The Jahangirnagar Review: Part II: Social Science, Vol. 47, No. 2, 2023
ISSN : 1682-7422, ©Jahangirnagar University

State of Higher Education during the COVID-19 Period in Bangladesh: A Quantitative Analysis

Md. Yousuf Ali[1]
Bashir Ahmed[2]

Abstract : This study explores how and to what extent e-learning facilities are provided to public university students during the closure amid the outbreak of COVID-19 infection in Bangladesh. We explore the probable outcome of implementing e-learning facilities for students during the closure of major public-funded universities (such as Jahangirnagar University, Bangladesh Agricultural University, Shahjalal University of Science and technology, and Rajshahi University Engineering and Technology) in Bangladesh amid the pandemic. This study focuses on how tertiary level educational institutes, particularly public universities (as these are less equipped with modern technologies) in Bangladesh have coped with vulnerable conditions and what students and teachers engage in using an e-learning platform during the closure of educational institutions amid the outbreak of the coronavirus infection in Bangladesh. This study also revealed why and how the e-learning education system was being adopted in Bangladesh, particularly in major public-funded universities. This study was also conducted for students and teachers at various public universities to gain additional information about the coordination and contribution of e-learning during this pandemic. We also explore how e-learning is provided for students as a learning paradigm in educational institutions through the use of information and communication technologies (ICTs).

Keywords: Higher Education, E-learning, COVID-19, Pandemic, Bangladesh.

1. Introduction of Quantitative analysis

The first Covid-19 patient was identified in China in December 2019 and swiftly spread over the world (Haleem et al., 2020). The World Health Organization has subsequently declared the coronavirus epidemic a pandemic. The first COVID-19 patient was identified in Bangladesh on March 8, 2020 and confirms the first fatality from Coronavirus on March 18, 2020 (Reuters, 2020a, 2020b; Reuters Staff, 2020; Star, 2020) . The Bangladesh government declared a national lockdown on March 26, 2020, and declared all educational institutes closed. The massive outbreak of COVID-19 diseases posed a significant challenge to the educational environment, forcing every institution including primary, secondary, post-secondary, and tertiary level institutions to shut down and seek alternate teaching and learning methods. While the pandemic impacts all nations, the poorest and developing countries are projected to be particularly hard struck owing to a lack of coping mechanisms including health and education facilities, infrastructure, and technology.

[1] Independent Researcher. E-mail: yousuf.stu2014@juniv.edu
[2] Professor, Department of Government and Politics, Jahangirnagar University, Savar, Dhaka, E-mail: bashir@juniv.edu

While we understand the reasonableness and importance of the use of face-to-face instruction in all educational institutions around the world but providing online or e-learning facility becomes necessary during the outbreak of coronavirus (COVID-19) infection in order to protect against viral infection. Despite online learning is going to become popular in most developed countries due to the availability of modern technologies but these tools and facilities have almost been unfamiliar to most of the populations in most developing countries like Bangladesh. Except few distance learning programs provided by radio or television in some educational institutions, a face-to-face learning method has been always considered the main medium of instruction for all educational institutes in Bangladesh.

As a result, tertiary level education institutions all over the world have been forced to experiment with e-learning because to COVD-19 legislation prohibiting traditional face-to-face classroom based learning (Belay, 2020). Therefore, Covid-19 has wreaked havoc on the educational system, much of which is yet unknown owing to the magnitude of its effects. Government authorities, academic staff, students, and parents have been all anxious about whether the move from classroom to online learning will produce the intended outcomes. While increased use of online learning is projected to create new challenges, possible innovation possibilities in higher education should never be overlooked during these hard times (Collis et al., 1997).

The government of Bangladesh was subjected to many lockdowns as a result of this crisis. Educational institutions have been closed on the other side of the shutdown. Campuses of primary, secondary and higher education institutions were shuttered for a year and a half, until August 2021. All limitations on public movement and activity will be lifted on the first of September 2021. We assess the probable outcome of implementing e-learning facilities for students at major public-funded universities in Bangladesh. This study focuses on how tertiary level educational institutes, particularly public universities (as these are less equipped with modern technologies) in Bangladesh have coped with vulnerable conditions and what students and teachers think about using an e-learning platform during the closure of educational institutions amid the outbreak of the coronavirus infection in Bangladesh.

In this ppaper, We provide an empirical finding of what type of e-learning methods have been implemented by the higher education institutes in Bangladesh and what the student's and teachers' view on them is. It presents the quantitative findings of students' opinions about what e-learning facilities they receive during the COVID-19 pandemic in Bangladesh. We mainly used a structured questionnaire to find a broad opinion from students. These findings have been presented quantitatively in different graphs and tables.

2. Methodology:

In this section, we mainly present empirical evidence from 200 students about the e-learning education methods that have been implemented by the major higher education institutes such as Jahangirnagar University (JU), Shahjalal University of Science and Technology (SUST), Bangladesh Agricultural University (BAU), and Rajshahi University of Engineering and Technology (RUET) during the COVID-19 pandemic in Bangladesh. By using an online survey and face to face Key Informant Interviews for the qualitative findings such as the views and narratives of the 129 students, 21 teachers including class tutors, heads of the Departments, and the dean of the Faculties at the four

major public universities about the reality and problems of e-learning methods that have been implemented at the education institutes during the couture amid the COVID-19 periods in Bangladesh. More specifically, quantitative data collection and data analysis tools and techniques have been used in the current study. We have specifically employed both the close- and open-ended questions to find opinions and narratives from students and teachers about the possibility of e-learning methods, quality of e-learning, necessities, problems, and suggestions for improving e-learning facilities during the COVID-19 pandemic.

3. Quantitative Analysis of higher education during Covid-19 pandemic

This section is about the survey results of 200 students about the reality of e-learning facilities provided by the major public universities during the COVID-19 pandemic in Bangladesh. In this quantitative section, we have mainly addressed the following questions for students to get demand-side information what is their opinion about what kind of e-learning facilities they have received during the COVID-19 pandemic: do you attend online classes regularly? Do you have access to a device for e-learning? What device do you use for e-learning? How do you feel overall about e-learning education? How helpful do you find the e-learning facilities provided by your department/university? Do you enjoy e-learning? Do you find your teachers helpful? Do you find all of your course teachers take online classes? What is the environment at your home for e-learning? Are you familiar with the e-learning tools currently available online? Do you prefer online classes to regular offline classes? And do you feel that there is room for improvement in the current e-learning facilities? The data that comes from the fieldwork was presented in the figure and chart. These are as follows:

3.1 Affiliation with Institutes and Departments

Figure-1: Students' Perception of the Affiliation with Institutes and Departments

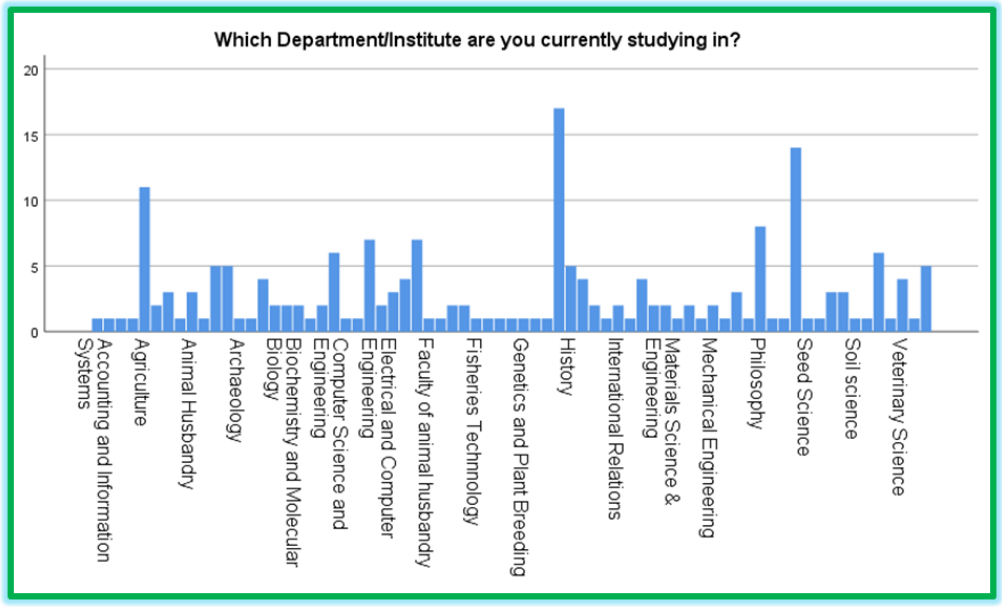
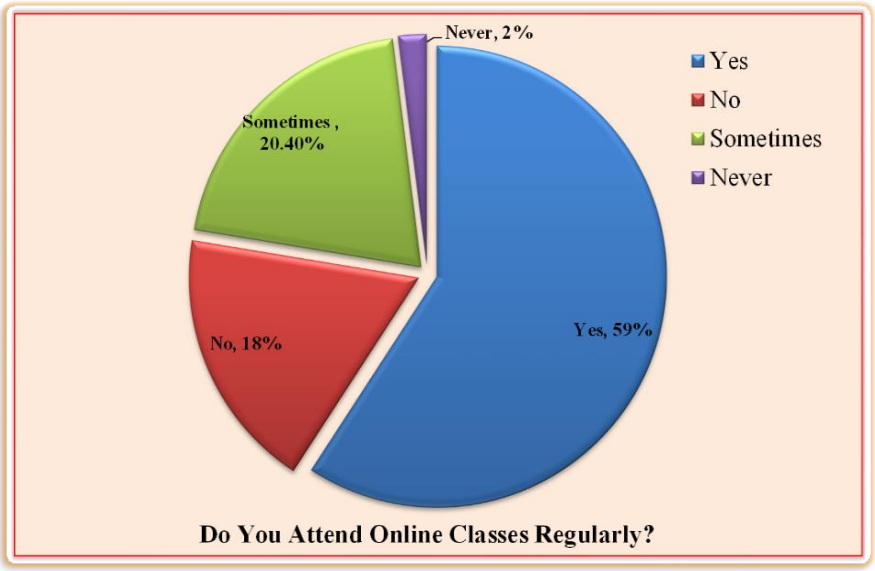


Figure 1 depicts the diverse range of institutes and departments to which the respondents in this study belong. According to findings, the 196 students studying at the undergraduate and master's levels at the aforementioned four universities come from 60 departments and institutes. The range of departments and institutes include Accounting and Information Systems, Agriculture, Agricultural Economics& Rural Sociology, Agricultural Extension Education, Agronomy, Anatomy, Animal Breeding and Genetics, Animal Husbandry, Animal science, Anthropology, Aquaculture, Archaeology, Architecture, Bangla, Biochemistry and Molecular Biology, Business Administration, Chemistry, Civil Engineering, Computer Science and Engineering, Department of Agricultural Economics, Department of geography and environment, Economics, Electrical and Computer Engineering, Electrical and Electronics Engineering, English, Environmental Science, Fine arts, Fisheries, Fisheries Management, Fisheries Technology, Food Engineering and Technology, Food, Technology and Rural Industry, Genetics and Plant Breeding, Geography and Environment, Geological Sciences, Government and Politics, History, Horticulture, Industrial and Production Engineering, Institute of Information and Technology, International Relations, Journalism and Media Studies, Marketing, Materials Science & Engineering, Math, Mechanical Engineering, Mechanical Engineering, Oceanography, Pharmacy, Philosophy, Physics, Physiology, Public Administration, Seed Science and Technology, Social Work, Sociology, Soil Science, Statistics, Urban and Regional Planning, and Veterinary Science.

3.2 Attending Online Classes

Figure -2: Students Perception about Attending Online Classes

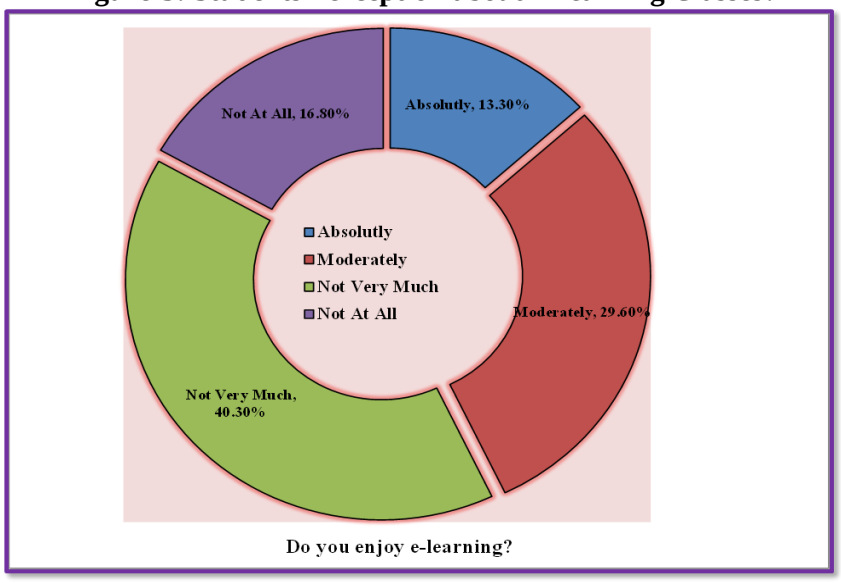


Traditional learning methods were widely accepted in developing countries such as Bangladesh prior to the emergence and spread of COVID 19. However, the closure of institutes and the pressure to complete the prescribed syllabus in a specified time frame in accordance with the academic calendar forced educational institutions to abandon their concerns and adopt emergency remote education. On March 20, 2020, the government of Bangladesh announced the closure of all educational institutions, including schools,

colleges, and universities. It was the first time in Bangladesh that online classes were held on such a large scale. The introduction of online classes created a number of challenges for both teaching and learning communities; however, the internet is a significant technological advancement that is reshaping society and universities around the world (Volery & Lord, 2000). When it comes to learner motivation, satisfaction, and interaction, the online learning environment is vastly different from the traditional classroom setting (Selvaraj et al., 2021). **Figure 2** shows the distribution of students in terms of attendance in online classes offered at their respective institutions. 116 (59.2% students out of 196 attended online classes regularly while 36 respondents (18.4%) reported that they did not attend online classes regularly. 40 respondents (20.4%) attended classes irregularly while 4 (2%) never attended such online classes.

3.3 **Are Students Enjoying E-learning Classes?**

Figure-3: Students Perception about E-learning Classes?

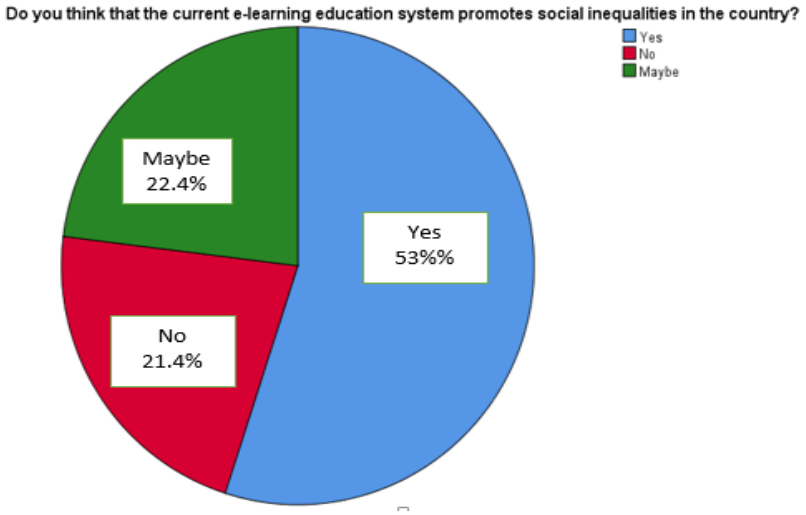


The pandemic disease COVID-19 had a worldwide impact on public health and safety, as well as on educational systems. Most educational institutions, including Bangladesh, have postponed face-to-face teaching out of fear of further disease spread. Without a doubt, online learning is a good initiative for continuing teaching and educational programs during this pandemic (Kim et al., 2005). At the same time, students and teachers must deal with some challenges when it comes to adjusting to online classes (Kim et al., 2005). Because the online learning method is relatively new in our educational system and we are unfamiliar with it, both students and teachers may encounter difficulties during online classes (Gopal et al., 2021). While teachers deliver their lectures in traditional face-to-face classes in developing countries such as Bangladesh, students and teachers use virtual classrooms. Adoption of the new online class and exam systems presents numerous challenges for both teachers and students (Sarkar et al., 2021). The majority of students who attend universities come from rural areas. Students returned home after the declaration of public holidays, and they are now required to participate in online classes and exams from remote regions (Ramij &

Sultana, 2020). Students had difficulty participating in virtual classes and communicating with their classmates during online classes. As a result, they encountered difficulties in online schooling, and students preferred traditional types of learning to virtual classes and struggled to understand the content of virtual classes (Shammi et al., 2020). What did Bangladeshi students think of the online class? **Figure 3** depicts whether or not students enjoy their e-learning classes. 79 students (40.3%) said they did not enjoy online classes too much' while 58 students (29.6%) said they did. To the question, 26 students (13.3%) responded 'absolutely', while 33 students (16.8%) responded 'not at all.'

How E-learning Programs Create Social Inequality

Figure-4: Students Perception about E-learning and Social Inequality

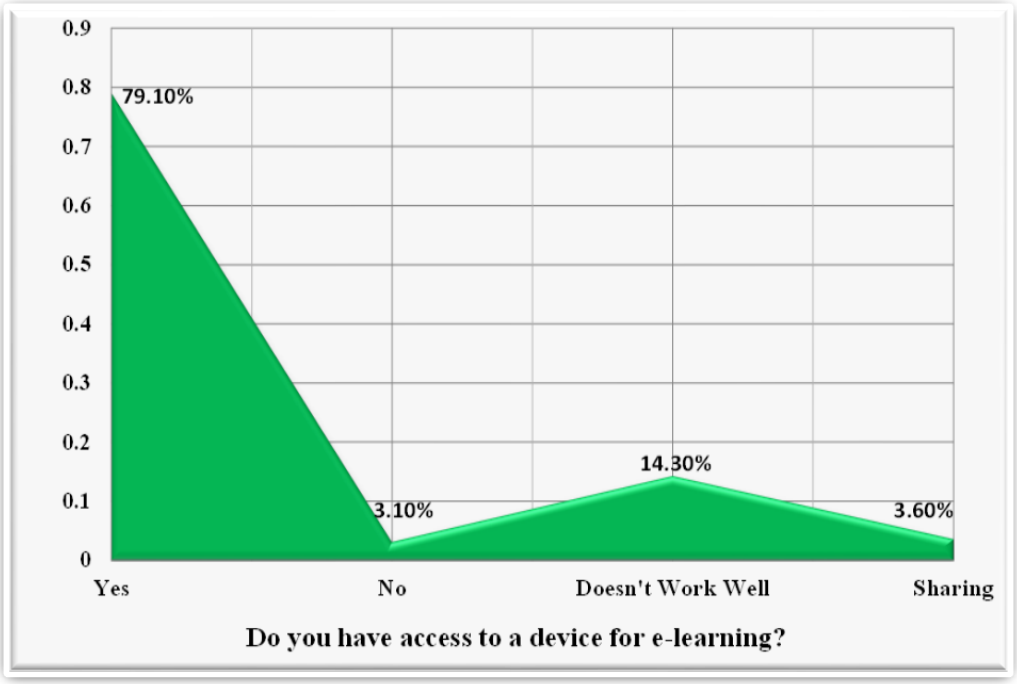


From March 2020 to August 2021, the government of Bangladesh kept all physical activities in educational institutes closed due to the massive outbreak of the COVID-19 diseases. Because physical classes were restricted, many educational institutions begun to offer web - based learning opportunities. Insufficient access to ICT, on the other hand, has become a major source of concern among Bangladeshi students. The digital divide refers to the disparity in ICT access. The term "***digital divide***" refers to the unequal distribution of digital technology and ICT in terms of usage, access, and impact in people's lives as well as in organizations' and countries' activities. The digital divide was an informal term used between the late 1980s and the early 1990s to describe the divide between "information-rich" and "information-poor" people (Badiuzzaman et al., 2021). After the public deployment of the Internet, the gap was visible as to who did or did not have access (Cohen et al., 2001). The term was coined by Lloyd Morrisett to describe a disparity in access to technology tools between socioeconomic groups (Badiuzzaman et al., 2021). In today's world, a digital divide can exist between any number of people, organizations, or countries. Similarly, there is a digital divide between educational institutions and student communities (Tarman, 2003). The digital divide is more than just having or not having access to ICT in the twenty-first century. Research on the digital divide has established multiple levels of the phenomenon in terms of access to devices

and the Internet, ICT usage abilities, and usage outcomes for more than two decades (Chipeva et al., 2018). In the midst of a pandemic, the only way to continue education was through an online class. Some students benefit from online classes while some have difficulties. Furthermore, online education has resulted in discrimination between rural and urban students, laptop/PC users and mobile phone users, and broadband users and mobile network users (Sarkar et al., 2021). During the pandemic in Bangladesh, students were asked who enrolled in the country's major universities whether technological disparities had widened the gap between the haves and the have-nots. The current technology based e-learning education system in Bangladesh promotes social inequalities among students at higher educational institutes, as shown in **Figure -4**. "Yes" was answered by a majority of respondents (53%, or 105 students). Despite the fact that 42 respondents (21.4%) said "No", 44 respondents (22.4%) said "Maybe" in response to the question. It is stated that the majority of students did not have access to digital technologies in order to participate in e-learning educational programs such as classes and examinations offered by universities. Disparities in access to technology may exacerbate social inequality.

3.5 Accessing to Devices and Internet Facilities for E-learning

Figure-5: Students Perception about the Access to Devices and Internet Facilities for E-learning

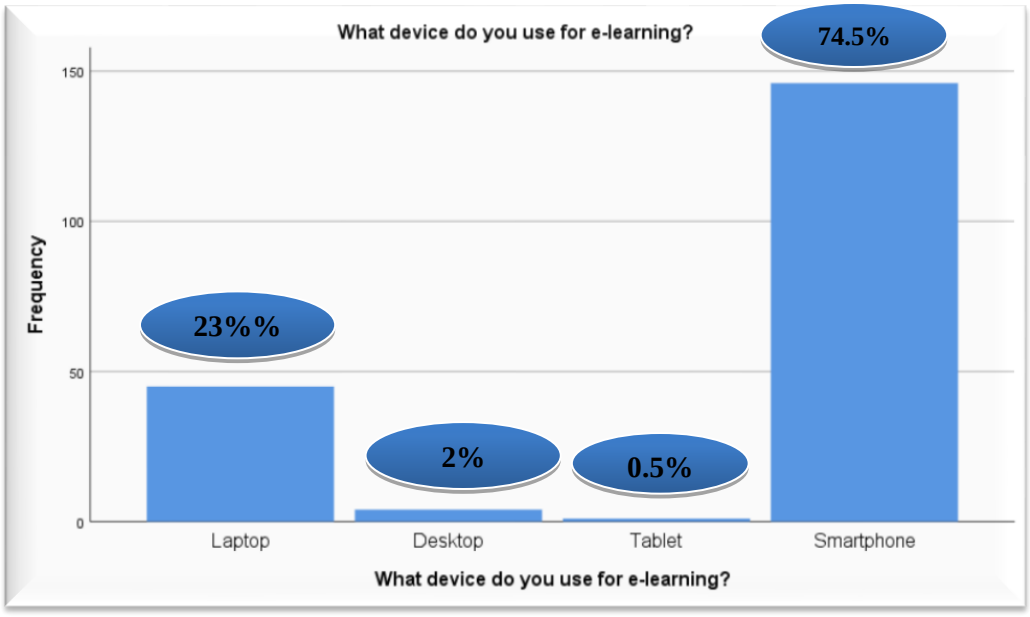


Due to the coronavirus pandemic, educational institutions continued to operate remote teaching and learning activities. Needless to say, the results of online education were mixed, as both teachers and students struggled to adapt to a digital curriculum on short notice. Distance learning necessitates the use of technological devices to supplement the

educational experience because it lacks the face-to-face component of the traditional classroom. There are a variety of devices available to help educators and students improve online learning, ranging from versatile computing options to basic devices to boost home connectivity. Online e-learning is defined as learning experiences that take place in synchronous or asynchronous environments using various electronic devices with internet access (e.g., computers, laptops, smartphones, and so on) (Zalat et al., 2021). Online teaching and learning has many advantages, but it also has some drawbacks. Online learning, on the other hand, acts as a barrier to students' participation in real-world classroom activities. Furthermore, students frequently lack access to e-learning devices and internet access. These difficulties also have an impact on their ability to attend online classes (Almahasees et al., 2021). Without the access to these devices and internet facilities, students cannot attend online classes**. Figure 5** shows the responses for the question of whether the students have access to devices for e-learning. 155 respondents said that they got accessed to these devices and internet facilities while 6 respondents did not receive. 28 respondents reported that their devices did not work sufficiently for them to be able to do their classwork properly, while 7 respondents answered that they have 'shared' devices for attending classes and doing class assignment.

3.6 ICT Devices for E-learning Education

Figure-6: Students Perception on Required Devices for E-learning Education

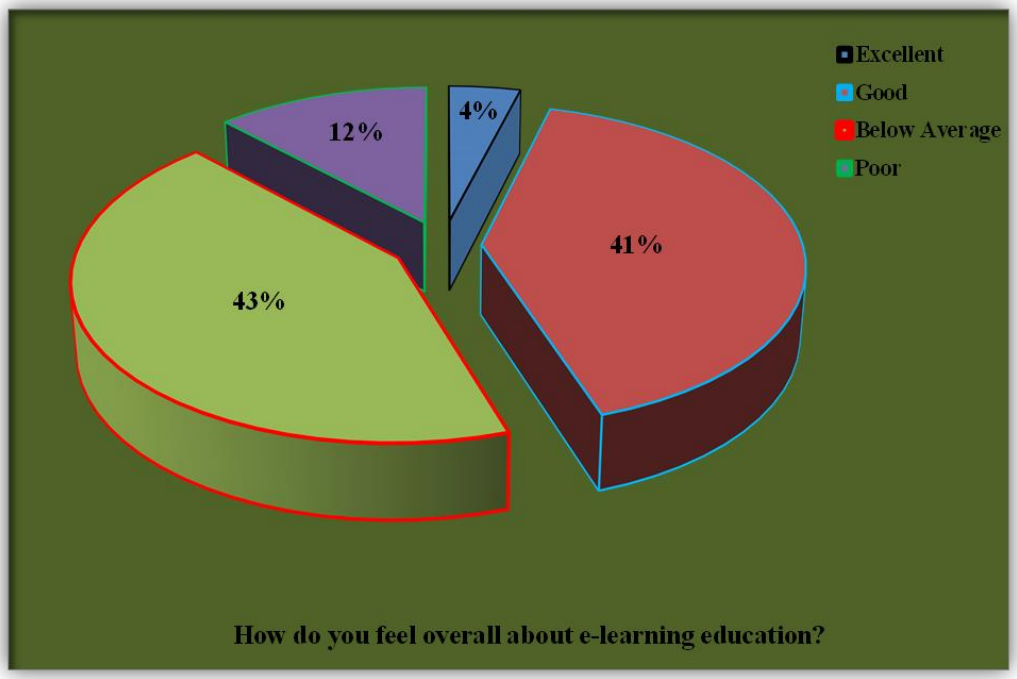


Over 190 countries including Bangladesh were compelled to close schools and move to remote learning as a result of the coronavirus outbreak. Governments scrambled to replace traditional schools and universities with remote learning choices, which included everything from online platforms to instructional television and radio programs to paper-

based packages that could be physically delivered or distributed via email. During the epidemic, online classes were held on a regular basis at higher education institutions. Remote learning's effectiveness is thus strongly reliant on resources available at a student's home, such as internet access and digital devices. A variety of devices, including a desktop computer, laptop, tablet, and smartphone and an adequate internet connection is required for the e-learning class. Students should have access to these electronic devices and stable internet. The best internet connection is via optical fiber. Students have a smooth conversation with teacher, ensuring an efficient learning process. **Figure 6** shows which devices the students generally use to attend online classes. They mostly
146 (74.5%) used 'smartphones' for their online class. 'laptop' was used by 45 (23%) of the respondents. However, 4 (2%) of them reportedly use 'desktops' while the remaining 1 (0.5%) use 'tablets' for e-learning.

3.7 Quality of E-learning Education System During the Pandemic

Figure -7: Students Perception about the Quality of E-learning Education System

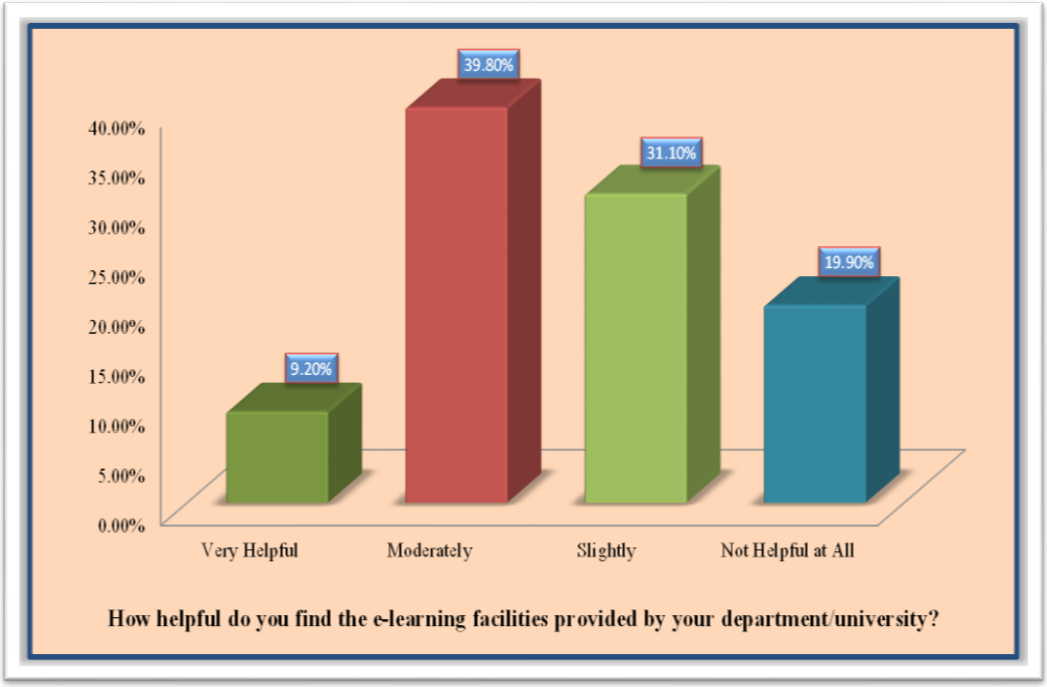


During the pandemic the unplanned shift from traditional learning to an exclusively online learning environment has altered the ways in which educational institutions deliver courses to their students (Khalil et al., 2020). The scheduled on-campus lectures were primarily offered as live-streamed plenary lectures lasting 30–45 minutes, which were primarily delivered via Zoom video conferencing. Educators received digital teaching training from the university during the academic year, and they increasingly used online student response systems and technologies to facilitate digital group work (Zoom).

However, there was no time to coordinate the many courses in terms of the various sorts of online instructional activities, classes, tests, or assessments. As presented in the third chapter, there are two types of online learning: synchronous and asynchronous. Synchronous technology (e.g., audio-conferencing, video-conferencing, web chats, etc.) allows for "live" contact between the instructor and the students, whereas asynchronous technology includes large time delays between instruction and its receipt (e.g., E-mail, earlier video recording, discussion forums) (Finkelstein, 2006). These may cause barriers for effective use of e-learning education system. **Figure 7** shows students' opinion about the online education system during the COVID-19 pandemic at the major public universities in Bangladesh. Only 8 respondents or 4.1% replied saying 'excellent'. 80 respondents (40.8%) viewed it 'good', 84 of them or 42.9% opined the system is 'below-average', while the remaining 24 (12.2%) students said about the current online education system 'poor'.

3.8 E-learning Facilities

Figure-8: Students Perception about E-learning Facilities

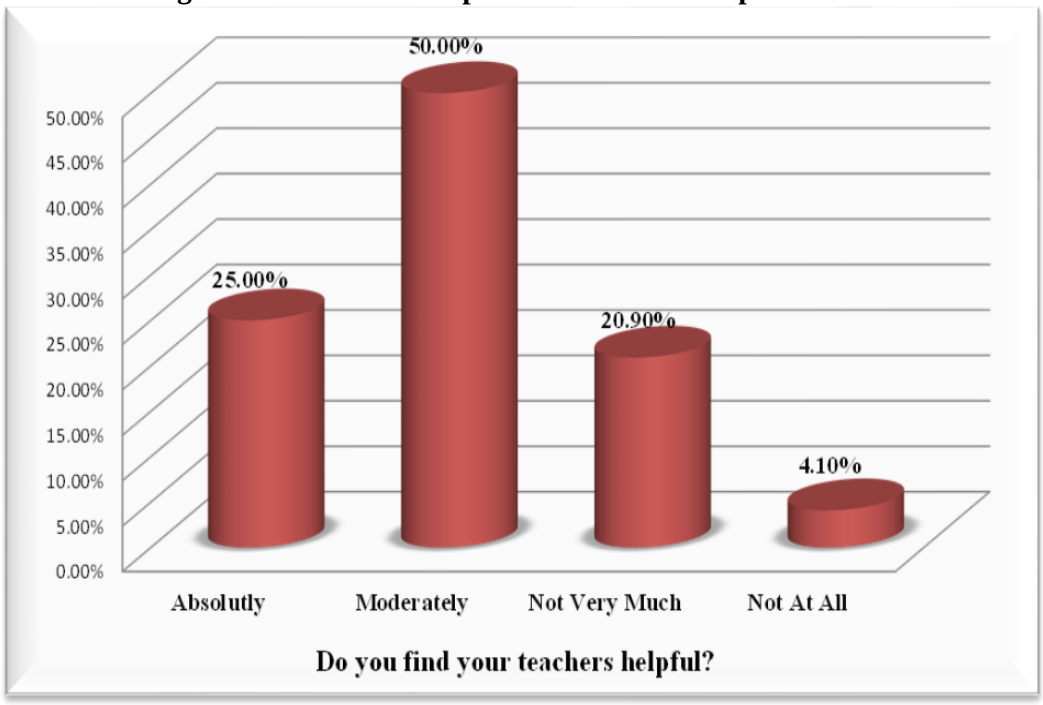


The e-Learning facilities, also known as a Course Management System, Learning Management System, or Virtual Learning Environment, are available in a variety of editions and are designed to aid in the formation of learning communities by providing various opportunities for collaboration and interaction via an ICT-based user interface. E-learning, often known as computer-based learning, is a method of learning that incorporates the use of digitally delivered content, system-based administrations, and mentoring support (Zhang et al., 2010). Content creation, assignment administration, reporting, internal messaging, a forum, chat, and a calendar are among the features

available. Effectiveness of e-learning education depends on providing these facilities to students by respective educational institutes. **Figure 8** shows the students' response on how helpful they find the facilities provided by their respective educational institutions. Merely 9.2% or 18 students find the facilities 'very helpful'. 39.8% or 78 respondents find the facilities 'moderately helpful'. A larger share of 31.1% or 61 respondents finds the facilities 'slightly helpful' while the remaining 39 respondents (19.9%) do not find these facilitates helpful at all. According to the data, one-third of students did not find their university's e-learning facilities to be helpful. For future pandemic preparedness, the government or educational institutions should begin giving sufficient e-learning facilities to students.

3.9 Are Teachers Helpful for Students?

Figure-9: Students Perception on Teachers Helpful Attitude

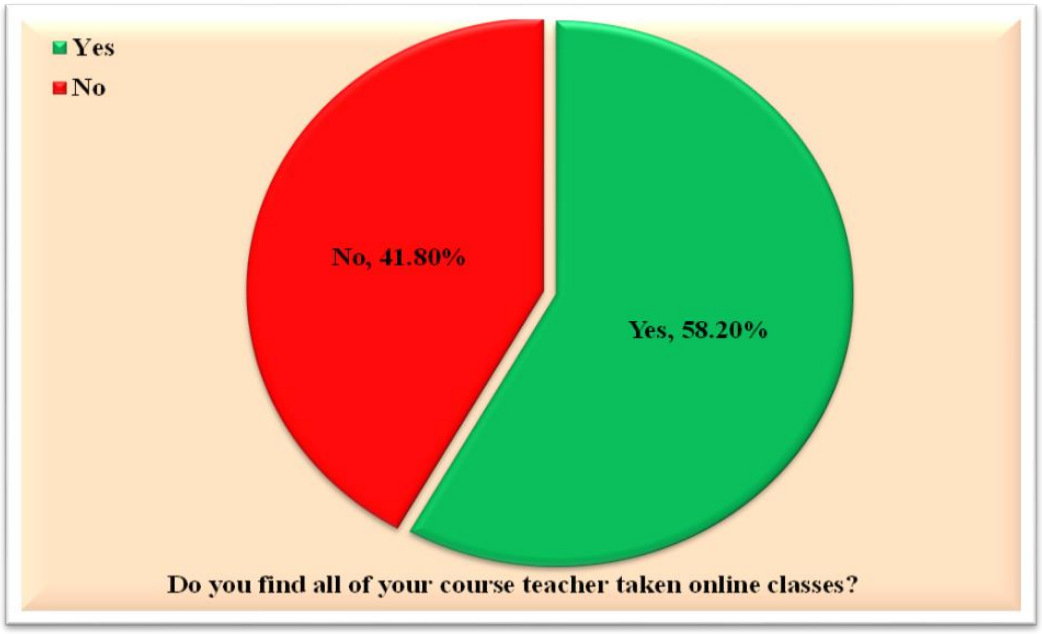


Teachers require assistance in integrating technology efficiently into their teaching practices and approaches, as well as in assisting students in overcoming some of the challenges that come with this type of e-learning environment (OECD, 2020). **Figure 9** shows the responses of the students whether they find their class teachers helpful. A half of the respondents (50%) replied by answering "moderately" to the question. On the other hand, 49 respondents (25%) found their teachers 'absolutely' helpful towards them. Nonetheless, 20.9% students responded with 'Not Much' and the remaining 4.1% responded with 'Not at All' in terms of their teacher's helpful attitude towards them. The unwillingness to assist students with their academic endeavors can be attributed to either a lack of information about e-learning equipment or a willingness to satisfy their students

by making them feel safe and protected psychologically in the face of the global pandemic. However, the data suggests that a large percentage of students are dissatisfied in this regard –if class teachers lack ICT based knowledge –indicating that enhanced teaching pedagogy and the quality of online classes and education are needed at Bangladesh's major higher educational institutions.

3.10 Conducting Online Classes by Teachers

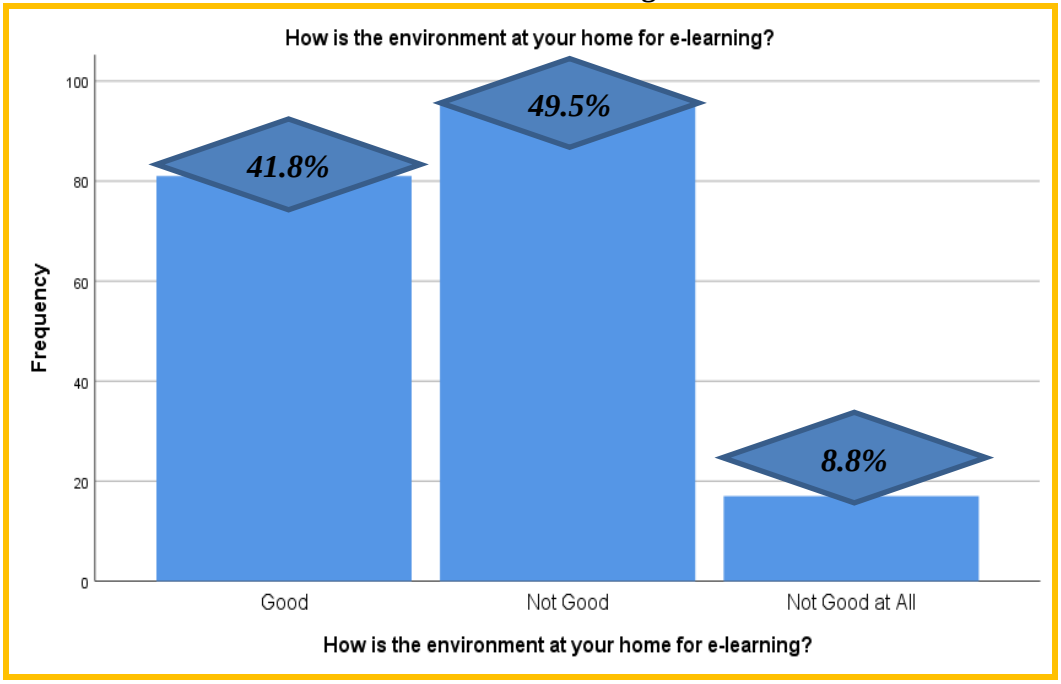
Figure -10: Student Perception about Taking Online Classes Regularly by Teachers



Students go to classrooms in the pre-epidemic model. Teachers and students at all levels were unable to attend school during the COVID-19 pandemic. The COVID-19 pandemic has had a significant impact on education, since it has shifted from an in-person to an online format (de Vries, 2021). As a result, regardless of whether or not they were familiar with or prepared for online education, teachers and students have had to quickly adapt online teaching approaches. The use of digital technology by teachers during the epidemic determines the quality of effective online classes. To guarantee that ICT is properly utilized, it is critical to support teachers' training in the use of digital resources for pedagogical practice and to promote teaching techniques that are appropriate to this context. **Figure 10** graphically represents whether the students find their teachers active in terms of taking online classes regularly. Out of 196 respondents, 114 replied in the affirmative that their teachers do take online classes regularly. However, 82 respondents or 41.8% of them in total do not wish to state the same. They replied with “No” implying that their teachers are not particularly active in taking classes regularly.

3.11 Congenial Environment with regards to Effective E-learning

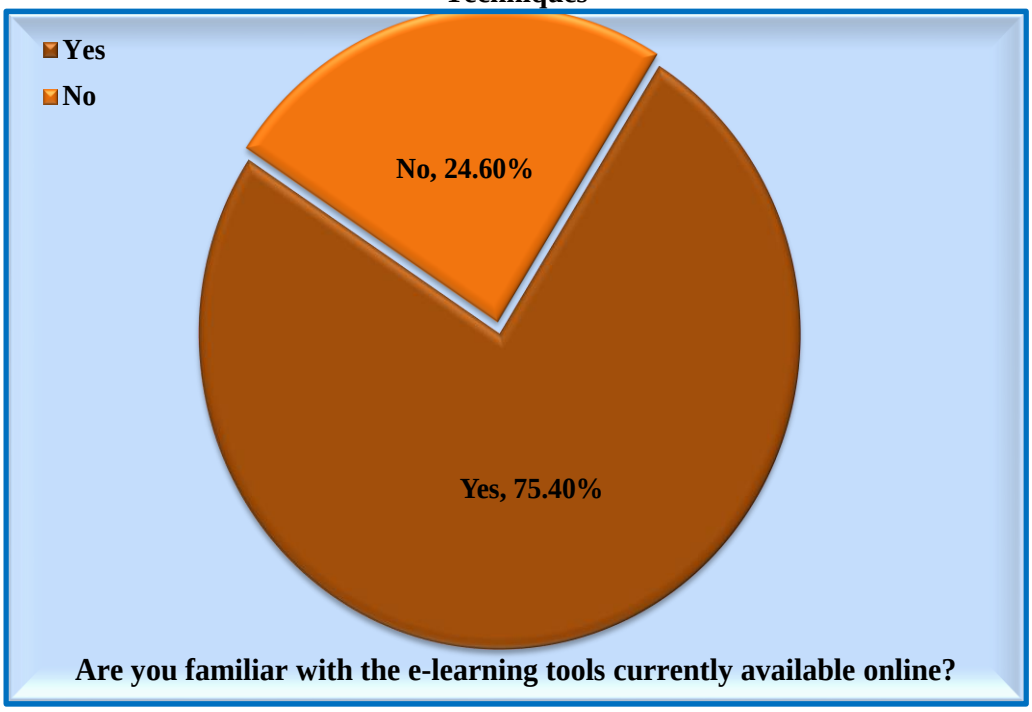
Figure-11: Student Perception about Congenial Environment with regards to Effective E-learning



Due to the outbreak of COVID-19, educational institutions were forced to close, causing an unprecedented impact on education (Muthuprasad et al., 2021). The COVID 19 has made e-learning as the new normal in academia, it is critical to take the necessary steps to ensure that students can learn uninterruptedly and optimally in a congenial learning environment. Though distance courses have existed for a long time, the introduction of the online mode of taking classes in universities, colleges, and schools in comparison to the traditional face-to-face classroom approach was only considered during the pandemic period in Bangladesh. When it comes to the educational system in Bangladesh, the face-to-face classroom approach has always been the most popular. The adoption of online classes of education has been hampered by the familiarity and ease of using offline methods, as well as the lack of tools and techniques for online classes. This is an educational program that shifts learning from the classroom to the home. Thus the effectiveness of learning is also dependent on the environment in which students take online classes and how well those constraints are addressed. **Figure 11** represents the environment of the students at home with regards to e-learning. Out of 196 respondents, 81 (41.3%) replied with 'good', 96 (49%) with 'not good', and 17 (8.7%) with 'not good at all'. According to the data, the majority of students at home do not enjoy their e-learning environment. For future pandemic preparation, creating a pleasant and uninterrupted homely environment for students using e-learning methods is a must; otherwise, students will not be able to gain proper insights despite attending classes

3.12 Familiarity of Students with E-learning Tools and Techniques

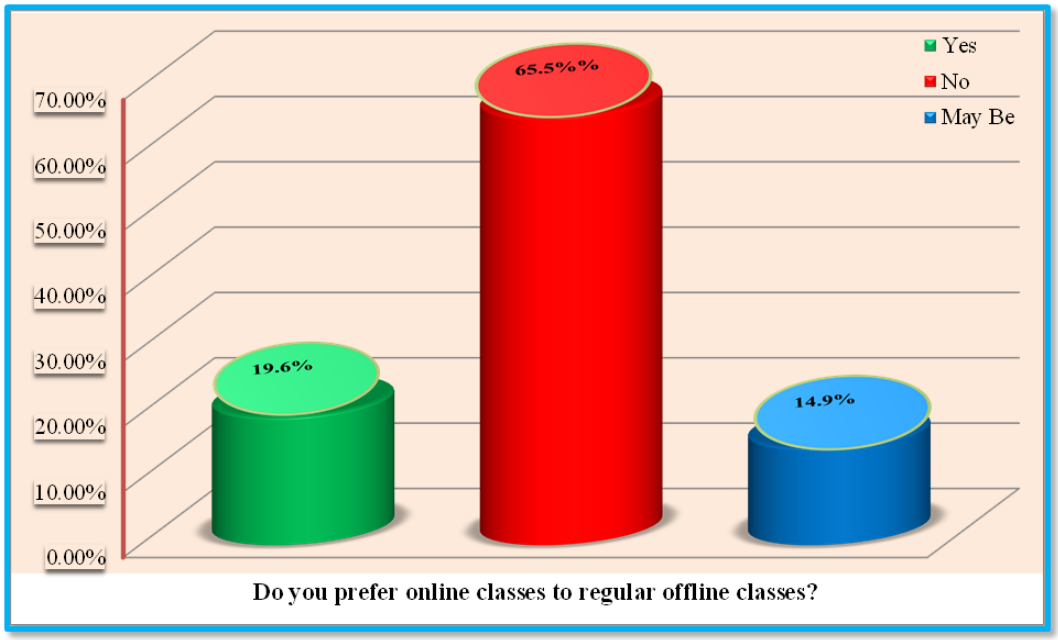
Figure-12: Student Perception about the Familiarity with E-learning Tools and Techniques



Electronic learning resources are preferred by today's students, particularly those affected by the COVID-19 pandemic. E-learning resources are interactive educational tools designed to run on a computer, mobile phone, or tablet computer (Boruff & Storie, 2014; Gaglani & Topol, 2014; Ortega et al., 2011). During the COVID-19 pandemic, universities all over the world used e-learning to keep students educated, regardless of whether or not students were familiar with the ICT technology (Saha et al., 2022). **Figure 12** represents the familiarization of the students at the major universities of Bangladesh with e-learning tools. The supermajority (75%) replied in affirmative that they are familiarized with the e-learning tools available to them. However, 48 respondents out of 196 (24.5%) responded with a 'No' in terms of any kind of familiarization with such tools – rendering a big chunk of the students clueless in terms of operating such tools and receiving education through these tools which is also alarming for the overall system. How can students use e-learning tools and techniques to attend online classes if they are unfamiliar with them? Universities must comprehend this phenomenon in order to plan and manage education effectively.

3.13 Preference about the E-learning Classes over Offline Classes

Figure-13: Student Perception on Preference about the E-learning Classes over Offline Classes



The COVID-19 pandemic caused many changes in our lives as a result of pandemic prevention strategies' consequences, and our educational system was no exception. Many countries including Bangladesh have adopted the virtual teaching-learning technique in their educational institutes during the COVID-19 pandemic (Basilaia, 2020). As the COVID-19 outbreak spreading the globe, educational institutions have been forced to close in order to contain the virus's spread. This incidence prompted policy makers and educators to consider alternative teaching methods during the pandemic. As a result, web-based learning, also known as e-learning or online learning, has become mandatory. **Figure 13** shows answers the question whether the students at the higher educational institutes prefer online classes over offline classes during the COVID-19 pandemic. The majority responded with a "No" (64.8%) – implying the urge to be present physically within the familiar classrooms and peers. The urgency of socializing with peers and receiving education directly through physical lectures via lively interaction and friendly exchanges create the urgency of practical knowledge that seems to flicker in online classrooms, especially in the current underdeveloped stage of e-learning in the country. Students benefit from direct instruction because it encourages more communication in the classroom. This is because students have a better opportunity to discuss their thoughts and feelings in a classroom setting. Nonetheless, 38 respondents (19.4%) prefer online classes to offline classes, which can be interpreted in a variety of ways depending on the respondents' situation and eagerness. It could be due to socioeconomic factors, such as the fact that many students work part-time to support themselves and their family. Furthermore, 14.8% of respondents chose "Maybe" as their preferred option.

4. Discussion:

Along with findings from other literature, this section mainly discusses the survey results of 129 students about the reality of e-learning facilities at the major public universities during the COVID-19 pandemic in Bangladesh. As shown in Figure 2, this study has found that 116 (roughly 60%) students out of 196 attended online classes regularly while 36 respondents (18.4%) students did not attend online classes regularly. The study has also found that the 40 respondents (20.4%) attended online classes irregularly. The sudden disruption of offline classes, lack of devices, and lack of knowledge of ICT use for online classes may get negative effects on students attending online classes regularly. A similar study was conducted in (Aldowah et al., 2019; Chen et al., 2020; Guo et al., 2020; Jena, 2020; Liyanagunawardena & Williams, 2021; Wang et al., 2021), where many students did not routinely attend online classes during the pandemic due to the abrupt disruption of face-to-face classes and a lack of ICT technical use (Batez, 2021). In Figure 3 depicts whether or not students enjoy their e-learning classes. While 79 students (40.3%) did not enjoy online classes 'too much' while 58 students (29.6%) did it. The vast majority of students did not enjoy online classes as the new ICT tool and techniques were unfamiliar to them. This finding is similar to other studies carried out anywhere in the world (Jones et al., 2020; Kapasia et al., 2020; Muthuprasad et al., 2021).

The findings of the study show that 155 respondents got access to ICT devices and internet facilities while 6 respondents did not get them (as seen in Figure 5)**.** 28 respondents reported that their devices did not work sufficiently for them to be able to do their classwork properly, while 7 respondents answered that they have 'shared' devices for attending classes and doing the class assignment. Electronic devices and internet access were a major burden for many students like in other developing countries like Bangladesh (Kedraka & Kaltsidis, 2020; Liguori & Winkler, 2020). The other issue related to student's opinions about the online education system during the COVID-19 pandemic at the major public universities in Bangladesh. The results show in **Figure 7** in that only 8 respondents (4.1%) marked it 'excellent' while a vast majority of respondents such as 80 (40.8%) viewed it 'good', 84 of them (42.9%) opined the e-learning system is 'below-average', while 24 (12.2%) students said it 'poor'. Near half of the surveyed students see e-learning facilities during the COVID-19 pandemic as below-average because they were not used to these sudden uses of ICT devices and tools. This result is also consistent with other studies carried out in similar socio-economic societies(Queen & Harding, 2020; Raaper & Brown, 2020; Ratten, 2020).

Another issue is related to whether students find their teachers active in terms of taking online classes regularly. The results show that 114 found their teachers take online classes regularly while 82 respondents (41.8%) did not find their teachers active. Students replied with "No" implying that their teachers were not regular in taking classes regularly. This is maybe the reason where some teachers were not fully equipped with ICT devices and tools to take online classes. This finding similar to other studies carried out in Sri-Lanka and India (Kapasia et al., 2020; Liyanagunawardena & Williams, 2021; Rameez et al., 2020)**.** The results of the study also represent the familiarization of the students with e-learning tools. The vast majority students (75%) replied that they were familiarized with the e-learning tools available to them while 24.5% responded with a 'No' in terms of any kind of familiarization with such tools – rendering a big chunk of the students clueless in terms of operating such tools and receiving education through these tools which is also alarming for the overall system. A recent small scale study carried out in 2020 in Bangladesh in a university shows that many students were not

familiar with e-learning tools and techniques for attending online classes (Dutta & Smita, 2020; Hossain et al., 2021; Tabassum et al., 2021). In Figure 13 also shows whether the students prefer online classes over offline classes during the COVID-19 pandemic. The result is consistent with other studies also shows that the majority students (64.8%) did not prefer e-learning classes– implying the urge to be present physically within the familiar classrooms with peers (Dutta & Smita, 2020).

5. Concluding Remarks

Although there are a number of obstacles that students and teachers face when teaching online learning, the findings of this study show that delivering classes online is a commendable initiative adopted by the current government to prevent students' academic activities from being lost. Students and teachers must be encouraged to complete this activity effectively and accurately, and it must be perceived as a challenge to complete. The government should also provide the necessary resources to public-funded higher educational institutions in order to establish digital infrastructures across the country. As students are the major stakeholders and they must be self-motivated to take a greater interest in receiving feedback on their digital classes in all of their undertakings. The importance's of online learning during challenging times and emphasizes the need for support and resources from the government to ensure its effectiveness. It also emphasizes the role of students in being self-motivated and actively seeking feedback to make the most out of their online classes.

The government, teachers and learners should consider some issues to make effectiveness of e-learning method that are following: *Accessibility and equity:* The government should address the issue of accessibility to online education by providing necessary resources, such as computers, internet access, and digital learning platforms, to students in underserved areas. This will help bridge the digital divide and ensure equal opportunities for all students. *Teacher training and support:* Along with supporting students, it is crucial to provide adequate training and support to teachers in effectively delivering online classes. Teachers need to be equipped with the necessary digital skills and pedagogical strategies to engage students and maintain the quality of education in an online setting. *Continuous improvement:* The government should encourage regular evaluation and improvement of online learning initiatives. Feedback from students, teachers, and other stakeholders can be valuable in identifying areas of improvement and implementing necessary changes to enhance the learning experience. *Emotional and social well-being:* Online learning can sometimes lack the social interactions and emotional support that come with traditional classroom settings. It is important to prioritize the emotional well-being of students and provide opportunities for social interaction, collaborative projects, and extracurricular activities in the online learning environment. *Research and innovation:* The government can support research and innovation in online education to explore new methods, technologies, and platforms that enhance student engagement and learning outcomes. Collaborations between educational institutions, industry experts, and technology providers can foster innovation and lead to more effective online learning solutions. By considering these points, the government can play a crucial role in facilitating successful online learning experiences for students and teachers, ensuring educational continuity and minimizing the impact of disruptions on students' academic activities.

References:

Aldowah, H., Al-Samarraie, H., & Ghazal, S. (2019). How Course, Contextual, and Technological Challenges are Associated with Instructors' Individual Challenges to Successfully Implement E-Learning: A Developing Country Perspective. *IEEE Access*, *7*, 48792–48806. https://doi.org/10.1109/ACCESS.2019.2910148

Almahasees, Z., Mohsen, K., & Amin, M. O. (2021). Faculty's and Students' Perceptions of Online Learning During COVID-19. *Frontiers in Education*, *6*, 119. https://doi.org/10.3389/FEDUC.2021.638470/BIBTEX

Badiuzzaman, M., Rafiquzzaman, M., Rabby, M. I. I., & Rahman, M. M. (2021). The Latent Digital Divide and Its Drivers in E-Learning among Bangladeshi Students during the COVID-19 Pandemic. *Information*, *12*(8), 287. https://doi.org/10.3390/INFO12080287

Basilaia, G. (2020). Replacing the Classic Learning Form at Universities as an Immediate Response to the COVID-19 Virus Infection in Georgia. *International Journal for Research in Applied Science and Engineering Technology*, *8*(3), 101–108. https://doi.org/10.22214/IJRASET.2020.3021

Batez, M. (2021). ICT skills of university students from the faculty of sport and physical education during the COVID-19 pandemic. *Sustainability (Switzerland)*, *13*(4), 1–13. https://doi.org/10.3390/su13041711

Belay, D. G. (2020). COVID-19, Distance Learning and Educational Inequality in Rural Ethiopia. *Pedagogical Research*, *5*(4), 0082.

Boruff, J. T., & Storie, D. (2014). Mobile devices in medicine: a survey of how medical students, residents, and faculty use smartphones and other mobile devices to find information. *Journal of the Medical Library Association : JMLA*, *102*(1), 22. https://doi.org/10.3163/1536-5050.102.1.006

Chen, T., Cong, G., Peng, L., Yin, X., Rong, J., & Yang, J. (2020). Analysis of user satisfaction with online education platforms in china during the covid-19 pandemic. *Healthcare (Switzerland)*, *8*(3). https://doi.org/10.3390/healthcare8030200

Chipeva, P., Cruz-Jesus, F., Oliveira, T., & Irani, Z. (2018). Digital divide at individual level: Evidence for Eastern and Western European countries. *Government Information Quarterly*, *35*(3), 460–479. https://doi.org/10.1016/J.GIQ.2018.06.003

Cohen, M. Z., Phillips, J. M., & Palos, G. (2001). Qualitative research with diverse populations. *Seminars in Oncology Nursing*, *17*(3), 190–196. https://doi.org/10.1053/SONU.2001.25948

Collis, B., Vingerhoets, J., & Moonen, J. (1997). Flexibility as a Key Construct in European Training: Experiences from the TeleScopia Project. *British Journal of Educational Technology*, *28*(3), 199–217. https://doi.org/10.1111/1467-8535.00026

COVID-19 timeline in Bangladesh - Better Work. (n.d.). Retrieved January 10, 2022, from https://betterwork.org/portfolio/covid-timeline-in-bangladesh/

de Vries, T. J. (2021). The Pandemic That Has Forced Teachers to Go Online. Zooming in on Tips for Online Teaching. *Frontiers in Education*, *6*, 105. https://doi.org/10.3389/FEDUC.2021.647445/BIBTEX

Dutta, S., & Smita, M. K. (2020). The Impact of COVID-19 Pandemic on Tertiary Education in Bangladesh: Students' Perspectives. *Open Journal of Social Sciences*, *08*(09), 53–68. https://doi.org/10.4236/jss.2020.89004

Finkelstein, J. E. (2006). *Learning in Real Time: Synchronous Teaching and Learning Online*. John Wiley & Sons.

Gaglani, S. M., & Topol, E. J. (2014). IMedEd: The role of mobile health technologies in medical education. *Academic Medicine*, *89*(9), 1207–1209. https://doi.org/10.1097/ACM.0000000000000361

Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, *26*(6), 6923–6947. https://doi.org/10.1007/S10639-021-10523-

1/TABLES/6

Guo, L., Wu, M., Zhu, Z., Zhang, L., Peng, S., Li, W., Chen, H., Fernández-Aranda, F., & Chen, J. (2020). Effectiveness and influencing factors of online education for caregivers of patients with eating disorders during COVID-19 pandemic in China. *European Eating Disorders Review*, *28*(6), 816–825. https://doi.org/10.1002/erv.2783

Haleem, A., Javaid, M., & Vaishya, R. (2020). Effects of COVID-19 pandemic in daily life. *Current Medicine Research and Practice*, *10*(2), 78. https://doi.org/10.1016/J.CMRP.2020.03.011

Hossain, M. J., Ahmmed, F., Rahman, S. M. A., Sanam, S., Emran, T. Bin, & Mitra, S. (2021). Impact of online education on fear of academic delay and psychological distress among university students following one year of COVID-19 outbreak in Bangladesh. *Heliyon*, *7*(6), e07388. https://doi.org/10.1016/j.heliyon.2021.e07388

Jena, D. P. K. (2020). Impact of Pandemic Covid-19 on Education in India. *International Journal of Current Research*, *12*(07), 12582–12586.

Jones, T. A., Vidal, G., & Taylor, C. (2020). Interprofessional education during the COVID-19 pandemic: finding the good in a bad situation. *Journal of Interprofessional Care*, *34*(5), 633–646. https://doi.org/10.1080/13561820.2020.1801614

Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., Barman, B., Das, P., & Chouhan, P. (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India. *Children and Youth Services Review*, *116*, 105194. https://doi.org/10.1016/j.childyouth.2020.105194

Kedraka, K., & Kaltsidis, C. (2020). Effects of the Covid-19 Pandemic on University Pedagogy: Students' Experiences and Considerations. *European Journal of Education Studies*, *7*(8), 17–30. https://doi.org/10.46827/ejes.v7i8.3176

Khalil, R., Mansour, A. E., Fadda, W. A., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., Alkhalifah, A., & Al-Wutayd, O. (2020). The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: A qualitative study exploring medical students' perspectives. *BMC Medical Education*, *20*(1), 1–10. https://doi.org/10.1186/S12909-020-02208-Z/TABLES/2

Kim, K. J., Liu, S., & Bonk, C. J. (2005). Online MBA students' perceptions of online learning: Benefits, challenges, and suggestions. *The Internet and Higher Education*, *8*(4), 335–344. https://doi.org/10.1016/J.IHEDUC.2005.09.005

Liguori, E., & Winkler, C. (2020). From Offline to Online: Challenges and Opportunities for Entrepreneurship Education Following the COVID-19 Pandemic. *Entrepreneurship Education and Pedagogy*, *3*(4), 346–351. https://doi.org/10.1177/2515127420916738

Liyanagunawardena, T. R., & Williams, S. A. (2021). Emergency Remote Education: Experience from Sri Lanka during Covid-19. *Asian Journal of Distance Education*, *16*(1), 2021. http://www.asianjde.com/

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID -19 pandemic. *Social Sciences & Humanities Open*, *3*(1), 100101. https://doi.org/10.1016/j.ssaho.2020.100101

OECD. (2020). *Strengthening online learning when schools are closed: The role of families and teachers in supporting students during the COVID-19 crisis*.

Ortega, L. D. M., Plata, R. B., Jiménez Rodríguez, M. L., Hilera González, J. R., Martínez Herráiz, J. J., Gutiérrez De Mesa, J. A., Gutiérrez Martínez, J. M., & Otón Tortosa, S. (2011). Using M-learning on nursing courses to improve learning. *Computers Informatics Nursing*, *29*(5), 311–317. https://doi.org/10.1097/NCN.0B013E3181FCBDDB

Queen, D., & Harding, K. (2020). Societal pandemic burnout: A COVID legacy. *International Wound Journal*, *17*(4), 873–874. https://doi.org/10.1111/iwj.13441

Raaper, R., & Brown, C. (2020). The Covid-19 pandemic and the dissolution of the university campus: implications for student support practice. *Journal of Professional Capital and*

Community, *5*(3–4), 343–349. https://doi.org/10.1108/JPCC-06-2020-0032
Rameez, A., Fowsar, M. A. M., & Lumna, N. (2020). Impact of Covid-19 on Higher Education Sectors in Sri Lanka: A Study based on South Eastern University of Sri Lanka. *Journal of Educational and Social Research*, *10*(6), 341–349. https://doi.org/10.36941/jesr-2020-0132
Ramij, M. G., & Sultana, A. (2020). Preparedness of Online Classes in Developing Countries amid COVID-19 Outbreak: A Perspective from Bangladesh. *SSRN Electronic Journal*. https://doi.org/10.2139/SSRN.3638718
Ratten, V. (2020). Coronavirus (Covid-19) and the entrepreneurship education community. *Journal of Enterprising Communities*, *14*(5), 753–764. https://doi.org/10.1108/JEC-06-2020-0121
Reuters. (2020a). *Bangladesh confirms its first three cases of coronavirus | Reuters*. Reuters, 2020. https://www.reuters.com/article/us-health-coronavirus-bangladesh-idUSKBN20V0FS
Reuters. (2020b). Bangladesh confirms its first three cases of coronavirus. *Retrieved April*, *14*, 2020. https://www.reuters.com/article/us-health-coronavirus-bangladesh-idUSKBN20V0FS
Reuters Staff. (2020). Bangladesh reports first coronavirus death. *Reuters*. https://www.reuters.com/article/health-coronavirus-bangladesh-idUSL4N2BB384
Saha, S. M., Pranty, S. A., Rana, M. J., Islam, M. J., & Hossain, M. E. (2022). Teaching during a pandemic: do university teachers prefer online teaching? *Heliyon*, *8*(1), e08663. https://doi.org/10.1016/J.HELIYON.2021.E08663
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. *Frontiers in Education*, *6*, 265. https://doi.org/10.3389/FEDUC.2021.703723/BIBTEX
Selvaraj, A., Radhin, V., KA, N., Benson, N., & Mathew, A. J. (2021). Effect of pandemic based online education on teaching and learning system. *International Journal of Educational Development*, *85*, 102444. https://doi.org/10.1016/J.IJEDUDEV.2021.102444
Shammi, M., Bodrud-Doza, M., Towfiqul Islam, A. R. M., & Rahman, M. M. (2020). COVID-19 pandemic, socioeconomic crisis and human stress in resource-limited settings: A case from Bangladesh. *Heliyon*, *6*(5), e04063. https://doi.org/10.1016/J.HELIYON.2020.E04063
Star, T. D. (2020). *First coronavirus cases confirmed | The Daily Star*. https://www.thedailystar.net/frontpage/news/first-coronavirus-cases-confirmed-1878160
Tabassum, M., Mannan, S. E., Parvej, M. I., & Ahmed, F. (2021). Online Education during COVID-19 in Bangladesh: University Teachers' Perspective. *Aquademia*, *5*(1), ep21005. https://doi.org/10.21601/aquademia/9611
Tarman, B. (2003). *The Digital Divide in Education*. ERIC.
Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, *14*(5), 216–223. https://doi.org/10.1108/09513540010344731/FULL/XML
Wang, K., Zhang, L., & Ye, L. (2021). A nationwide survey of online teaching strategies in dental education in China. *Journal of Dental Education*, *85*(2), 128–134. https://doi.org/10.1002/jdd.12413
Zalat, M. M., Hamed, M. S., & Bolbol, S. A. (2021). The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLOS ONE*, *16*(3), e0248758. https://doi.org/10.1371/JOURNAL.PONE.0248758
Zhang, Q., Cheng, L., & Boutaba, R. (2010). Cloud computing: State-of-the-art and research challenges. *Journal of Internet Services and Applications*, *1*(1), 7–18. https://doi.org/10.1007/S13174-010-0007-6/METRICS