix 3).

Table 3. Devices and their uses in online learning during COVID-19 pandemic in Rajshahi

University Types	No. Respondents	MP%	LT%	DT%	MP+LT%
Public (RU)	Males= 329	60.62	0.20	0.20	6.13
	Females= 161	30.40	-	-	2.45
Private (VU, NSU, AIUB)	Males= 130	30.69	-	-	22.27
	Females= 72	31.18	-	-	6.53

RU= Rajshahi University; VU= Varendra University; NSU= North-South University; AIUB= Asian International University of Bangladesh; Devices used in online learning; MP = Mobile phone; LT- Laptop; DT = Desktop; MP+LT = Mobile phone & laptop.

The above scenario is slightly different for the learners of the public universities, where 30.69% males and 31.18% females used their MPs and 22.27% males and 6.53% females used MP+LT devices for attending the online deliveries.

The findings of the study in Pakistan (Adnan & Anwar, 2020) highlighted that online learning cannot produce expected results in underdeveloped countries like Pakistan, where a vast majority of students are unable to access the internet due to technical as well as monetary issues. The lack of face-to-face interaction with the instructor, response time and absence of traditional classroom socialization were among some other issues highlighted by higher education students. Basilaia & Kvavadze (2020) made a case study, where the Google Meet platform was implemented for online education in a private school with 950 students in **Georgia**, which showed the usage statistics generated by the system for the first week of the online education process. Results confirm that the quick transition to the online form of education went successful and gained experience can be used in the future. The experience and studies can be useful for other countries that have not found the ways of transition yet. The lesson learned from the pandemic of 2020 will force a generation of new laws, regulations, platforms and solutions for future cases, when the countries, government and population will be more prepared than today.

According to a study in **Bangladesh** (BRAC, 2020), the corona virus pandemic seemed to have made 13% student less interested in studying while 14% of students did not study at all.

Another study by Dutta & Smita (2020) showed several major concerns such as unavailability of electronic devices, limited access to the internet, high cost of internet, low speed of internet, and difficulties in using online platforms regarding online education in the country. Necessary steps therefore should be taken to improve internet speed and provide free or cheaper internet packages and technical training on online education to tertiary level students in Bangladesh during COVID-19 pandemic. Working on online teaching and learning in the country, however, Emon *et al.* (2020) concluded that not technologies but also technicalities are needed to run the education system smoothly during the corona virus pandemic. Janssen *et al.* (2020) concluded by their observations in the **Netherlands** that on average the healthy parents and adolescents seemed to deal fairly well with the COVID-19 pandemic in the country. The substantial heterogeneity in the data however, also suggests that whether or not parents and adolescents experience emotional problems can vary from household to household. Implications for researchers, mental health care professionals and policy makers are praiseworthy.

In **Chittagong** International Medical College, a total of 217 students participated in the study where the response rate of the survey was 87%. Among pre-clinical students, 47.6% \pm 1.1% and among clinical students 48.3% \pm 0.8% 'sometimes' felt interested in the class. Though majority of both pre-clinical and clinical students mentioned having appropriate device; there had been a wide range of variations in responses regarding their own internet connectivity. The most striking finding came out with the question if online class would be felt as a good substitute of 'face-to-face' class; it was 'never' response in more than 70% students in both pre-clinical and clinical groups. To take challenge of creating real-life picture in online class, there is necessity of a shift of traditional 'lecture-based' classes to more interactive, simulation-based classes; especially for clinical students. Institutional support needs to be strengthened for ensuring sound and visibility during the classes (Khanom *et al.*, 2020).

The crucial finding of Mollah & Parvin (2020) on online classes in **Rajshahi University** are not fruitful for a long time as higher education is highly technical, professional, and specialized and based on a practical, lab test, and field survey. However, for a temporary period, it is moderately helpful for students. If prolong pandemic stay, higher education including all kinds of education will hamper and session jams will

appear throughout the world which would be harmful to the global education, economy, governance, health, safety, and peaceful world.

In **India**, Radha *et al.* (2020) aimed to study the E-learning process among students who are familiar with web-based technology. It also helps to find out solutions to improve the self-study skills of students. The stratified sampling method has been adopted in this study and the sample size is 175 across the world. The findings of the study reflect the impact of E-learning, students' interest in using E-learning resources, and their performance. In conclusion, this study showed that E-learning has become quite popular among the students all over the world particularly, the lockdown period due to the COVID-19 pandemic. Al-Amin *et al.* (2021) conducted a quantitative study surveyed over 844 students of different universities of **Bangladesh** to analyze the status of preparedness, participation, and classroom activities through online during the pandemic. The findings revealed a lack of preparedness, participation, and less scope of classroom activities through online learning. Problems of infeasible consistency of the internet and electricity, paying attention, understanding lessons through the online platform are the main constraints of online learning in the developing country. Finding ways of mitigating these problems can be the next subject for further researchers.

In the University of **Brunei Darussalam (UBD)**, Idris *et al.* (2021) reported a total of 56 lecturers (100% response rate) and 279 students (93.3% response rate) participated. The positive experiences reported by students include becoming independent (72.8%) and adapting to online learning (67.4%), while lecturers learned new teaching techniques (50.0%) and became more innovative (50.0%) by learning new tools (48.2%). In this abrupt shift from physical (offline) to virtual (online) teaching, students and lecturers had both positive and negative experiences including the impact on their physical and mental health. Their findings are important to provide the evidence for online pedagogical benefits and can serve to promote the enhancement and adaptation of digital technology in education. These also aim to promote the importance of addressing physical and mental health issues of the university community's well-being through provision of emotional and mental health support and appropriate programs. Mahmud *et al.* (2021) reported that teachers and students experienced some challenges during the online education system in **Bangladesh**. It was found that teachers were not well trained and had not sufficient knowledge about technology for conducting online classes. Alternatively, many students were unable to participate in online classes for not having digital devices and poor internet connection for living in rural areas. Even though some of the students had participated in online classes, they had a lack of concentration during online classes because of the new class format and poor lecture presentation of teachers. A major portion of the students faced financial crises and unable to bear educational expenses. The university final year students have suffered psychological pressure because they missed their opportunity to apply for several job circulars. The lockdown situation compelled the educational institute to close its academic activities throughout Bangladesh. The government is trying to take policies to solve the issues, but there have not enough published documents to incorporate this issue. This study will contribute to minimizing the research gap by supporting the policymaker by presenting the current education situation.

According to the findings of Rouf *et al.* (2021), majority of the university respondents in **Dhaka City** felt that online classes could be more challenging than the traditional classroom because of the technological constraints, digital divide, insufficient data pack to access the material to attend the class, poor connectivity, lack of device, poor learning environment, technophobia, delayed response and incapability of the teacher to handle efficiently the material and communication machineries. However, results of Sarkar *et al.* (2021) from **Islamic University, Kustia** suggest that most students faced difficulty participating in virtual classes and could not communicate with their friends correctly, and most did not feel comfortable. However, female students showed a better view than male students and urban students had more positive appreciation than rural students. Laptop/PC users showed more positive perceptions towards online education than mobile users. Broadband/Wi-Fi users had more positive perceptions than mobile network users. While the findings of Shahzad *et al.* (2021) revealed that males and females have different levels in terms of usage towards e-learning portals in Malaysian Universities.

IV. CONCLUSIONS

Findings of this cross-sectional study revealed the public and private university students' perceptions towards online teaching and learning during COVID-19 pandemic in Rajshahi Metropolis, Bangladesh, which might provide an essential guideline for the government policymakers, technology developers and university authorities for making better policy choices in the future. Moreover, the study might also be helpful for the policy makers such as top government personnel, ministry of higher education and University Grants Commission (UGC) of Bangladesh in designing the policies and programmes on e-learning portal success in the country.

ACKNOWLEDGEMENTS

The co-operation, willingness and positive responses received from the participants during the survey are gratefully acknowledged. The work was partly supported by the Research Grant from the Faculty of Biological Sciences, University of Rajshahi, Bangladesh.

REFERENCES

- [1]. Adnan, M. & Anwar, K. 2020. Online learning amid the COVID- 19 pandemic: Students perspectives. *J. Pedagog. Res.* **1**: 45-51. doi: 10.33902/JPSP.2020261309. 3.
- [2]. Al Mamun, F, Hosen, I., Misti, J. M., Kaggwa, M. M. & Mamun, M. A. 2021. Mental disorders of Bangladeshi students during the COVID-19 pandemic: A systematic review. *Psych. Res. Behav. Manag.* **14**: 645–654.
- [3]. Al-Amin, M., Al Zubayer, A., Deb, B. & Hasan, M. 2021. Status of tertiary level online class in Bangladesh: Students' response on preparedness, participation and classroom activities. *Heliyon* **7**(1): e05943. doi: 10.1016/j.heliyon.2021.e05943.
- [4]. Basilaia, G. & Kvavadze, D. 2020. Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagog. Res.* **5**: 1-9. doi: 10.29333/pr/7937.
- [5]. BRAC 2020. Impact of COVID-19 on education in Bangladesh: A rapid assessment. BRAC Education Programme (BEP). May 2020. 24 pp.
- [6]. Dutta, S. & Smita, M. K. 2020. The impact of COVID-19 pandemic on tertiary education in Bangladesh: Students' perspectives. *Open J. Social Sci.* **8**: 53-68. <https://doi.org/10.4236/jss.2020.89004>.
- [7]. Emon, E. K. H., Alif, A. R. & Islam, M. S. 2020. Impact of COVID-19 on the institutional education system and its associated students in Bangladesh. *Asian J. Educ. Social Stud.* **11**(2): 34-46, 2020; Article no.AJESS.61036.
- [8]. Idris, F., Zulkipli, I. N., Abdul-Mumin, K. H., Ahmad, S. R., Mitha, S., Rahman, H. A., Rajabalaya, R., David, S. R. & Naing, L. 2021. Academic experiences, physical and mental health impact of COVID-19 pandemic on students and lecturers in health care education. *BMC Med. Educ.* **21**:542. <https://doi.org/10.1186/s12909-021-02968-2>.
- [9]. Islam, M., Akash, S. & Aovi, F. I. 2021. The mental health impact of COVID-19 pandemic in Dhaka. *Academia Letters*. Article 2538. <https://doi.org/10.20935/AL2538>.
- [10]. Janssen LHC, Kullberg M-LJ, Verkuil B, van Zwieten N, Wever MCM, van Houtum LAEM, et al. 2020. Does the COVID-19 pandemic impact parents' and adolescents' well-being? An EMA study on daily affect and parenting. *PLoS ONE* **15**(10): e0240962. <https://doi.org/10.1371/journal.pone.0240962>
- [11]. Khanom, M., Hoque, A., Sharif, P. I., Sabuj, M. U. & Hossain, M. A. 2020. How were the online classes in undergraduate medical teaching during COVID pandemic? Students' views of a non-government medical college in Bangladesh. *Bangladesh J. Med. Edu.* **11**(2): 1-11.
- [12]. Mahmud, A., Dasgupta, A., Gupta, A. D., Hasan, M. K. & Kabir, K. R. 2021. Current status about Covid-19 impacts on online education system: A review in Bangladesh. : <https://www.researchgate.net/publication/349350482>.
- [13]. Mollah, M. A. H. & Parvin, M. S. 2020. Online higher education during Covid-19 pandemic in Bangladesh: Benefits, problems and prospects. *J. Int. Politics* **2**(4): 23-28.
- [14]. Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, A. R. 2020. E-learning during lockdown of Covid-19 pandemic: a global perspective. *Int. J. Control Autom.* **13**(4): 1088-1099.
- [15]. Reimers, F., Schleicher, A., Saavedra, J., & Tuominen, S. 2020. Supporting the continuation of teaching and learning during the COVID-19 pandemic. *OECD* **1**(1): 1-38.
- [16]. Rouf, M. A., Hossain, M. S., Habibullah, M. & Ahmed, T. 2021. Online classes for higher education in Bangladesh during the COVID-19 pandemic: A perception-based study. *PSU Res. Rev.* <https://www.emerald.com/insight/2399-1747.htm>.
- [17]. Sahu, P. (2020), "Closure of universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff", *Cureus*, doi: 10.7759/cureus.7541.
- [18]. Sarkar, S. S., Das, P., Rahman, M. M. & Zobaer, M. S. 2021. Perceptions of public university students towards online classes during COVID-19 pandemic in Bangladesh. *Front. Educ.* **6**: 703723. doi: 10.3389/educ.2021.703723.
- [19]. Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A. & Lodhi, R. N. 2021. Effects of COVID-19 in e-learning on higher education institution students: the group comparison between male and female. *Quality & Quantity* **55**: 805-826. <https://doi.org/10.1007/s11135-020-01028-z>.
- [20]. UN (United Nations) 2020. Policy Brief: Education during COVID19 and beyond. United Nations, August 2020.
- [21]. Wadud, M. 2020. Delayed online teaching in pandemic widens education gap. Bangladesh, University World News, The Global Window of Higher Education, published 22 July 2020. <https://www.universityworldnews.com/post.php?story=20200722154017758>.

Appendix 1. University-wise respondents and their attendance during COVID-19 pandemic in Rajshahi, Bangladesh

Univ. Types	Faculty/Dept	Year/ Semester	No. Respondents	No. Courses/ Lectures delivered	No. Courses/ Lectures attended
Public (RU)	History	1 st	Males= 64	3/30	3/16
Public (RU)	History	1 st	Females= 36	3/30	3/18
Public (RU)	Geography & ES	3 rd	Males= 25	8/64	8/53
Public (RU)	Geography & ES	3 rd	Females=06	8/64	8/55
Public (RU)	Marketing	5 th	Males= 26	5/60	5/45
Public (RU)	Marketing	5 th	Females=04	5/60	5/50
Public (RU)	Marketing	2 nd	Males= 36	5/75	5/65
Public (RU)	Marketing	2 nd	Females=07	5/75	5/61
Public (RU)	Info Sci. & LM	3 rd	Males= 17	9/135	9/103
Public (RU)	Info Sci. & LM	3 rd	Females=13	9/135	9/107
Public (RU)	Statistics	4 th	Males= 22	8/250	8/205
Public (RU)	Statistics	4 th	Females=10	8/250	8/200

Public and Private University Students' Perceptions towards Online Learning during ..

Public (RU)	Philosophy	Masters	Males= 33	6/20	6/7
Public (RU)	Philosophy	Masters	Females=21	6/20	6/11
Public (RU)	Bangla	2 nd	Males= 28	7/90	7/56
Public (RU)	Bangla	2 nd	Females=20	7/90	7/56
Public (RU)	Zoology	2 nd	Males= 27	9/180	9/165
Public (RU)	Zoology	2 nd	Females=17	9/180	9/173
Public (RU)	Zoology	4 th	Males= 25	7/140	7/132
Public (RU)	Zoology	4 th	Females= 11	7/140	7/133
Public (RU)	Islamic H & C	2 nd	Males= 19	7/140	7/128
Public (RU)	Islamic H & C	2 nd	Females= 11	7/140	7/130
Public (RU)	Law	4 th	Males= 17	8/80	8/53
Public (RU)	Law	4 th	Females= 05	8/80	8/54
Total= 1	Faculty/Dept= 10	Year/ Semester= 12	Males=329 Females= 161	No. Courses=82 Lectures delivered=1164	No. Courses=82 Lectures attended=2076
Private (VU)	BA	2 nd	Males= 42	5/40	5/34
Private (VU)	BA	2 nd	Females= 22	5/40	5/33
Private (VU)	English	1 st	Males= 44	3/36	3/30
Private (VU)	English	1 st	Females= 21	3/36	3/31
Private (NSU)	EEE	1 st	Males= 11	5/60	5/48
Private (NSU)	EEE	1 st	Females= 05	5/60	5/48
Private (AIUB)	EEE	4 th	Males= 18	7/90	7/77
Private (AIUB)	EEE	4 th	Females= 12	7/90	7/79
Private (AIUB)	CSE	4 th	Males= 15	6/60	6/48
Private (AIUB)	CSE	4 th	Females= 10	6/60	6/50
Total= 3	Faculty/Dept= 4	Year/ Semester= 5	Males=130 Females= 72	No. Courses=26 Lectures delivered=286	No. Courses=24 Lectures attended=478

RU= Rajshahi University; VU= Varendra University; NSU= North-South University; AIUB= Asian International University of Bangladesh.

Appendix 2. University-wise respondents and their perceptions towards online teaching qualities during COVID-19 pandemic in Rajshahi, Bangladesh

Univ. Types	Faculty/ Dept	Year/ Semester	No. Respondents	SL	L	UD	DL	SDL
Public (RU)	History	1 st	Males= 64		28	20	16	
Public (RU)	History	1 st	Females= 36	04	17	10	04	01
Public (RU)	Geography & ES	3 rd	Males= 25	01	08	06	09	01
Public (RU)	Geography & ES	3 rd	Females=06	-	06	-	-	-
Public (RU)	Marketing	5 th	Males= 26	02	11	03	10	
Public (RU)	Marketing	5 th	Females=04	-	01	-	03	-
Public (RU)	Marketing	2 nd	Males= 36	03	17	05	09	02
Public (RU)	Marketing	2 nd	Females=07	-	07	-	-	-
Public (RU)	Info Sci. & LM	3 rd	Males= 17	-	13	-	04	-
Public (RU)	Info Sci. & LM	3 rd	Females=13	-	06	03	04	-
Public (RU)	Statistics	4 th	Males= 22	-	18	-	03	01
Public (RU)	Statistics	4 th	Females=10	-	10	-	-	-
Public (RU)	Philosophy	Masters	Males= 33	-	23	-	08	02
Public (RU)	Philosophy	Masters	Females=21	-	13	02	06	-
Public (RU)	Bangla	2 nd	Males= 28	-	07	05	15	01
Public (RU)	Bangla	2 nd	Females=20	01	07	02	10	
Public (RU)	Zoology	2 nd	Males= 27	-	16	-	11	-
Public (RU)	Zoology	2 nd	Females=17	-	04	01	10	02
Public (RU)	Zoology	4 th	Males= 25	-	12	03	08	02
Public (RU)	Zoology	4 th	Females= 11	-	11	-	-	-
Public (RU)	Islamic H & C	2 nd	Males= 19	01	04	01	12	01
Public (RU)	Islamic H & C	2 nd	Females= 11	-	06	-	05	-
Public (RU)	Law	4 th	Males= 17	-	-	-	17	-
Public (RU)	Law	4 th	Females= 05	-	02	-	03	-
Total = 1	Faculty/Dept= 10	Year/Semester= 12	Males=329 Females=161	12	23 7	61	167	13
Private (VU)	BA	2 nd	Males= 42	-	20	04	16	03
Private (VU)	BA	2 nd	Females= 22	-	11	01	07	03
Private (VU)	English	1 st	Males= 21	-	10	01	09	01
Private (VU)	English	1 st	Females= 44	-	23	04	14	03
Private (NSU)	EEE	1 st	Males= 11	-	04	01	05	01
Private (NSU)	EEE	1 st	Females= 05	-	02	01	02	-
Private (AIUB)	EEE	4 th	Males= 18	-	05	01	10	02
Private (AIUB)	EEE	4 th	Females= 12	-	09	-	03	-

Public and Private University Students' Perceptions towards Online Learning during ..

Private (AIUB)	CSE	4 th	Males= 15	03	10	-	02	-
Private (AIUB)	CSE	4 th	Females= 10	-	08	-	04	-
Total= 3	Faculty/Dept= 4	Year/Semester = 5	Males=130 Females=72	03	10 1	13	72	13

RU= Rajshahi University; VU= Varendra University; NSU= North-South University; AIUB= Asian International University of Bangladesh; Students' perceptions towards online teaching qualities; SL= Strongly liked; L= Liked; UD= Undecided; DL= Disliked; SDL= Strongly disliked.

Appendix 3. University-wise respondents and their devices used in online learning during COVID-19 pandemic in Rajshahi, Bangladesh

Univ. Types	Faculty/Dept	Year/Semester	No. Respondents	MP	LT	DT	MP+LT
Public (RU)	History	1 st	Males= 64	60	-	-	04
Public (RU)	History	1 st	Females= 36	36	-	-	-
Public (RU)	Geography & ES	3 rd	Males= 25	23	-	01	01
Public (RU)	Geography & ES	3 rd	Females=06	06	-	-	-
Public (RU)	Marketing	5 th	Males= 26	21	-	-	05
Public (RU)	Marketing	5 th	Females=04	04	-	-	-
Public (RU)	Marketing	2 nd	Males= 36	36	-	-	-
Public (RU)	Marketing	2 nd	Females=07	04	-	-	03
Public (RU)	Info Sci. & LM	3 rd	Males= 17	17	-	-	-
Public (RU)	Info Sci. & LM	3 rd	Females=13	13	-	-	-
Public (RU)	Statistics	4 th	Males= 22	14	-	-	08
Public (RU)	Statistics	4 th	Females=10	07	-	-	03
Public (RU)	Philosophy	Masters	Males= 33	31	-	-	02
Public (RU)	Philosophy	Masters	Females=21	21	-	-	-
Public (RU)	Bangla	2 nd	Males= 28	28	-	-	-
Public (RU)	Bangla	2 nd	Females=20	19	-	-	01
Public (RU)	Zoology	2 nd	Males= 27	25	-	-	02
Public (RU)	Zoology	2 nd	Females=17	17	-	-	-
Public (RU)	Zoology	4 th	Males= 25	20	-	-	05
Public (RU)	Zoology	4 th	Females= 11	08	-	-	03
Public (RU)	Islamic H & C	2 nd	Males= 19	16	01	-	02
Public (RU)	Islamic H & C	2 nd	Females= 11	11	-	-	-
Public (RU)	Law	4 th	Males= 17	16	-	-	01
Public (RU)	Law	4 th	Females= 05	03	-	-	02
Total= 1	Faculty/Dept= 10	Year/Semester = 12	Males=329 Females=161	297 149	01	01	42
Private (VU)	BA	2 nd	Males= 42	35	-	-	07
Private (VU)	BA	2 nd	Females= 22	18	-	-	04
Private (VU)	English	1 st	Males= 21	18	-	-	03
Private (VU)	English	1 st	Females= 44	37	-	-	07
Private (NSU)	EEE	1 st	Males= 11	06	-	-	05
Private (NSU)	EEE	1 st	Females= 05	01	-	-	04
Private (AIUB)	EEE	4 th	Males= 18	03	-	-	15
Private (AIUB)	EEE	4 th	Females= 12	05	-	-	07
Private (AIUB)	CSE	4 th	Males= 15	-	-	-	15
Private (AIUB)	CSE	4 th	Females= 10	02	-	-	08
Total= 3	Faculty/Dept= 4	Year/Semester = 5	Males=130 Females=70	62 63	-	-	77

RU= Rajshahi University; VU= Varendra University; NSU= North-South University; AIUB= Asian International University of Bangladesh; Devices used in online learning; MP = Mobile phone; LT- Laptop; DT = Desktop; MP+LT = Mobile phone & laptop.