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Teaching and Learning in Higher Education in Bangladesh during the COVID-19 Pandemic: Learning from the Challenges

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Abstract: The higher education sector globally has gone through a transition because of the coronavirus outbreak, and as a result, many traditional higher education institutions across the globe have been forced to go online to provide education and arrange assessments so that their students could continue their education and complete their courses. Unlike developed countries, at the beginning of the lockdown, most of the higher education institutions in Bangladesh shut down their operations, and a few universities started moving toward online distance teaching and learning activities. Based on an empirical study, this article discusses the challenges of teaching and learning in higher education in Bangladesh during the COVID-19 lockdown. It also identifies good practices to overcome those challenges. An online survey was conducted to collect data from university teachers throughout the country. Findings from this study show that it was a great challenge for most universities to adopt online teaching and learning models at the beginning of the pandemic. Many factors, such as preparedness, limited resources including financial means, low digital literacy, internet connectivity and suitable physical and virtual infrastructure affected this transition. However, the findings also show that the COVID-19 pandemic created new opportunities for educators and practitioners to explore various professional development activities by trying out different digital pedagogies through practice and reflection. This article also highlights the immediate effect and long-term impact on teaching and learning regarding preparedness for future approaches to education in emergencies.

Keywords: Bangladesh; challenges; COVID-19; digital pedagogies; education in emergencies; emergency remote teaching and learning; higher education; higher education institutes; online distance teaching and learning; opportunities; future directions

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1. Introduction

The COVID-19 pandemic has changed the landscape of higher education across the globe [1,2], including in Bangladesh [3–6]. Traditional face-to-face classrooms around the world have been replaced by emergency remote teaching and learning (using combinations of online, hybrid, and digital education systems) because of the sudden closure of educational institutions such as schools, colleges, and universities to prevent the spread of the coronavirus [7,8]. This widespread technological adaptation or diffusion was long-overdue; the pandemic was a catalyst for the transition and transformation of education systems to adjust to the technological advancements of the 21st century. This pedagogical transformation could be termed as a 'rebirth' and included new perspectives on education as serving new purposes through new pedagogical approaches and new practices (refer to 3NPs) [9]. Country-wide lockdowns showed how vulnerable traditional education systems are to emergencies and their various shortcomings [10].

The COVID-19 situation has challenged the deep-rooted notions of time, place, and methods of teaching and learning, i.e., when, where, and how education programmes can

be delivered and the role of educational institutions in providing educational programmes and learning opportunities. It also shows the importance of continuing education as a lifelong learning process and of educators to become reflective practitioners [11]. This unprecedented situation has also clearly distinguished between the traditional and non-traditional mindsets of educators and learners. As a result, different pedagogical models have emerged, and in the process of transition and transformation, both teachers and students have been working as change agents. As the teachers are integral parts of this transition and transformation, more educators are exploring the possibilities of distance teaching and learning as an effective pedagogical method in these challenging times [12].

The higher education sector in Bangladesh, with a growing body of private universities, was not prepared to deliver teaching and learning under these emergency conditions [6]. Most public universities were closed for a long period during COVID-19 because of the inadequate technology and pedagogical support [13]. However, later, several public university faculty members conducted online classes on their own [6]. Some higher education institutions used pre-recorded video lectures uploaded on YouTube, which students could access via devices such as desktops, laptops, tablets, and smartphones [6]. In this context, studies identified some problems regarding online education in Bangladeshi higher education institutions, such as lack of adequate devices for all students, limited availability of broadband connections in households, and expensive internet data rates [5,14–17]. While several studies discussed the barriers mainly from the technical and technological aspects, evidence on how teachers continued their good practices to overcome the challenges of limited resources is still unexplored, and this study aims to fill that gap. The study, therefore, explores the challenges of teaching and learning during the COVID-19 lockdown and identifies the good practices used by the higher education institutions to overcome these challenges.

2. Literature Review

2.1. Online Teaching and Learning during an Emergency

Digital technologies make distance teaching and learning more collaborative and impactful [18]. Emerging technologies, i.e., high-speed internet, cloud-based software, and online educational resources, blur the lines between remote and in-person teaching and learning. Cutting-edge technologies push the boundaries further, as educational institutions are advancing toward the era of Education 4.0 [19]. In the global north, blended learning approaches are becoming more popular in the context of higher education [20,21]. With the adaptation of emerging technologies in everyday life, teachers in higher education must be able to integrate technology with their expertise to foster an interactive and supportive learning environment for their students. As digital natives, the new generation of techno-savvy students should also be encouraged to engage in collaborative peer-to-peer study outside of allocated class time [21]. This helps students to gain a better understanding of course content through shared discussions and creates a university-based learning culture, as they feel more easily able to interact with each other.

In response to the COVID-19 pandemic, many educational institutions implemented social distancing interventions, such as initiating closure, developing plans for teachers to work remotely from home, and switching teaching and learning from their face-to-face classroom environments into virtual online learning environments [2,6,14,22,23]. Though online distance teaching and learning is not a new concept [24], many traditional universities across the globe, including in Bangladesh, were forced to switch to online teaching for the first time because of the global pandemic and subsequent lockdown and social distancing rules [6]. Online distance teaching and learning is also known as distance education or e-learning [25]; its popularity is increasing due to emerging technologies as well as the associated flexibility and cost-effectiveness [26,27]. With online education, teaching and learning take place anywhere at any time, using the internet and collaborative synchronous or asynchronous tools [26].

Studies [28,29] show that the number of students who have had online learning experiences has continued to increase each year. Online education is growing in popularity by virtue of convenience, technological advancement and the availability of the internet [30]. However, the abrupt switching to emergency remote teaching and learning because of the COVID-19 pandemic has created concerns about the pedagogical soundness of this mode of delivery. This switch has been a significant change for administration, teachers and students at traditional higher education institutions and has called into question the resultant quality of teaching and learning activities and the assessment of learning among many beneficiaries and stakeholders. In addition, the switch has also revealed inequalities when it comes to the types of students served as a result of the accessibility of provided education [31].

It is essential as higher education institutions move forward with online instruction that policies and strategies need to be put into place to help support and meet all constituents' needs, both under normal operations and when unprecedented situations arise [32]. To describe the worth of emergency e-learning in creating an equitable opportunity for all, Murphy [33] argued that emergency e-learning could be extended after any pandemic so that wider access to education is created for those who are unable to attend full-time in-person classes due to personal and financial considerations. Thus, it is crucial to explore the experiences of teachers, students and policymakers to understand current trends and future directions of higher education in Bangladesh.

With the declaration of COVID-19 as a global pandemic in March 2020, all educational institutions' campuses in Bangladesh were closed. Educational institutions in most developing and developed countries were consequently moved to teaching and learning online [34,35]. Even when university campuses were reopened, teachers and learners had to continue practising physical distancing and continued some of their works online. However, the situation created by the COVID-19 pandemic has been a wake-up call for stakeholders (educators, learners, policymakers and society at large) to acquire a more holistic understanding of the challenges and opportunities of the mainstream educational systems around the world [36]. Fundamentally, the pandemic has caused higher education institutions to challenge (i) the inherent notions of how, when and where to deliver education, (ii) the holistic role of higher education institutions, (iii) the significance of lifelong learning and reflective practice, and (iv) the particularity of traditional and non-traditional learners concerning time, space and the context of learning [37–43].

2.2. Teaching and Learning in Higher Education in Bangladesh during COVID-19 Lockdown

During the COVID-19 lockdown, the government of Bangladesh, especially the Ministry of Education and the University Grants Commission of Bangladesh, played important roles in addressing the issues to provide access to education across the education sector in Bangladesh. As mentioned above, immediately after the declaration of the coronavirus as a global pandemic, unlike in the developed world, most universities in Bangladesh just shut down their operations, leaving students without instruction for an extended period. Later, a few universities started adopting online distance teaching and learning activities to allow students to continue to study, helping them to progress and finish their courses. In general, all Bangladeshi higher education institutions mostly follow a face-to-face mode for providing education, training and research, except for the Bangladesh Open University and the newly established Bangabandhu Sheikh Mujibur Rahman Digital University [44]. Only these two universities have approval from the government and the University Grants Commission of Bangladesh (UGC), the government's regulatory body under the Ministry of Education to oversee higher education, to provide higher education using a distance mode [45,46]. At the beginning of the pandemic, the UGC instructed private universities that they could run their teaching and learning activities online, but they could not complete assessments using a distance learning mode [47].

Later, driven by the uncertainty caused by COVID-19 and the global outlook of transitioning traditional face-to-face teaching and learning into an online format, the government

asked all Bangladeshi higher education institutions to set up 'online programmes' [6,48]). The online learning platforms were new to most teachers and students; they had to familiarise themselves with emerging technologies and fulfil the technological requirements for integrating those emerging technologies into their teaching and learning contexts [49]. The unprecedented lockdown of the COVID-19 pandemic revealed inequalities (i.e., rural vs. urban students, public vs. private university students and teachers, males vs. females, lab and field-based disciplines vs. other disciplines) in the educational system and the specific effects of inequities when it comes to teaching and learning online [3,31]. For example, many students do not have access to adequate tools to attend online classes and access digital learning content as their financial situation does not allow this [16]. Students who did not participate in online learning activities faced 'systematic' or 'structural' discrimination. Many students do not have a sufficient learning space or environment at home because of their low socioeconomic backgrounds [50]. Furthermore, a considerable number of students reside in remote areas where neither electricity nor internet access is available [3].

Compared to other parts of the world, Bangladesh played a reluctant role in responding to the emergency situation caused by the COVID-19 pandemic. While Bangladesh declared the campuses closed, some overseas higher education institutions adopted innovative strategies, for example, a medical college in the USA adopted flipped classrooms, social media-based classrooms, online practical classes, academic conferences via teleconference and so on. Facilitators also used surgical videos to teach their students [51]. Moreover, a case study of a Chinese university found that teachers adopted various strategies to ensure students' learning achievement during the pandemic, for example, ensuring a high relevance between the online instruction and students' learning, ensuring effective delivery of online instructional information, and finally developing a contingency plan to deal with the unexpected situation through online education [52]. In addition, researchers, for example, Murphy [53], have emphasised the psychological impact of the pandemic on students and found that almost 30% of them experienced anxiety during the pandemic for various reasons, including separation from friends and relatives, financial challenges, and illness of family members. Studies of this nature are rare in the context of Bangladesh.

The long-term closing of the higher education institutions caused by the COVID-19 crisis appeared as another form of 'session jam'. In Bangladeshi higher education culture, there is a history of political interference on campuses and shutting down institutions for long periods of time, leading to students being unable to complete their academic programmes on time. These academic backlogs are known as 'session jams' in Bangladesh. A prolonged session is usually caused by political unrest or violence [54]. Initially, students and teachers were disassociated from educational activities due to the government repeatedly extending the closure of higher education institutions due to the pandemic, creating what many saw as 'session jams'. The academic community usually does not take initiative to reactivate academic activities or reopen the universities under session jam conditions; rather, it relies on the government to find a solution in order to restart academic activities. However, over time, Bangladeshi universities used available resources to provide their service of teaching and learning and continued academic activities remotely.

3. Research Questions

The purpose of the research was to first investigate the challenges of teaching and learning in higher education in Bangladesh during the COVID-19 lockdown and then to identify good practices by higher education institutions to address such challenges. The following research questions were explored in the study:

1. What were the challenges of emergency remote teaching and learning in Bangladeshi universities during the COVID-19 lockdown?
2. What were the positive aspects and learning from the challenges of online teaching and learning in Bangladesh during the COVID-19 lockdown?
3. What lessons did Bangladeshi universities take away from emergency remote teaching and learning during the COVID-19 lockdown to prepare for future emergencies?

4. Methodology

This main research project was based on a mixed-methods multi-perspectival study design to explore the research questions from multiple perspectives, i.e., teachers, students and policy makers. According to Creswell [55], mixed-methods research helps to investigate the social complex phenomenon most effectively; therefore, the empirical study was designed to explore the complexity of higher education teaching and learning in Bangladesh. However, this article is only based on teachers' perspectives and only used the survey responses, both close-ended and open-ended questions, from the questionnaire. The questionnaire was designed to collect both quantitative and qualitative data from the faculty members of both public and private universities. Therefore, to analyse the learnings obtained from the challenges of teaching and learning during COVID-19 lockdown, this study used the descriptive phenomenology method to obtain teachers' perspectives, as this allowed us to gather the participants' descriptions of experiences as open-ended text [55,56]. Through descriptive phenomenology, it is possible to understand people's subjective experiences of an event [55], as this approach helps the researchers obtain insights into the participants' experiences of a specific phenomenon in a descriptive manner; this study used the phenomenon of teaching and learning experiences and challenges of Bangladeshi higher education institution teachers during the COVID-19 lockdown. "A phenomenological study describes the meaning for several individuals of their shared experiences of a concept or a phenomenon" (p. 57) [54]; this study explores teachers' experiences and challenges as a result of this specific situation.

4.1. Research Participants and Data Collection

Teachers of Bangladeshi public and private higher education institutions were chosen as the research participants. Following the University Grants Commission (UGC) links to websites, the publicly available email addresses of all public and private university faculty members were collected from individual university websites, and they were invited to attend the survey. For understanding the teachers' perspectives, a total of 12,468 email addresses were collected, and email invitations were sent to all of them (11,649 delivered and 819 bounced back) to participate in the survey. The survey was conducted in June and July 2020. Within an 8-week window, a total of 525 survey responses (response rate of 4.9%) were received. Such a response rate can be accepted, as the response rate for an online-based survey is usually low [57], ranging from 3% to 5% [58,59] and almost always less than 10% [60]. While there is a potentiality of bias, it is assumed that such a low response rate would not create a highly biased result [61]. However, among the respondents, 388 (73.9%) were males and 133 (25.3%) were females and 4 (0.8%) did not mention their gender. Among the participants, 291 (55.4%) were from public and 234 (44.6%) were from private higher education institutions. After cleaning the data to ensure the validity and quality of the responses, 502 responses were accepted for final analysis.

4.2. Research Tool

An online questionnaire was designed and created using the Online Surveys (https://www.onlinesurveys.ac.uk/) platform, in which both closed-ended and open-ended questions were included. The first part of the instrument provided necessary information about the study objectives and data collection procedures. This section also presented the ethical considerations, so that the participants could understand what the research was about and how the data would be collected, handled and used by the research team. Some specific demographic information of the participants, i.e., the name of their department and university, age, gender, educational qualification, teaching experiences, etc., was collected in the second part. The next part of the questionnaire held closed-ended questions regarding their teaching and learning activities during the COVID-19 pandemic, including preparation, training, assessment, etc., and several open-ended questions related to the challenges, barriers, good practices and suggestions, including the participants' consent to attend a follow-up interview.

4.3. Data Analysis

This article reports findings from a larger project regarding teaching and learning practices in Bangladeshi higher education institutions during the COVID-19 pandemic. While the survey instrument has many specific questions regarding teaching and learning practices during the COVID-19 pandemic, for this article, mostly open-ended questions related to challenges, good practices and suggestions were analysed. Inductive thematic analysis was employed to analyse the responses to open-ended questions [62]. All the responses were read by the first two authors, and coding was employed for a similar group of responses. All the authors checked the data several times to ensure the correctness of the raw data. Previous studies on the investigated issues guided the selection of coding as well. To ensure reliability in the records, the first author and the second author conducted coding separately, and the third and fourth authors did a second-time review of the records; then, the codes were compared and discussed to finalise the code list [63,64]. A more focused coding, including themes and sub-themes, was produced after finalising the code lists. Finally, the common themes that emerged were identified and finalised. In the following stage, all the codes were categorised and clustered based on their potential connection and the possibility of integration [64]. During this analysis, data reduction, coding expression/term, and verification of conclusions were conducted simultaneously until the conclusions were drawn. For the coding and analysis part, manual coding analysis was used.

4.4. Ethical Considerations

Consent was obtained from the participants at the beginning of the online survey. Throughout the research process, information was dealt with special care to ensure the data management was secure and the provided personal information was kept completely confidential. The academic ethical guidelines [65,66] were followed throughout the research process to ensure confidentiality, anonymity, and the right to withdraw from the study. The dataset was electronically stored, and personal information was excluded before processing the data for analysis by the lead researcher. Only a cleaned dataset without any personal information was shared with the co-authors for analysis and interpretation. Safeguarding of confidentiality and anonymity was ensured throughout the process of collecting, storing, sharing and analysing data.

5. Results

Both challenges and positive aspects are presented in the results section. While the findings are presented based on the responses to the open-ended questions, some quantitative information was also considered to understand the two phenomena, i.e., challenges of emergency remote teaching and learning, and positive aspects of online teaching and learning.

5.1. Challenges of Emergency Remote Teaching and Learning

5.1.1. Participation

Low participation levels of students in emergency remote teaching and learning were observed and considered as one of the major challenges by the university teachers. Among the participants who were private university teachers, 46.1% found that more than 75% of their students took part in online classes, whilst only 22.4% found that students showed their full willingness to participate. From the observations of public university teachers, fewer students were attending and participating willingly in online classes. According to the data, 13.9% of respondents from public university teachers opined that more than 75% of students attended their online classes, and 12.4% of them found students' full willingness in-class participation. The teachers mentioned a number of issues ranging from poor internet connection to students' mindset regarding the worth of online classes that had an impact while conducting the online classes. The key issues that were stated by the teachers directly were: "*poor internet connection, coverage, and facilities*", "*lack of digital*

devices like computer, smartphone, or tablet", "*financial constraint*", "*lack of logistic support from the university*", "*incompetency in terms of technological knowledge*", "*high price of internet*", "*lack of training*", "*lack of motivation and inspiration*", "*lack of adequate home setting for the online class*", "*students' mindset; they believe online teaching can never be as successful as face-to-face interactions*".

5.1.2. Pedagogy and Assessment

Many teachers voiced their concerns about the practicalities of teaching online as well as how online teaching and learning approaches would impact their students' learning. One of the concerns of the teachers was how to control the students' movement and attention and how to ensure their engagement during the lecture. They felt that there was a lack of real presence in the lecture, and full concentration was not always possible. Teachers could not identify which students were unable to follow instructions or whether it was essential to repeat any portion of the lecture. Interaction between teacher and student was unsatisfactory, according to them. There were difficulties in ensuring the participation of all students in hands-on activities. Especially in science subjects, practical lessons and lab work are essential. However, it was impossible to conduct practical lessons and lab work online in some cases. One teacher in this regard stated that "*understanding the participation of students is very difficult in online classes, especially in Mathematics classes*". A few teachers blamed the learning materials for the dissatisfactory classroom interaction. One stated that "*the learning materials are poorly designed and do not allow much interaction between students and lecturers*". This indicates a teacher-centred discussion, where the teachers prepared the materials e.g., PowerPoint presentations, without considering the scope of students' participation. Students sometimes became tired as a result of increased stresses on eyes and ears during online teaching.

Similarly, many participants expressed their doubts about assessments in online teaching and learning. According to some of the teachers, online assessments were not fully effective as there were weaknesses in the assessment mechanism adopted or advocated for adoption. Some teachers identified the biggest drawback of online teaching and learning as the lack of a strong assessment system. Assessing students justly was identified as a major problem; some expressed how they thought it was completely impossible to conduct online assessment. Often, formal assessment was not possible, and there was no guideline on online exam systems. Some of the teachers perceived that fair grading was almost impossible in the case of engineering or practical disciplines. For some, online real-time exams were almost impossible. Furthermore, some participants expressed their concerns about providing suitable feed-forward feedback, supporting their students with online assessments, and the possibility of plagiarism and cheating during online assessments. It was extremely difficult to identify cheating during online exams.

Regarding the shortcomings of the assessments, a few comments made by the participants can help us understand their feelings. Concerning online assessment effectiveness, they remarked, "*online assessment is not fully effective*", and "*the biggest drawback of online teaching and learning is the lack of a strong assessment system and internet connection*". Teachers' lack of confidence in the morality of the learners was reflected in statements such as "*online assessment is challenging in countries like Bangladesh, where the average ethics level is far below the average levels of the developed countries*". Portraying the limitations regarding supervision, one teacher stated that "*there is no central monitoring or measure for quality assessment*". Regarding the lack of training and policies on assessment, teachers reported that "*traditional assessment (i.e., exams, class tests) is difficult to conduct online since most teachers are not trained to conduct online assessment properly*" and "*there is a lack of proper assessment policies*".

5.1.3. Resources and Internet

The practicalities and logistics of running online teaching and learning were of concern from the micro to the macro level. Most of the teachers mentioned in some form that the main challenges and weaknesses of online teaching and learning were the lack of resources

(whether it be at the institution or at home) and inadequate internet availability. Many teachers could not afford to use technological kits as well as computer facilities for assisting students. As teachers felt unsupported by their institutions. According to one teacher, "*all teachers cannot afford to use technology tools*". Teaching from home was problematic for many teachers, as there was a lack of a proper learning space or environment for lectures at home, and low speed of internet connection, and an unaffordability of data, as it is costly and insufficient for live sessions. This appeared as a major challenge that needs to be addressed by institutions and stakeholders in the event of future education in emergencies.

In terms of resources and the internet, the majority of participants complained about slow internet connections and excessive internet costs. The magnitude and extent of these problems were presented in complaints such as "*slow internet speed*", "*the weak internet connection and the lack of facilities*", "*weak internet signal in rural or remote places*", "*computer and internet access is not available to all students*", "*internet data is expensive and networks are inadequate*", "*device unavailability*", "*costly internet package and unavailability of essential equipment*", "*the internet is not available everywhere with the required video streaming speed*", "*expensive cost of internet and technical gadgets*", "*absence of ICT infrastructure*", "*unpredictable electrical supply and poor internet connection*".

5.1.4. Technological Skill Sets of Teachers and Students

Another concern that teachers expressed was linked to both staff and students' ability to manoeuvre and effectively use the online tools and technological resources that were available to them. As mentioned previously, there was a lack of available resources to higher education users, and even for the few that did have resources, there were no guarantees that the teachers and students would be able to use them accurately and efficiently. The participants felt that teachers and students did not have the appropriate level of skill to navigate the online systems. Many teachers and students did not have the skills to use technologies for educational purposes, and they were not familiar with online teaching and learning. Therefore, among the many online platforms, they had little knowledge of which were appropriate to use. The "*lack of technological skill*" and "*incompetency in terms of technological knowledge and skills*" were mentioned by teachers. All teachers, especially senior ones, did not consider themselves as tech savvy. It was difficult for them to perform online teaching. This was a reasonable concern for the teachers since most were asked to move to online teaching without having the appropriate support from their departments and universities.

5.1.5. Lack of Support from Universities and Stakeholders

According to 72.8% of private university teachers, online teaching and learning initiatives were taken by their universities. Only 33.2% of public university teachers opined that online teaching and learning initiatives were taken by the teachers, i.e., as a personal initiative. In terms of financial or technical support, only 5.5% mentioned that they received full support from their department or university to run online classes. On the other hand, 21.5% and 33.8% of teachers from private universities stated that they received full and partial financial or technical support, respectively. From the analysis of the data, it can be said that private universities were ahead of public universities in Bangladesh for taking initiatives and supporting teachers to ensure online teaching and learning during the COVID-19 lockdown. In this situation, many public university teachers took the personal initiative to conduct online classes, and this inspired other institutions to follow in supporting their students' learning.

Many participants expressed their concerns about the challenges, barriers and lack of support provided by their universities, mentioning such aspects as, *"no logistics support from university"*, *"institutional support is not available"*, *"inadequate policy and functional support and role of the Ministry of Education (MoE) and University Grants Commission of Bangladesh"*, *"inadequate support from government"*, *"lack of support from the institution"*, *"lack of willingness of authorities"*, *"we do not have any departmental support and we are not given credit"*, *"no policy*

from the authorities", "there is no backup mechanism for dealing with an emergency if the system fails or collapses".

5.2. Positive Aspects of Online Teaching and Learning

The purpose of the open-ended question related to the positive aspects of online teaching and learning in the survey was to elicit the teachers' perceptions of the main positive aspects. It also gave scope to talk about the challenges of online learning and teaching in higher education in Bangladesh. It is to be noted that around 30% of the data were missing from the answers to these questions, and numerous participants alluded to the idea that there were 'no positives of online learning in Bangladesh'. Nonetheless, for those who did respond, the analysis of the responses produced the following themes.

5.2.1. Health and Safety

It is imperative to remember that the world was experiencing a global pandemic, with millions of people affected worldwide, when the study was conducted. For that reason, this project was initiated, and respondents highlighted that a significant benefit of emergency remote teaching and learning was bringing the health and safety of staff and students alike to the forefront. Some participants specifically highlighted the worth of online classes during the pandemic from the perspective of health benefits. They mentioned that it was *"safer because of fewer chances of exposure to contagious diseases such as COVID-19"* and it *"reduced rapid transmission of the COVID-19 virus"* while others mentioned general physical health and safety, for instance, *"saving lives during the pandemic", "safe for teachers and students in this pandemic", "students' safety and hygiene is maximized", "staying safe at home and teaching".* Some participants also mentioned the importance of mental health*: "It improved the mental health of students".*

5.2.2. Widening Participation and Longevity

The majority of the teacher responses were linked to the usefulness of online teaching and learning for their students. The participants highlighted how the adaptation of online learning and teaching would allow more students to engage and participate in higher education, when previously they may not have had the opportunity. Respondents mentioned that it is "*possible to learn from a distance", "poor students can attend class from anywhere in the country*", and carefully planned online teaching and learning for covering part of traditional teaching and learning might help a large number of students who work part-time: *"online education will create an opportunity for them".* It was noted that online teaching and learning options *"can reach a wider audience", "are available for all (sick students can participate)"*and can *"reach students in remote places".*

In terms of accessibility, many of the teachers highlighted that one of the main positives of online learning and teaching was the ability to record their lectures, seminars and content, for flexibility and longevity purposes. Participants went on to explain how this could be beneficial for both students, who could learn at their own pace and convenience, and for teachers, as it would develop a kind of portfolio and archive. Participants commented as follows: *"produces retrievable teaching contents", "classes can be preserved in the archive", "for teachers, the benefit is that once they prepare the course materials (videos, handouts, practice sheets, etc.) for online teaching, they will be able to use them in the later semesters", "class lectures will be available all the time on the websites", "in the case of recorded lectures, students can go through the lectures multiple times, which leads to a better understanding of the topics", "recorded videos, students can watch any time", "students can work at their own pace, place and time can take more ownership and responsibility in their own learning", "as it has the option for recording, it is suitable for slow as well as fast learners", "absentees can watch video lectures later. For part time students, they can learn away from classes", "students can learn at a convenient time. If needed, they can watch the lecture again and again".*

5.2.3. Time and Financial Benefits

The teachers mostly reflected on the positive financial implications for staff and students and how online learning and teaching could save money and consequently time at a micro classroom level. Some examples include, *"less time consuming, less costly"*, *"minimises the cost in several ways"*, *"it saves a lot of infrastructural expenses"*, *"as it does not require any formal setup, it will save both money and time"*, *"cost-effective, by reducing excessive time consumption"*, *"saves time (travelling time) and money (living outside from the family requires extra living cost) for the students as they are living with their families"*, *"saves money for the university; providing off-campus delivery any time"*, *"time-saving, no everyday travel required, given Dhaka's traffic conditions; cost-saving, students do not have to pay for room and board in Dhaka where living cost is very high"*. Policymakers and stakeholders can take the holistic learning approach of the e-learning experience and implement it to make more efficient and financially viable decisions and assessments on a larger scale for higher education institutions.

5.2.4. Service Length and Adopting to the Change

Based on the quantitative data, the teachers who have been teaching at the tertiary level for fewer years were more involved in online teaching than experienced teachers. One teacher noted, "*a lack of will among senior teachers to conduct online teaching and learning*". For example, 68.4% of teachers who had less than one year of teaching at higher educational institutions were fully involved in online teaching during the COVID-19 lockdown. However, only 52.7% of teachers were fully involved in online teaching during this period who had more than six years of teaching experience at the university level. Among the participants, 14.3% of teachers were not involved with online teaching in any way, and the same percentage of teachers started online teaching during the lockdown for the first time. However, many could not continue because of issues such as lack of support from institutions, low participation and engagement of students, lack of policies for online teaching and assessment, etc., and 13.9% of teachers who took the initiative to deliver online teaching to students during the coronavirus outbreak could not continue.

6. Discussion

On account of the crisis, the 'new normal' involved adapting through the digitalisation of services, including education. Being traditional in thinking and practice might not help professionals, as they need to be reflective practitioners. Therefore, there is a need for re-examining the rituals and monotonous practices of the formal education culture that teachers in higher education institutions in Bangladesh follow in their professional practice.

Higher education institutions are unique for independent learning, as their learners are adults who can cope with the rigour of online work, and the majority have a minimum level of technological knowledge to traverse new platforms. The responsibilities lie in the higher education institutions at which they learn, which have adopted online modalities of learning for their offered programmes to survive the change to online teaching and learning. Nevertheless, academics worldwide struggled to sustain the same level of engagement and learning as they had in the face-to-face classroom environment [6,67]. The implementation of online tools in the past few months of lockdown was unprecedented, and universities had to find solutions to avoid a decline in their educational provision, which could have major short-term and long-term financial ramifications. In the short term, academics employed interim solutions by utilising remote instruction, as campuses were closed [68] which is also evident in the findings of the study. However, the higher education sector is slowly understanding that remote teaching and learning during the pandemic was the first step in the shift to offering online education permanently, particularly in Bangladesh. Even before the pandemic, higher education institutions from the global north had seen a decrease in enrolment of traditional-aged students in campus-based programmes, with corresponding increases in part-time online courses [69].

Resulting from the COVID-19 pandemic, higher education institutions globally have been forced to move to online distance teaching and learning [8,70,71]. The main advantages and rationale for all governments and consequently higher education providers were to safeguard their employees and their students and thus society as a whole. Teachers in this study mentioned specifically how moving to online distance teaching and learning would reduce the spread of the Coronavirus and help protect all staff and students. A further advantage of online distance teaching and learning includes students being able to learn at their own convenience, with the potential of engaging hard-to-reach students who cannot attend face-to-face traditional teaching delivery [72]. This was found to be the case in this study, where many academic and teaching staff members highlighted that online learning and teaching could provide opportunities for families and individuals who were struggling in higher education or even for those who would not have had the chance to study higher education altogether.

The opportunity to record lectures was also considered as a positive aspect of e-learning by the teachers, who argued that it would allow students to learn at their own speed and convenience. Such kinds of resources can only be helpful to the students when they have good quality in terms of technical aspects such as sound and video clarity, the depth of information and most importantly the rigour of the pedagogical outline followed by the teachers. Furthermore, such content needs to be sufficiently self-explanatory since students would not have any chance to ask questions until they communicated with the teachers virtually or physically. Therefore, preparing such digital content with proper quality is even more challenging for teachers, especially in the COVID-19 context, when teachers are more prone to anxiety and fatigue [73].

Furthermore, higher education institutions are finding ways to be more streamlined and efficient with their already stretched finances and resources. The teachers in this study noted that online e-learning would be time and cost effective for staff and students. Therefore, it could be more lucrative and appealing at the micro (teacher and students), macro (university stakeholders and governors) and meso (University Grants Commission of Bangladesh and government) levels. Teachers' arguments regarding the worth of online classes was consistent with Murphy [33], which reported that e-learning creates greater access [74] for those students who cannot attend face-to-face classes for various reasons. This change could be highly beneficial for higher education institutions in Bangladesh, as this transfer to emergency remote teaching and learning forced many to be better prepared for using alternatives in the case of emergencies, including pandemics, common tropical weather challenges and political disruptions.

Despite many positive aspects of online teaching and learning, online e-learning can present many barriers to teachers, students and administrative staff. However, there is a necessity to acquire technological competencies in planning, implementing and assessing the performance of students. Higher education institutions need to provide teachers with the required training and resources to effectively implement learning through online delivery [75]. Similarly, institutions and policymakers must consider the appropriateness of the resources, especially the feasibility and availability of the internet for their staff and students, if they want to maximise the potential of online teaching and learning. The majority of the respondents in this sample mentioned the lack of resources available to staff and students, including the lack of technological devices and insufficient and expensive networks [76,77]. This lack of resources needs to be addressed, as this may lead to an even larger educational and economic divide between the rich and poor if access is only available to the middle and upper classes. The technology, design of the programme, choice of instructors, responsive curriculum, and supportive stakeholders in developing training programmes are necessary and significant for the successful delivery of teaching in an online e-learning environment [49,77]. If the government and stakeholders are serious about the transfer to online teaching and learning, long-term financial planning is needed; if used correctly, Bangladesh could become a strong player in the international online higher education market.

Universities and policymakers must provide swift, clear administrative and policy steps linked to online distance teaching and learning, access to resources, financial support and technological and e-learning training to staff and students. Therefore, integrating cutting-edge e-learning technologies to assist and strengthen both teaching and learning is one of the major difficulties faced by universities in the digital era [8]. This needs to be done at the national but also the localised level, with a more collaborative yet strategic agenda for education and research. It is fundamental that universities boost their collaboration in teaching, researching, joint financing and community service, proactively listen to concerns, and work with higher education institutions users.

There is also a need to encourage and support staff and students in building quality assurance systems to create new networks between higher education institutions and other educational providers in the region to develop best practices [76]. The University Grants Commission of Bangladesh and policymakers need to ensure to keep the physical and mental health of staff, students and society at the forefront of all decisions and consider ways to employ online teaching and learning to widen participation for those who may not traditionally have the opportunity to attend higher education institutions [32].

According to Coman et al. [8], the most significant concerns are technological issues, followed by teachers' lack of technical abilities and a teaching style that is not appropriate for the online setting. This situation was new to Bangladesh, and the country did not have previous experience in virtual education at the time of the emergency. Therefore, many teachers and students did not know how to use these resources effectively, which creates a demand for training. Both the students and teachers could be provided with rigorous training and support on how to use software, learning tools and other resources effectively [75]. However, the pedagogy for online teaching and learning is different from traditional face-to-face instruction. Therefore, teachers should be trained on how to conduct effective online classes, addressing the aspects of technological and pedagogical issues [75].

Based on the findings of this study, the government and policymakers need to ensure adequate training is in place for staff and students when adopting online learning and teaching. Higher education institutions must also provide financial support in the form of appropriate technologies and platforms to assist in the high-quality delivery of learning; otherwise, this be a hollow transition. Follow-up studies could generate student-centred views, as students' perspectives may highlight that they deem different technologies to be useful for significant growth. Further studies might also examine blended learning instead of fully online teaching and learning to determine whether a mix of face-to-face and online learning could be valuable for staff and students.

Both the teachers and students need to be provided with the necessary resources and training to continue education if an emergency occurs [78]. Considering the context of Bangladesh, it is recommended to provide high-end computing devices to faculty members, including the necessary software. Both the university administration and the University Grants Commission of Bangladesh could take the initiative to provide laptops and other devices for educational purposes. As an alternative, they could provide interest-free loans with easy and flexible instalment opportunities to teachers. The University Grants Commission of Bangladesh could confirm an agreement between the higher education institutions and computer companies, and commercial banks could also be involved in providing loans for buying computing and internet devices.

For the students, both the university authorities and the University Grants Commission of Bangladesh could take the initiative to provide computing and internet devices with the help of zero-interest loans. The universities could take initiatives so that the necessary IT infrastructure can be established on the university campus, and it could support both teachers and students remotely. Other resources, such as teaching and learning materials as well as digital copies of text and reference books, journal papers, reports and so on, could be provided to the teachers and students at no cost. During the pandemic, many teachers and students in Bangladesh could not access the resources they required, which created a problem in ensuring effective online teaching and learning procedures. Hence, this study

recommends providing these resources to both groups; this could be a core task of the university administration.

Adequate internet facilities could be ensured for both the teachers and students. The University Grants Commission of Bangladesh could play a substantial role in providing sufficient internet facilities. As broadband services are minimal countrywide [79], it is necessary to start a discussion with the broadband providers on how they can extend their coverage and provide internet service to teachers and students. The University Grants Commission of Bangladesh should arrange a discussion with the telecom operators so that they can provide 4G internet service all over the country. Findings show that while many students and teachers had devices, due to reduced internet speed, they could not attend online classes. Therefore, by ensuring proper internet services, it is possible to bolster online learning. The ministry and telecom operators must work closely together to ensure this. Lessons can be learned from the example of China, where the Chinese government asked the telecom operators to provide the necessary internet facilities for people to continue their education during the pandemic [80–82]. The price of data should be decreased and the duration of using the data pack should be increased. For the sake of educational development, telecom operators can provide special offers to students and teachers for educational purposes. For example, they could remove data charges for using Google Meet, Zoom, Microsoft Teams, or such conferencing software or services.

For ensuring an effective online teaching and learning process, necessary policies and guidelines should be prepared, considering the strengths and weakness of the national context [81,82]. For instance, the country, as well as the university, should decide whether to use a full-fledged online system or a blended learning procedure. It is important to establish policies and guidelines according to this decision. Based on this decision, both the curriculum and syllabus should be established for the students. The assessment procedure for the online learning system is still not clear to many teachers, according to the findings. The universities of Bangladesh did not have any specific policy on assessing students while conducting online classes [6]. Therefore, forming relevant policies and guidelines is important. There was no specific policy or guideline on how to continue education during an emergency [83]. However, the University Grants Commission of Bangladesh recently developed a 'Policy on Blended Learning for Bangladesh' [84]. A countrywide policy or guideline needs to be developed and incorporated, including training the teachers by the ministry so that higher education institutions follow up with customisation [85].

Higher education is about self-administered learning journeys, where teachers facilitate and learners take active roles to bridge their knowledge gap and develop their skills for the future [3,86]. The COVID-19 lockdown period can be considered a wake-up call for educators, institutions and students alike to place less importance on physical attendance in the classroom as the sole way to gain formal accredited qualifications. Instead, viable alternatives can be held up as examples of the future of education. This, in turn, could go a long way to help address the inequalities that currently exist in the higher education system, as access becomes more easily scalable and is democratised as a result of demand for education in emergencies such as the COVID-19 lockdown.

An important question remains unanswered for many teachers: how would they develop the use of technologies in a resource-constrained environment to transform their teaching and research in higher education settings? Higher education institutions need to create a culture that supports and values learning and teaching along with student engagement and achievement, where students learn how to generate and critique existing and evolving knowledge and professional transformation [87]. In the process of online distance teaching and learning, the 4Cs (connect, communicate, collaborate and co-create) strategy [88] does not work, as many teachers and students do not have access to technology and the internet, particularly in Bangladesh [6], nor the skills to use the required technologies for teaching and learning. Therefore, it is important to make creative use of a wide range of technological tools for teaching, learning and research through synchronous

and asynchronous communication and share those innovative approaches across the learning communities.

Teachers need to think outside the box regarding assessment, going beyond the traditional paper and pencil exam system. Therefore, it is important to reconsider assessment techniques to make them fair, manageable and 'fit for purpose' in emergency remote online teaching and learning [89]. During the COVID-19 pandemic, alternative assessment methods and different innovative assessment techniques were adapted in many universities in the global north [90]. These alternative methods include open-book format, take-home long-period exams, problem-based case studies, concept maps, online quizzes, online presentations, multimedia submissions, and written essays. Based on Universal Design for Learning (UDL), one could ensure an effective assessment design that is inclusive and incorporates a variety of assessment methods.

Teachers' main aim is to transfer knowledge and skills as well as create new knowledge and skills to bridge the gap in preparing the new generations to overcome the challenges ahead [91–93]. Technologies could be used as the vehicles as well as the tools to transform teaching, learning, assessment and research activities; at the same time, they must build bridges by supporting the development of technological fluency across the digital divide to prevent educational exclusion [3,31]. However, teachers and students alike are facing a digital divide in resource-constrained environments; this needs to be addressed at institutional and societal levels [3–5].

7. Implications of the Study

This study presents the challenges teachers faced during the COVID-19 pandemic and identifies the positive aspects of online teaching and learning in Bangladeshi universities in low-resource settings. It is evident that while the teachers faced several challenges, dominated by technical problems, a number of positive issues were also identified. From the responses of both public and private university teachers, this study provides a snapshot of how university teachers respond in an emergency, without having the necessary preparation and prior training. The results of the study, therefore, establish a baseline of the teachers' response to online teaching and learning. This result could help the university authorities and the government to understand the overall situation, and based on this, authorities could take the necessary initiatives to overcome existing challenges. Higher education institutions can understand the level of teachers' enthusiasm about continuing online teaching and learning activities. If teachers receive appropriate training and access to technical resources, they could more effectively organise and design teaching and learning activities during an emergency. One of the critical discussions of this article is to ensure the pedagogical knowledge of the teachers in line with technological adaptation and blended approaches to delivery. The universities could take the opportunity to revise their curriculum, pedagogical approaches and assessment procedures so that integrated teaching and learning activities are possible.

The study also identifies a lack in terms of proper guidelines from the authorities. This realisation of the teachers could help the university authorities and the University Grants Commission of Bangladesh formulate specific policies for online education. In addition, the university could also think about implementing blended learning approaches in which online learning activities are an essential part. While the University Grants Commission has produced a general guideline for blended learning, based on the findings of this study, the universities could realise the potential of blended learning and how to support its faculties and students.

8. Limitations of the Study and Scope for Further Research

The study adds value by presenting the voices of teachers, both from public and private universities in Bangladesh, particularly considering how they coped with the challenges of a new situation without having adequate preparation. The findings might be helpful, particularly for countries with limited resources to run online teaching and learning

activities. However, the study has some limitations. Firstly, due to the low response rate, the findings might not be generalised, though a snapshot of the online teaching and learning practices is provided. Secondly, this study presents the views and opinions of the teachers only, not the students and administrators; hence, the holistic challenges and learning from these challenges in Bangladeshi universities are yet to be understood. Thirdly, the study addressed the issues only from the participants whom we could reach through the only survey. Those who did not have online access were not included. Responses from both teachers and students could provide more insights.

Along with these limitations, the study creates some scope for further studies. Firstly, it could be understood more deeply how the teachers and students continued their activities during the pandemic without training and in a low-resource setting. Bangladeshi university teachers showed their interest in running online learning activities. The reasons behind their enthusiasm in a resource-constrained environment could be further understood. Secondly, how the practice of online teaching and learning activities could be continued in normal times might be another area of investigation. Remarkably, considering the characteristics of blended learning and massive open online courses (MOOCs), how teachers, students and administrators could continue the good practices of online activities can be investigated. Particularly, one study shows that Bangladeshi students have a great interest in learning from MOOCs [94]; therefore, university administrators could consider this learning modality. Finally, a more extensive study needs to be carried out to understand the universities' strengths and weaknesses in training their staff on technological pedagogical content knowledge and how to use it effectively in teaching and supporting their students.

9. Conclusions

For many teachers and students, switching to emergency remote teaching and learning online has become a transformative learning experience. In conjunction with the COVID-19 pandemic and this new learning experience, higher education institutions have struggled to cope with the educational needs of students and the training needs of teachers. The stress created by the pandemic and the tension of learning loss severely hindered the whole system of higher education. Although some Bangladeshi universities have taken a few initiatives to continue their teaching and learning activities online, it is still unclear whether teachers managed to enhance student engagement and participation. It is also unclear what the impact is on students' learning outcomes. Without having a proper understanding of these, it might not be possible to conclude how this transformative learning experience affected the lives of teachers and students. Consequently, it is not possible to form appropriate policies to face future emergencies as they have multifaceted complexities and multidimensional priorities.

The pandemic highlighted the need for an alternative online approach to teaching. Without a solid understanding of online teaching and learning, it is difficult to understand how to benefit from it. This could be acquired through adequate research. The current study explored various issues of online teaching and learning in the COVID-19 context. More studies of a similar kind can help us realise the reality on the ground more in-depth. It would be beneficial if the experiences of the practitioners, e.g., teachers, could be analysed and the generated insights could be applied to redesign online activities accordingly. Therefore, allocating research funding to teachers for carrying out practitioner research for pedagogical innovation in using emerging technologies is essential for formulating effective policy and practice.

In reality, student success depends on the ownership of their learning and how they involve themselves as co-creators of knowledge and curriculum. Therefore, it is highly important to engage the students both in the teaching and learning process as well as the research. The issues raised by the teachers while conducting online classes could be further analysed to design online sessions in a more student-friendly way by addressing the challenges teachers face. It is important to keep in mind that online teaching and learning is relatively new for many in Bangladesh; this was greatly advanced by the pandemic. That

is why, it can be considered as a new opportunity for the changing the landscape of higher education. A thoughtful, thorough, and research-based policy formulation focusing on the use of educational technologies in emergencies is the most crucial task to cope with the new normal situation. The present study identified a number of challenges and portrayed the scenario of teaching and learning in a holistic manner. The way forward is to learn from this unpresented situation for adopting appropriate policies and strategies to support teachers to deal with the present needs to prepare themselves for future emergencies.

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