



## Research Article

# Emergency Remote Education During the COVID-19 Pandemic: Lesson Learnt from Higher Education in Bangladesh

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**Abstract:** During the COVID-19 pandemic, the education systems in almost all parts of the world came to a sudden standstill followed by an expedited transition to emergency remote teaching and learning. Traditional universities in Bangladesh, a country with minimal resources and expertise in online teaching, also hurriedly transitioned to online education. This article focuses on the first phase of the pandemic and the impact that lockdown and social distancing had on the teaching and learning methods used in Bangladesh's higher education sector. The study highlights the need for strategic planning to improve future preparedness for emergency remote education. Using a mixed-method research approach, a dataset was developed through an online survey of public and private university teachers' views and experiences. Findings revealed that private university teachers tended to be significantly more engaged in emergency remote teaching and learning than their public sector peers. Although teacher participation was mainly driven by university initiatives, almost a quarter of this drive could be attributed to personal initiatives. Further, previous online teaching experience and training had a significant positive effect on full engagement. In addition to identifying important factors affecting the transition from conventional face-to-face to online teaching in Bangladesh, the recommendations for the future of emergency teaching and learning proposed in this article have important implications for higher education policy-makers in any resource-constrained context.

**Keywords:** Bangladesh, COVID-19, Education in Emergencies (EiE), Emergency Remote Education (ERE), higher education, online teaching, pandemic, private university, public university, remote teaching, teaching and learning, teachers' perspective

## 1. Introduction

Crises, such as the recent global pandemic caused by the spread of the coronavirus, have seriously impacted education systems worldwide (Shohel et al., 2022a; Bond et al., 2021). In addition to the closure of education institutions for prolonged periods, the COVID-19 pandemic resulted in drastic changes to teaching delivery and learning assessment methods (Hew et al., 2020; Mottiar et al., 2024; Şenel & Şenel, 2021; Zhang et al., 2021). Whilst the initial impact was mainly negative, some positive effects have also been noted (Shohel et al., 2022b). Negative impacts

include reduced participation of students, lack of motivation, difficulty with technologies, mental health issues, and social isolation among university staff and students (Filho, 2021; Sahu, 2020). In some cases, staff and students also reported an overall decrease in life satisfaction (Zimmermann, 2021). In contrast, the unplanned transition to online and blended learning approaches noted by Hosen (2022) facilitated competency in the use of technologies (Bygstad, 2022), improved student inclusivity (Díaz-Noguera, 2022) and motivation (Beardsley et al., 2021). It also added flexibility of teaching and learning methods, and the development of new learning and assessment pedagogies (Slack & Priestley, 2023). For many countries, such as Bangladesh, the impact of the COVID-19 pandemic on teaching and learning was even more pronounced, as most higher education providers moved to online teaching and learning activities for the first time. The sudden transition to online education created several challenges for higher education sector in Bangladesh. These challenges, which are discussed further below, are likely to have been experienced in other resource-constrained scenarios.

The responses to online education may vary from one context to another, depending on resource availability. The provision of a specific policy for emergency remote teaching, adequate resources, motivated teachers and students, and administrator initiative could play the main role in making a new initiative successful (Roy & Abdin, 2023; Shohel et al., 2022b). Many countries, including Bangladesh, began online teaching and learning activities widely in higher education sector for the first time during the COVID-19 pandemic. This created several challenges, which are discussed below. Using a new learning modality, such as online education, has both immediate effect and long-term impacts on the future preparedness of institutions to provide education in emergencies (EiE) (Shohel et al., 2022a). While Bangladesh's educational institutions use technology-enhanced teaching and learning practices from primary to higher education, the use of emerging digital technologies, including the internet, is a new phenomenon for continuing EiE (Shohel et al., 2022a). Issues such as teacher preparedness, student and teacher motivation, internet speed and cost, and administrator motivation have all presented challenges for the integration of digital learning technologies (Roy et al., 2023).

In higher education sector in Bangladesh, computers and the internet are used to support teaching and learning; however, pedagogical integration in educational activities is yet to be established (Shohel et al., 2022a). The use of technologies during EiE is a concern for Bangladesh as it continues to face various disasters each year including those of natural (such as floods) and human-made varieties (such as class closure due to political movements). As a consequence, there is a demand for new teaching and learning strategies to continue educational activities in an emergency. The COVID-19 pandemic created a new scope for integrating technologies and pedagogical approaches, and served as an opportunity to review the preparedness for future EiE. This article identifies the factors behind the responses of higher education teachers towards the transition to emergency remote teaching and learning during the COVID-19 pandemic in Bangladesh. It also explores the long-term effect of pandemic aligned pedagogical practices in higher education. Owing to the significance of this pandemic, the study also provides insights for future preparedness in the event of unplanned interruptions to education.

## 2. Literature review

### 2.1 *Teaching in emergency*

The impact of the COVID-19 pandemic on the education system was unprecedented in modern history. Emergency remote education (ERE) is a type of distance education, however, is not a new concept (Bond et al., 2021). This also falls into the category of education in emergencies (EiE) (Shohel, 2022). In the past decade, several natural disasters and human-made crises (such as war and political clashes) have led to the use of ERE in many parts of the world. It is well known that the use of emerging technologies has a prominent role in ensuring effective and cost-efficient ERE (Rapanta et al., 2020). These technologies, which may often be lacking in economically poorer countries and communities, include hardware for teachers and students such as laptops and mobile phones, reliable internet connection and appropriate software. Teachers often require support for delivering teaching in emergencies to enable them to adapt to new technologies, pedagogical methodologies, and associated changes in teacher-student interactions (Espino-Díaz et al., 2020). Researchers note several pedagogical differences between remote learning and conventional classroom-based education, such as the availability of increased learning methods, limited opportunities to monitor assessments, and reduced interactions between teacher and learner (Oyedotun, 2020). These pedagogical changes significantly impact the

academic achievement and learning experience of students (Hew, 2020).

A quick decision on implementing remote education during an emergency is possible if a country or higher education institution (HEI) has a specific policy or guidelines for EiE. Many European or North American HEIs have adequate resources to continue an online provision during an emergency. This is a challenge for many Asian countries (Marinoni et al., 2020), particularly in resource-constrained higher education sector such Bangladesh. The transfer of instructional activities from one form to another requires specific policy guidelines to ensure a fast and efficient response to teaching and learning activities during and after an emergency (Kalloo et al., 2020). Institutions in China, for example, had such a policy in place and were able to act promptly in response to emergency teaching (Xue et al., 2020; Zhang et al., 2020). This practice was not observed in Bangladesh (Roy et al., 2023). While the National Education Policy (2010) and the National Information and Technology Policy (2018) of the Government of Bangladesh (GoB) prioritised the use of information and communication technology (ICT) in education, they did not focus on EiE (GoB, 2018; GoB, 2010). The guidelines provided by the University Grants Commission (UGC) of Bangladesh for blended education within HEIs also failed to address EiE (Hossain, 2020). Ill-prepared for continuing education in an emergency, the country's experience of the COVID-19 pandemic provided an opportunity to understand the initial measures that need to be taken by university administrators before, during, and after a disaster.

## **2.2 Remote learning pedagogy**

There has been a growing trend in the use of remote or distance learning for many years. In the UK, the Open University has provided online distance learning courses to large cohorts of students since 1969. Between 2011 and 2021, the number of participants in Massive Open Online Courses (MOOCs) has risen from 300 thousand to almost 220 million (Shah, 2021). The COVID-19 pandemic added more educational institutions to what was already a growing online learning sector.

Researchers have proposed various theories regarding effective online learning techniques (Gaytan & McEwen, 2007; Junk et al., 2011). It is important to note that online learning is not a simple change of delivery methods for the same content as conventional classroom-based education. Rather, content, classroom interactions and assessment methods all require adjustment for effective online teaching. According to Pelz (2010), three principles must be applied for effective online pedagogy:

- Let the students do most of the work through application of flipped learning approaches (Jenkins et al., 2017; Kemp et al., 2002; Rahman et al., 2020),
- Keep the classroom environment interactive (Grönlund & Islam, 2010), and
- Strive for social, cognitive and teaching presence (Pelz, 2010).

Following the renowned work of Bransford et al. (2000) on learning processes, effective online learning needs the intersections of four overlapping lenses: community-centeredness, knowledge-centeredness, learner-centeredness, and assessment-centeredness.

Modern cutting-edge technologies eliminate the barriers to remote learning procedures and make the processes of teaching and learning more collaborative and impactful (Priyankar, 2016). Many universities in developing countries, for example, are considering blended learning by adapting the features of online learning technologies.

## **3. The context of the study**

After completing a total of 12 years of primary, secondary and higher secondary education, students enter universities for higher education in Bangladesh, predominantly through public and private universities. According to the University Grants Commission (UGC), there are currently 54 public universities and 112 private Universities in Bangladesh. In public universities, the cost of education is almost entirely paid by the Government in public universities; student accommodation, food and other costs are also usually highly subsidised. Public universities are autonomous institutions run by self-statutory bodies (such as an academic council, senate and syndicate) and admission is highly competitive. Private universities are also autonomous and established under Bangladesh's Private University Act, however, students pay the full cost of education (Nobi, 2018). Admission to reputed private universities may still be competitive, despite the high fees associated with the education.

The COVID-19 pandemic is significant as its effects have been felt globally to varying degrees. Developing countries, such as Bangladesh, have felt them more severely owing to poor infrastructure and facilities, a severe lack of (teacher and student) technological skills, and very little preparation for dealing with such a massive challenge (Roy et al., 2023; Shohel et al., 2022b). This study aims to explore the impact of the COVID-19 pandemic on the teaching and learning methods in Bangladesh's higher education sector through the collection and analysis of a diverse range of practitioner-related data. The dataset was analysed to estimate the impact of the pandemic quantitatively, and to understand teachers' views on the transition to ERE in addition to its longer-term impact on teaching and learning approaches. The results from this study provide important insights into the response of higher education practitioners during the pandemic, and the current and future state of remote teaching and learning in Bangladesh. These understandings are required to develop national and university-level policies to support online teaching and learning in Bangladesh, and inform policy-makers across other low-resource countries.

## 4. Research questions

The specific research questions explored through this study are:

- What were the factors behind higher education teachers' responses to transitioning to emergency remote teaching and learning during the COVID-19 pandemic in Bangladesh?
- What were the determining factors supporting or hindering online teaching and learning in Bangladesh during COVID-19 and beyond?
- What are the longer-term effects of the pandemic on the teaching and learning pedagogy in the higher education sector?

## 5. Methodology

### 5.1 Research design

The data discussed here is drawn from a larger research project carried out during the COVID-19 pandemic. The main study employed a convergent parallel mixed-methods approach to data collection (Robson, 2011), aligned with pragmatism (Onwuegbuzie & Leech, 2005), to give equal weight to quantitative and qualitative data. The focus of this article is on quantitative data collected from university teachers, through a questionnaire, to identify specific teaching and learning practices in higher education during emergencies. This form of research design facilitates detailed description and provides an in-depth understanding of a specific situation and generalisation of the topic studied (Mertler, 2020). This study is centred on teachers' views and perceptions about their online teaching practices, with the aim of providing future direction for online education policy during an emergency. Descriptive phenomenology was selected to facilitate understanding of teacher perceptions and experiences since it "describes the meaning for several individuals of their shared experiences of a concept or a phenomenon" (Creswell, 2007, p. 57).

### 5.2 Participants

The participants of this study were higher education teachers occupying the roles of Lecturer, Assistant Professor, Associate Professor, and Professor at public and private universities in Bangladesh. Among the participants, 73.4% identified as male, 24.8% identified as female, 0.6% preferred not to say, and 1.2% did not answer. Of these, 54.6% taught at public universities and 45.4% taught at private universities. With regard to their highest educational qualification, 12.4% of participants held an undergraduate degree, 56.6% held a master's degree, and 30.8% held a doctoral degree. Teaching experience among the participants also varied. 7.6% of teachers reported that they had been teaching for less than one year, 21% had been teaching for 1-3 years, 15.4% for 4-6 years, and 55.8% for over six years. For participant age, 28.8% selected the range 21-30, 38.2% selected 31-40, 20.6% selected 41-50, 8.2% selected 51-60, 3.4% selected 60 and above, and 0.8% did not answer. As stated above, survey participants were from a diverse set of people in terms of gender, qualification, age and teaching experience.

### **5.3 Research tool**

An online questionnaire was designed and created for the survey with the university teachers using the Online Surveys (<https://www.onlinesurveys.ac.uk>) platform. The primary survey was piloted with a small number of participants. Several language-related adjustments were then made to clarify questions and finalise the survey. The survey contained both closed-ended and open-ended questions. The first part of the survey provided the necessary information about the study objective, research protocols, and ethical considerations to elicit informed consent from participants. Once consent had been gained, participants were asked for their demographic information. This information included department name, university name and type, age and gender, teaching experience and educational qualification. A series of closed-ended questions about online teaching and learning activities followed. Open-ended questions asked participants' opinions about online teaching and learning challenges, good practices, strengths, limitations, and suggestions for future improvement. Some of this demographic information and responses to closed-ended and open-ended questions are presented and discussed later in the findings and discussion sections.

### **5.4 Data collection**

Data was collected over an 8-week period between June and July 2020. Public and private university teachers' email addresses were collected from the UGC. An email invitation containing a direct link to the survey was sent to 12,468 prospective research participants. Of these, 819 emails bounced back, indicating that a total of 11,649 emails had been successfully delivered. In total, 525 responses were received (4.51% of the successfully delivered emails). Two reminders were sent during the data collection period to encourage participation. The first reminder was sent four weeks after the initial survey email invitation, while the last one was sent after the seventh week. Data was cleaned manually by inspecting the saved contents on the survey platform and a total of 500 responses were accepted as valid. Of the responses, 273 were from public university teachers and 227 were from private university teachers. Some survey responses were incomplete and therefore not included in the analysis.

### **5.5 Data analysis**

This article reports the findings from demographic information and closed- and open-ended questions. After cleaning the first round of the data, the team jointly identified six themes through which to unpack pandemic online learning practices and their long-term effects. These comprised:

- Teacher engagement,
- Background factors for teacher engagement,
- Tools used for online teaching and learning,
- Teacher preparedness,
- Support for online teaching, and
- Future directions.

IBM SPSS Statistics 27 software was used to check the quantitative data. The missing values were checked carefully, and the necessary coding and recording were completed. After finalising the data set, descriptive statistical analysis was carried out to explore the survey responses. Microsoft Excel software was used to facilitate the visualisation of some findings. For the qualitative data, thematic analysis was carried out to facilitate interpretation and triangulation of data.

### **5.6 Ethical considerations**

Throughout the research process, the academic ethical guidelines (BERA, 2018; BPA, 2018) were followed. At the beginning of the survey, study objectives, research protocols, the right to withdraw from the study, and other ethical issues were described in detail. The participants were asked to provide consent before starting the survey. In the event that consent was not given, the survey page closed. For those who consented, a link re-directed them to the survey questions. After data collection, personal information (such as name, email address, institutional affiliation, and so forth) was removed from the dataset to preserve anonymity and ensure confidentiality. The clean dataset was saved digitally

and stored securely.

## 6. Results

### 6.1 Engagement in remote learning during the COVID-19 pandemic

The percentage of teachers who delivered various degrees of online teaching during the COVID-19 pandemic in Bangladesh is illustrated in Figure 1. Up until the data collection date, only 57% of research participants working at Bangladeshi universities delivered online teaching fully during the COVID-19 lockdown. Of the remaining teachers, 14% started but were unable to continue after a while, 14% took up the online teaching initiative but did not deliver any, and 15% did not take up the initiative or deliver any online teaching at all. A comparison of public and private university teachers' engagement (Figure 2) in remote teaching revealed that 90% of private and 30% of public university teachers delivered online teaching fully. Around 6% of private and 48% of public university teachers did not deliver any online teaching, even though they may have taken up the initiative.

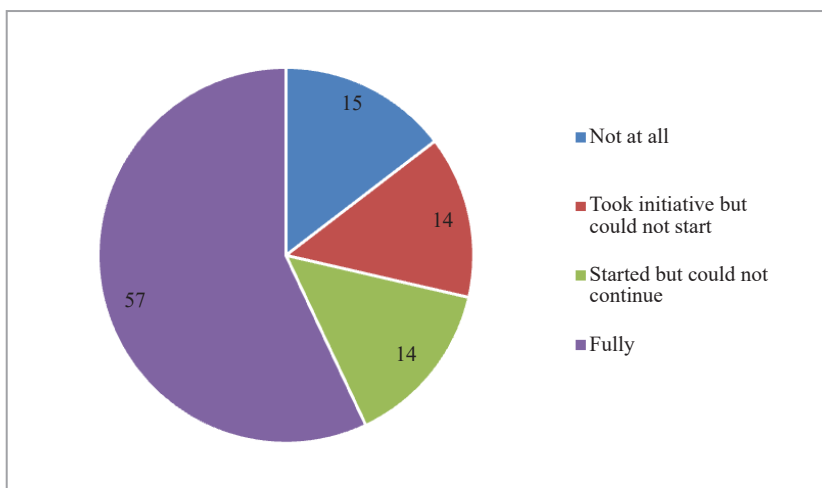


Figure 1. Percentage of teachers' initiatives for online teaching during COVID-19 lockdown in Bangladesh

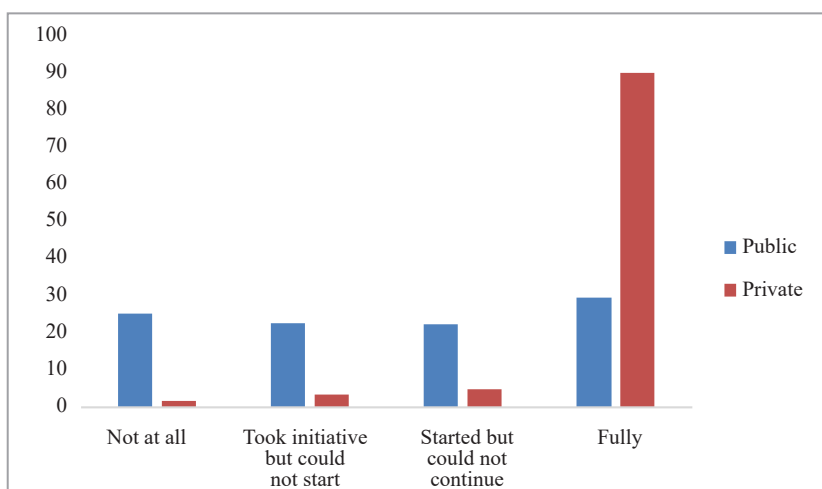


Figure 2. Breakdown of the engagement in online teaching during the COVID-19 pandemic between public and private university teachers in Bangladesh

The types of online teaching initiatives undertaken by the teachers are presented in Figure 3. Although the majority of the initiatives were either university-wide (46%) or department-wide (16%), around one-quarter of initiatives were personal.

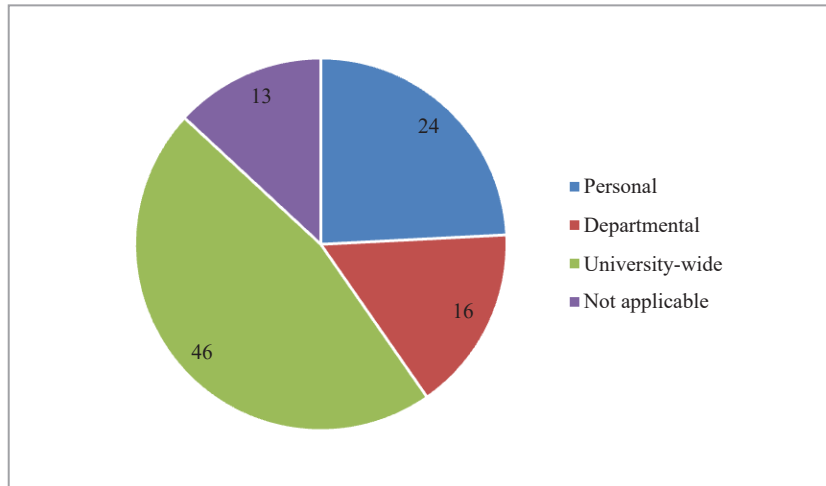


Figure 3. Types of online teaching activities undertaken by university teachers in Bangladesh during the COVID-19 pandemic

The research participants’ understanding of student participation in online teaching is reflected in Figure 4, where only 28% of teachers reported that more than 75% of their students participated in online teaching sessions. A further 23% of teachers reported that 51-75% of their students participated.

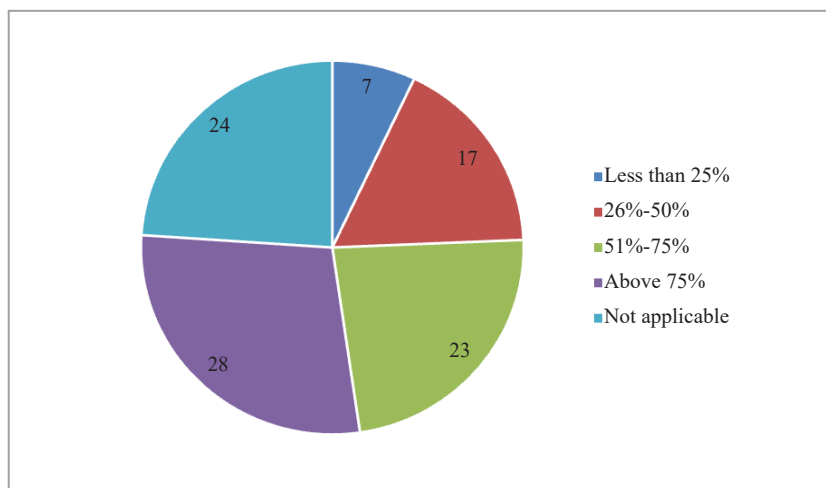


Figure 4. The rate of students’ participation in online classes reported by the teachers during the COVID-19 lockdown

## 6.2 Online teaching and learning tools used by university teachers

The various digital tools used to deliver online teaching during the pandemic are shown in Figure 5. Zoom was by far the most popular software used by teachers. Google Meet, Google Classroom and Facebook Messenger were also used widely. Although Microsoft Teams is popular for online teaching worldwide during COVID-19 pandemic (Sundari

& Karthikeyan, 2022), Bangladesh’s university teachers only had limited opportunity to use this tool during the pandemic.

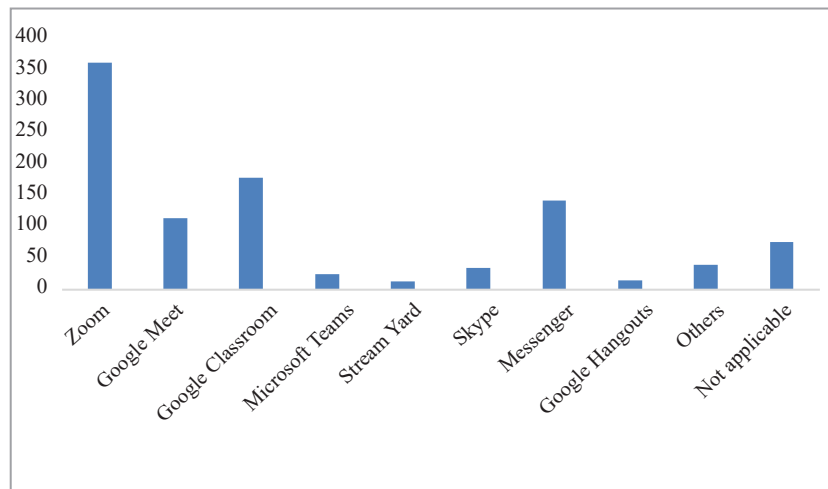


Figure 5. Learning tools used by the university teachers in Bangladesh in online teaching during the COVID-19 pandemic

### 6.3 Teacher preparedness for online teaching

Figure 6 shows the percentage of teachers with previous online teaching experience and training. Approximately 21% of public and 25% of private university teachers had prior experience of online teaching. With respect to training for online teaching, private university teachers (46%) out-numbered those in public universities (29%).

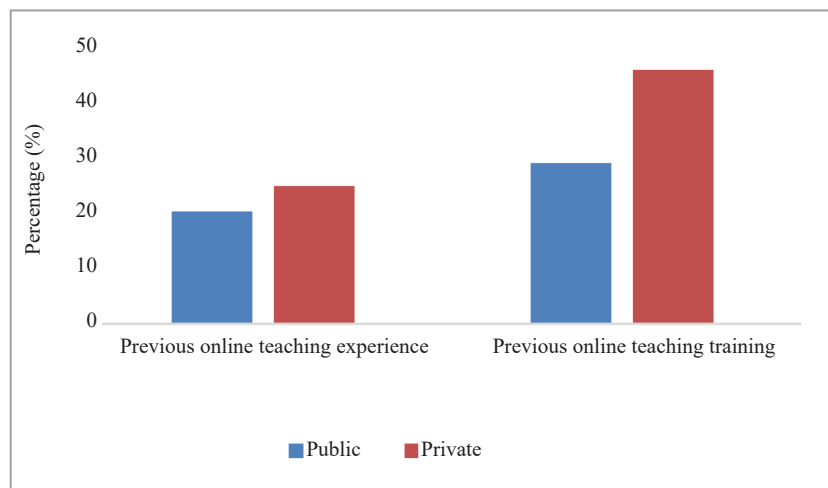


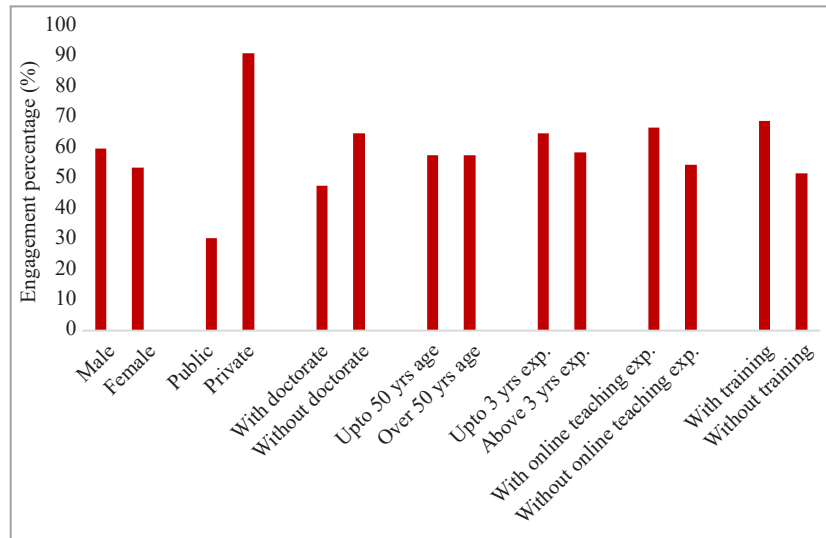
Figure 6. Pre-COVID-19 experience and training of online teaching among the public and private university teachers in Bangladesh

### 6.4 Background factors influencing teacher engagement in online teaching

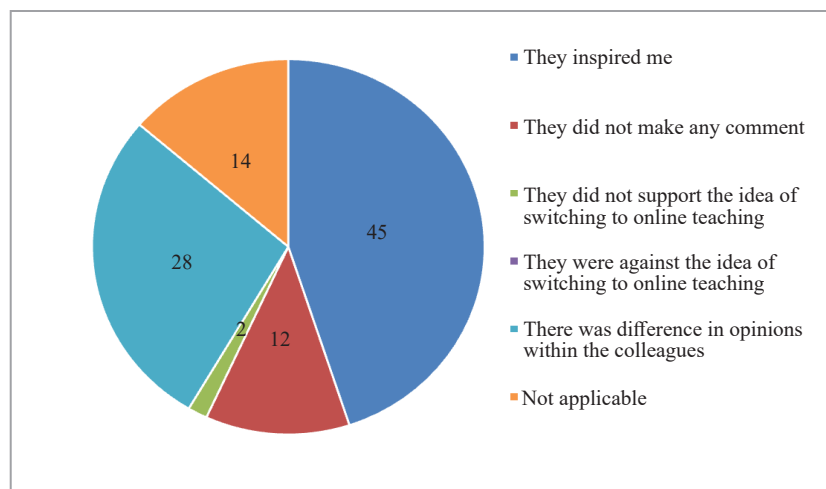
Figure 7 refers only to teachers who conducted online teaching throughout the pandemic. The largest factor in online teaching engagement during this time was the type of institution (public or private) as opposed to previous online teaching experience, training, or teaching background. Approximately 90% of the teachers from private universities reported full engagement in online teaching. This was only 30% for public university teachers. It was also found that



previous online teaching and training experience had a significant positive effect on teachers' take-up of online teaching throughout the pandemic. Teachers with a doctoral degree (47%) demonstrated comparatively less engagement with online teaching across the pandemic than those without doctoral degree (64%). No significant difference was found in between gender and age group.



**Figure 7.** Comparison of background factors among the university teachers who have taken full initiative of online teaching during the COVID-19 lockdown in Bangladesh



**Figure 8.** Percentage of teachers reporting various feedback they have received from their university, department or colleagues regarding their online teaching initiatives

### 6.5 Support for online teaching

Only 45% of the teachers reported positive feedback or inspiration from their university or colleagues regarding the online teaching initiatives (Figure 8). More than one-quarter of teachers reported a mixed scenario where they received some sort of positive support from their colleagues or university administration. 14% of teachers reported an absence of comment or inspiration from their institutions, or that they were actively discouraged from switching to an online teaching modality.

## 6.6 Future direction of online teaching in higher education in Bangladesh

Teachers' opinions on the future direction of online teaching in Bangladesh's higher education are presented in Figure 9. Around 60% of the private and public university teachers considered that 'a mix of online and traditional teaching would be the new trend'. Around 16% of public and 9% of private university teachers mentioned that 'only a limited number of universities will adopt online teaching'. Approximately 16% of the participants reported that instead of online teaching, 'traditional face-to-face teaching would be the dominating practice'. The remaining participants commented that either 'online and blended teaching would be the norm' (10%) or that 'a new trend of online-based degrees would be introduced' (15%).

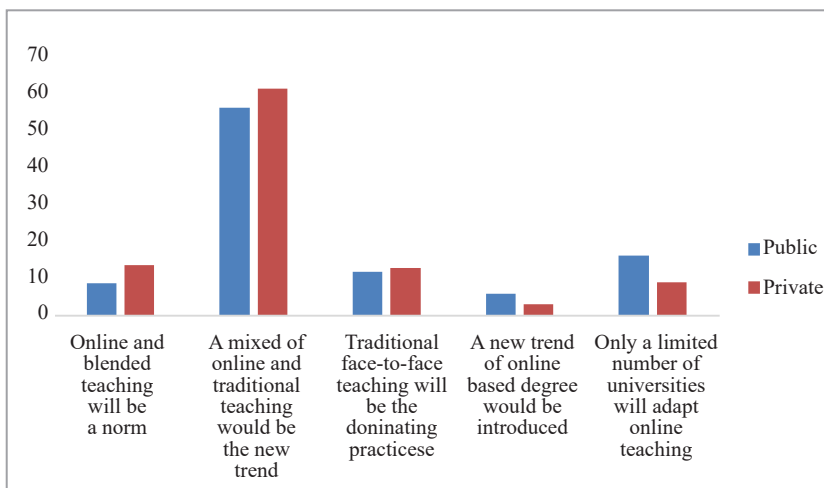


Figure 9. Percentage of teacher's views on the future adoption of online teaching by universities

Figure 10 shows the percentage of teachers with plans for continuing online teaching. 45% of public and 61% of private university teachers said that they 'would continue online teaching but in a limited way'. Around 20% of teachers from both public and private universities reported that they wanted to continue with online teaching, whilst 10% of public and private university teachers reported that they 'would not continue'.

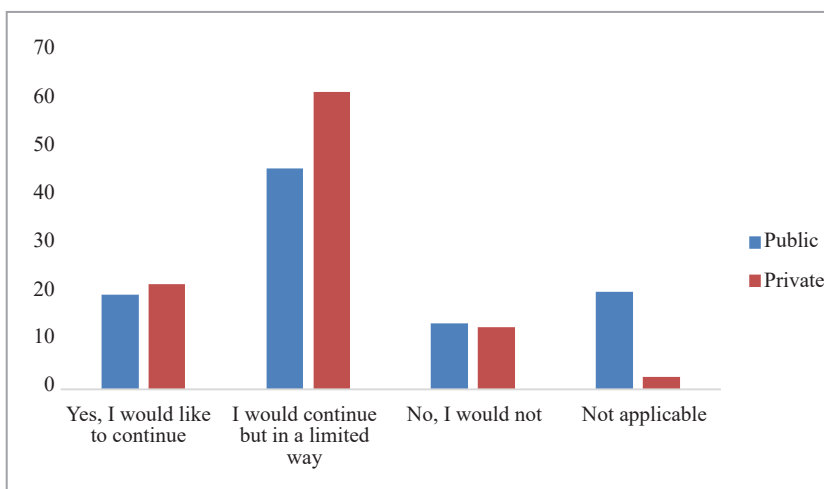


Figure 10. Percentage of teachers' opinions on the future continuation of online teaching in Bangladeshi universities

## 7. Discussion

This study identified several challenges and strengths in responses to emergency remote teaching and learning in Bangladeshi universities during the COVID-19 pandemic. Many teachers started and continued online teaching during the pandemic despite the challenges. Private university teachers were ahead of public university teachers (Roy et al., 2023; Shohel et al., 2022b). The administrators of private universities acted promptly and put instant initiatives in place to continue education during the crisis (Roy et al., 2023), which may have helped their teachers to respond according to the situation. Most public universities in Bangladesh have to maintain a bureaucratic protocol for making academic decisions, which takes considerable time. For instance, making a policy-level decision requires approval from syndicates or similar bodies. Private universities, on the other hand, were able to make the necessary decisions within a shorter time-frame and this reality is reflected in teacher responses in online activities as private university administrators could make a decision on an ad-hoc basis. Prompt decision-making by private universities could be the main reason for their high engagement in online teaching and learning activities during the pandemic and could, potentially, help them prepare for future online education activities in an emergency situation. Further, public university administrators could draw from this experience to develop suitable response strategies to improve future preparedness.

The results also highlight the fact that the majority of teachers in both public and private universities lacked previous experience and training in online teaching. This proved to be a major obstacle in the transition to online learning during the COVID-19 pandemic in Bangladesh, particularly in relation to speed. For the first time, Bangladesh faced the kind of emergency that required sector-wide closure. As a result, this pandemic created the chance to develop familiarity widely across the HE sector with the online learning modality. Whilst this approach created several challenges for teachers, it also provided an opportunity to integrate new teaching and learning strategies in HEIs. This experience is particularly important for university administrators because, a speedy response is a priority to avoid interruptions in educational activities.

It is also evident that teachers use a variety of platforms for their online teaching activities across the education section. However, as most of the universities were not using any specific Learning Management System (LMS) before or during the pandemic, the university authorities were unable to offer technological infrastructure and support to continue online teaching and learning procedures. Along with popular remote learning tools such as, Zoom, Google Meet and Google Classroom. Facebook Messenger is also used by some teachers. With its focus on social networking and limited features for teaching, it is an unusual choice. Its popularity among the young generations in Bangladesh and ease of use for two-way communication, between teacher and student, is likely the primary reason for its use in online teaching during the COVID-19 pandemic.

The scenario discussed above draws attention to the fact that Bangladesh's universities, like many other countries, were not prepared for a new and unfamiliar system (Toquero, 2020). The use of such platforms might be acceptable as a first response to an emergency situation. However, administrator-managed initiatives (through an LMS) are desirable for the long-term effectiveness of online educational activities. Previous studies indicate that teachers and students are keen to use online learning platforms; however, evidence suggests that there has been a lack of support from university administrators (Roy & Abdin, 2023). As the technological infrastructure is not well-developed in Bangladesh, HEIs and teachers participating in this study had not been trained to use online teaching tools and resources to continue teaching and learning activities during an emergency, the necessary online resources had to be managed by the administrators.

Challenges encountered by teachers when transitioning to online teaching included the limited availability of hardware and internet connections, the lack of training, and financial issues such as the high cost of internet connections. Other major issues included the lack of teacher-student interaction, difficulty in conducting a proper assessment of learning, digital inequality between students, and the lack of proper guidance from their institution. These issues impacted both students and teachers in Bangladesh owing to the HEIs' lack of adequate resources. It is imperative to provide the necessary support to both parties for smooth online education experiences in the future. Teachers need experience in managing course activities and integrating ICT (emerging technologies) and pedagogy (Phan & Dang, 2017; Varvel, 2007) if they are to provide effective online teaching and learning.

Almost all teachers in public and private universities commented on the lack of hardware. Infrastructure is one of the largest challenges when transitioning to online teaching and is, therefore, a major challenge for future emergency teaching and learning in Bangladesh. Broadband internet connection in Bangladesh is still limited to big cities and

people in rural areas often depend on mobile internet connections that tend to be unreliable and expensive (Shohel et al., 2022b). Furthermore, the electricity connection in Bangladesh is frequently interrupted to cover the gap between energy generation and usage, repeatedly interrupting online classes. The price of mobile internet packages in Bangladesh is also expensive, which not only prohibits the regular participation of some students but also increases the economic divisions between students from varying financial backgrounds.

In a resource constrained context like that of Bangladesh, such issues are likely to demotivate teacher and student engagement towards online education. In order to design guidelines for future emergency teaching, these obstacles should be taken seriously. While it may not be possible for HEIs to overcome these issues alone, targeted support through government initiatives would be beneficial. During the initial days of the pandemic, for example, the Government of China instigated some country-wide initiatives (Zhang et al., 2020). These helped Chinese HEIs to continue their online educational activities. A similar initiative from the Government of Bangladesh could facilitate uninterrupted university teaching and learning activities during an emergency.

The lack of adequate training for online education, and the resultant lack of technological skills and knowledge of online teaching pedagogy, may have contributed to the low participation in online teaching in Bangladesh. The small percentage of teachers with previous experience and/or training in online teaching could account for the poor transition during the pandemic. Teachers also noted a lack of technological skills among the students, which created barriers to effective teaching and assessment. These problems seem to have been exacerbated by the lack of access and know-how regarding the use of effective teaching software. Consequently, teachers had to rely on familiar software, such as Facebook Messenger, despite its unsuitability for online teaching. These findings highlight the need for adequate training for teachers to integrate pedagogical aspects in online teaching. This aligns with the technical competencies, such as the integration of ICT and pedagogy (Phan & Dang, 2017; Varvel, 2007).

An absence of coordinated online teaching transition initiatives from institution executives and administrators is also evident. The problems were more severe in the case of public universities. Owing to poor understanding of the extent of the pandemic and lack of preparation for such an extreme scenario in all universities, communication with the educators and students was also haphazard. Although many universities, especially the private ones, eventually took up initiatives for online teaching to reduce learning loss and continue EIE, it was often uncoordinated and tended to depend upon the personal skills and initiatives of teachers. Even then, the initiatives were not always fully supported by the institute or their colleagues.

Several teachers also reported a lack of pedagogical knowledge about online teaching and assessment as a primary reason for the poor retention of students in online classes during the COVID-19 pandemic in Bangladesh. University authorities should provide teachers with the necessary training, guidance, and resources to ensure they are adequately prepared for any future emergency situation. Due to a very short transition time and deficit in online pedagogical understanding, many teachers simply tried to teach the same content through similar delivery methods used for face-to-face classes. These approaches were not effective as the curriculum, teaching materials, and assessments used in online teaching were designed for face-to-face teaching. As teacher confidence depends on several factors, it is imperative to prepare them by reviewing their current skills and aptitude towards online education. The readiness, willingness and attitude of teachers are important to make online learning a successful journey (Cutri & Mena, 2020; Martin et al., 2019).

The above pedagogical issue also created problems for the development of suitable learning assessment processes. The most common modes of assessment in the Bangladeshi HE sector are in-person exams, assignments, class-based quizzes, and viva. Apart from the assignments, assessments could not be organised during the pandemic resulting in a significant challenge for academic staff. Assessments in practical subjects, such as lab-based courses, were even more difficult to organise online.

This study demonstrates that one of the pedagogical challenges of online teaching is the use of suitable methods for evaluating the effectiveness of teaching. In online teaching during the COVID-19 pandemic, university teachers in Bangladesh used their judgement and experiences in delivering the curriculum; however, many of them acknowledged that they were not sure whether their teaching was effective. A significant number of teachers reported learning objectives not being achieved. Clear teaching and learning and assessment guidance from the university authorities would help teachers in this regard. While teachers are generally motivated towards online teaching (Roy & Abdin, 2023), a set of guidelines from university administrators would go a long way to improving their confidence.

Many of the techniques used in conventional classroom-based teaching can be used to evaluate the effectiveness of online teaching. These include assessment of achievement against pre-defined learning objectives, student feedback, peer observation, assessment of learning outcomes, and student performance over the longer term. However, there are a few important differences that need to be considered. Evaluation based on student participation and interaction, classroom dynamics, and practical activities, for example, can be significantly different in the case of online teaching. In the context of the Bangladeshi HE sector, student participation and interaction during online classes are often hindered by the lack of suitable hardware, internet connection, and technological knowledge. Therefore, if the matrix of student participation and interaction is used in evaluating the effectiveness of online teaching, it may result in an inaccurate representation of the effectiveness of the teaching itself. While in-person teaching emphasises real-time interaction and classroom dynamics, online teaching focuses on the effective use of technology, asynchronous engagement, and data-driven insights. The evaluation process should adapt to these differences to ensure accurate assessments of teaching effectiveness.

The effectiveness of a new initiative in Bangladeshi HEIs is dependent on the existence of a specific policy. While HEIs worldwide were struggling with the transition to online teaching during the pandemic, the universities of China drew upon established policies and guidelines and directly commenced online education (Xue et al., 2020; Zhang et al., 2020). There was a considerable delay before the UGC of Bangladesh provided guidelines for the integration of blended approaches in education. Such guidelines should be considered by the universities of Bangladesh in order to prepare for the provision of EIE in the future. In the event that a university cannot continue traditional and face-to-face learning activities during an emergency, blended learning could be a viable alternative to ensure the continuation of education and engage teachers and students in teaching and learning activities.

## **8. Recommendations for future directions**

This section offers recommendations for improving responses to future emergency crises in the higher education sector, drawing on the lessons learnt from this study.

### **8.1 *Institutional preparedness for emergency remote education (ERE)***

The absence of institutional preparedness in terms of lack of policy guidelines for ERE and necessary plans for transition during the COVID-19 pandemic in Bangladesh revealed significant challenges in moving to online learning. Institutions were often unprepared, leading to inconsistent implementation of remote education. It is critical that HEIs and national governments develop comprehensive policies for ERE that can be enacted swiftly during future crises regardless of their cause (pandemics, natural disasters, or political unrest). These policies should address teacher training, technological infrastructure, and clear guidelines for online pedagogy.

### **8.2 *Investment in technological infrastructure and readiness***

One of the most significant lessons from the pandemic is the vital role of digital infrastructure in maintaining educational continuity during crises. Both students and teachers faced difficulties due to unreliable online communication tools, insufficient hardware, and the lack of proper learning management systems. To prepare for future crises, substantial investment in digital infrastructure is needed. This should include the expansion of access to broadband in rural areas, affordability of mobile internet, and provision of the necessary tools (such as laptops, software, and servers) for educational institutions to sustain long-term online teaching. Building resilient, scalable digital ecosystems will help universities respond more effectively to any future disruptions.

### **8.3 *Teacher and students' preparedness for online education***

Teachers and students alike were underprepared for the sudden shift to online education, with limited training and unfamiliarity with digital tools negatively affecting the quality of instruction and learning. This experience underscored the importance of ongoing professional development and training in digital pedagogy for the teachers. This includes

training in the use of digital tools, creating engaging online content, managing virtual classrooms, and assessing students in a remote environment.

#### **8.4 Flexibility in learning models**

Teachers in the study indicated a preference for blended learning approaches, where online and traditional teaching methods are combined. This hybrid approach offers flexibility and can be adapted quickly in response to emergencies. Institutions should adopt blended learning as a standard practice to ensure seamless transition to fully remote education in the event that it is needed. This will also provide continuity for students who may face disruptions due to local or national crises.

#### **8.5 Equity in access to education**

The pandemic exacerbated existing inequalities in which students from lower socio-economic backgrounds struggled with access to reliable technology and internet services. Governments and educational institutions must prioritise measures that reduce inequality in accessing education. Subsidised internet access, provision of digital devices for students, and establishment of community learning centres in underserved areas are key steps towards ensuring that all students can continue their education during emergencies.

#### **8.6 Developing crisis-specific assessment strategies**

The difficulty in conducting assessments and ensuring academic integrity during the pandemic highlighted the need for alternative assessment strategies. Future crises may limit traditional assessment methods, such as in-person exams. Universities should explore and implement flexible, crisis-specific assessment models (such as open-book exams, project-based evaluations, and peer assessments) to ensure that learning objectives are met without compromising academic integrity.

### **9. Conclusion**

Unlike previous responses to various natural and human-made disasters, the COVID-19 pandemic experience draws attention to current limitations in the preparedness for continuing education during emergency situations in Bangladesh. Study findings are likely to be helpful to university administrators and policy-makers worldwide, particularly in developing countries, for the development of strategies to minimise the impact of emergencies on the provision of education. The transition to online teaching in Bangladesh was severely affected by a serious lack of hardware, infrastructure, and technological skills. The lack of preparedness and pedagogical knowledge around online learning among the university teachers also contributed to a slow transition and low engagement. It is also evident that private university teachers engaged more positively than public university teachers with the transition to online education. The main reasons for this include the higher competitiveness of performance among private universities, higher obligations to high fee-paying students, and quick decision-making processes.

Although university authorities took up most online teaching initiatives, it is encouraging to see a significant proportion of online teaching (almost a quarter of all initiatives) was undertaken through personal initiatives. This demonstrates the commendable commitment of the university teachers in Bangladesh towards the learning of their students in resource-constrained scenarios. The majority of teachers who participated in this survey believe that the blended teaching method will be the prevailing method of teaching in Bangladesh's higher education in the future. The majority of private and public university teachers noted that they aimed to continue to use online teaching in limited capacities. The major obstacles to widespread online teaching remain the lack of hardware, infrastructure, and know-how for online teaching among both teachers and students.

The COVID-19 pandemic provided a valuable opportunity to learn how universities can respond to large-scale crises. These lessons are particularly relevant when preparing for future emergencies (including natural disasters, war and political unrest) in Bangladesh and beyond. By strengthening digital infrastructure, adopting flexible learning

models, ensuring equity and access, and building comprehensive crisis management plans, universities can enhance their resilience in the face of future conflicts. Online and blended modalities appear to offer the best solution for ensuring the continuance of education during these times.

## Conflict of interest

The author declares no competing financial interest.

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