

# The Transition from Face-to-Face (f2f) to Remote Proctoring Examination: Evidence from Bangladesh Open University (BOU)

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## Abstract

Remote proctoring has become increasingly important worldwide in recent years, particularly during the Covid 19 pandemic when traditionally proctored in-person exams became almost impossible. From the start, Bangladesh Open University (BOU) has developed and delivered learning materials through the internet. In the tertiary programme, BOU contently uses the online examination system while it is new to the higher secondary certificate (HSC) programme. Recently, Open School of Bangladesh Open University (OS-BOU) launched offshore school programmes for Non-Resident Bangladeshi (NRB)s in South Korea under the HSC programme. For these international learners, BOU conducted a remote proctoring examination which was a suitable solution for assessing the distant learners. This article explores the logic of using the remote proctoring system to assess BOU learners through online examinations. This article identifies the advantages and challenges of the remote proctoring system. Later, this study describes the planning and designing stage of the remote proctoring system that BOU developed and executed. The research used a case study design and collected data from secondary sources and in-depth responses from learners, teachers, and university staff. The research findings and recommendations can be used to improve BOU's existing remote proctoring system.

**KEYWORDS:** *Online Proctoring, Digital Proctoring System, Online Examination, Remote Proctoring, Online Invigilation.*

The importance of digital technology in the growth of online education is beyond debate. Digital technologies have spawned the fourth Industrial Revolution (Schwab, 2016) and digital transformation (Balyer & Öz, 2018). They have altered the teaching and learning process, including mobile computing, cloud computing, social networking,

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3D printing, and data analytics. (Dijkstra et al. (1997) defined online education as a computer-based, remote, or asynchronous education system supported by some instructional system. The online education system is driven by the emergence of new technologies, the widespread adoption of the internet, and the intensifying demand for a skilled workforce for a digital economy. Consequently, distance education is gaining popularity among new and varied student populations as it is a more convenient and flexible option (Szopiński & Bachnik, 2022). The Covid-19 epidemic dramatically expedited the trend of a steady interest in expanding online education.

Assessment is an essential component of teaching-learning, and students often see it as a measure of their academic achievement (Prakasha et al., 2021). In distance education, online examinations have been deemed effective in developed countries with a high level of sophisticated internet services and proctored functions (Raman et al., 2021). The usage of digital proctoring systems increased dramatically to prevent dishonesty and cheating in distance online examination and because of the emergency crisis of the Covid-19 pandemic (Han et al., 2022). Higher educational institutions have already resorted to online examinations via e-proctoring. Remote proctoring or virtual proctoring or online proctoring, or E-proctoring refers to the use of technologies to remotely monitor students for exams over the internet through a webcam or other technological devices. This technique of online evaluation is regarded as efficient and decreases instances of unethical behavioural. This proctoring technique often involves monitoring the candidate's audio and video feed collected from their devices (Webcam, microphone) and their computer progress by mirroring their displays. E-proctoring software restricts the applicant from simultaneously accessing other tabs or applications. Most higher education institutions use remote proctoring services, while others plan to or are considering their implementation. Respondus, Proctorio, and ProctorU are well-known companies that provide remote proctoring services (Balash et al., 2021). Students may be forced to install software to prove their identity, monitor their conduct, and block access to unauthorised resources while taking an online test. Monitoring may include using a camera and microphone, screen sharing, network monitoring, eye tracking, and other forms of behavioural tracking. Some services use a human observer to monitor the pupil. At the same time, there are additional methods for remote examination, such as taking an examination through video conferences such as Zoom.

## REVIEW OF LITERATURE

In Bangladesh, the essential elements connected with access, such as infrastructure and pricing, are critical for a successful shift to online education. The worldwide Affordability Report ranks Bangladesh in the 45th position internationally regarding one's capacity to acquire 1GB of mobile prepaid data with less than 2.0 percent of their typical monthly salary (Khan et al., 2021b; Woodhouse, 2021). It is also to be noticed that Bangladesh ranks 104th out of 177 nations for broadband internet capacity (Ookla, 2023). The same assessment places Bangladesh at 121st out of 140 countries for mobile internet bandwidth. These facts and figures place Bangladesh vulnerable to accessing and financing online education (Khan et al., 2021a).

During the Covid-19 epidemic, the Government of Bangladesh (GoB) implemented open and distance learning (ODL) for school students through TV lectures, online classrooms, and assignments utilising platforms like Zoom, Google Classroom, and University Grant Commission (UGC)-led BdRen. Since its inception, Bangladesh Open University has used this instructional delivery style. Recently, to address the government's policy of skilling remittance-warriors, the Open School of Bangladesh Open University (OS-BOU) has launched offshore Higher Secondary Certificate (HSC) programmes for Non-resident Bangladeshi (NRB)s in South Korea and Middle East countries (Bangladesh Open University, 2022). The nations in which (NRB)s operate are geographically varied, and their working hours vary from Bangladesh's. Therefore, the mode of operation differs from OS-BOU's current onshore school programmes, and the school relies only on information and communication technologies (ICT) to reach the learners. Accordingly, OS delivered the online lessons using open-source platforms such as Zoom. However, OS faced challenges in completing the assessment of international students due to the diversity of workstations, the difficulty of travelling to test centres, and the risk of handling examination scripts in a distant place. Conventionally, OS-BOU administers all exams in person rather than online. However, being an independent entity, BOU may develop and adopt a new assessment method when needed (Akhter & Rahman, 2022). Therefore, this consequence motivated the development and implementation of the remote proctoring system to assess the current international students of OS-BOU. There has been a lack of studies investigating different aspects of online assessment in higher education (Khalaf et al., 2020) and school and higher school certificate programmes.



Moreover, a few works of literature were found in higher education in Bangladesh, but no literature found in Bangladesh on SSC or HSC level that has undertaken the online examination, specifically remote proctoring (Khan et al., 2021a). Therefore, the main objective of this research is to explore the arena of remote proctoring at the HSC level in Bangladesh.

### **OBJECTIVES OF THE STUDY**

1. to discover the different types of remote proctoring systems with advantages and disadvantages;
2. to analyse the planning and designing procedure of remote proctoring at BOU, and
3. to suggest the necessary recommendations.

### **METHODOLOGY**

In this research, a case study design was adopted as the purpose of the research was to explore the opportunities and challenges of online proctoring and assess the development of live proctoring in BOU. A case study is a qualitative study design that investigates the present event in detail and its actual context (Yin, 2018). When research emphasises discovering and comprehending in-depth, as opposed to validating and quantifying, this type of design is of extreme significance. Moreover, it gives an overview and in-depth knowledge of a case, process, and interactional dynamics within a unit of study but cannot be generalise to a population beyond cases similar to those studied (Kumar, 2014). Under this case study design, the data was collected by reviewing relevant literature, in-depth interviewing, and observing the simulated examination environment. The secondary data was obtained from sources available in websites, journals, reports, and other publications. Primary data was collected using an open-ended questionnaire by in-depth interviewing learners, teachers, and the supporting team (Exam division, ICT & E-learning centre) after the mock test. This research included fourteen learners, ten teachers, and four supporting team members to know the learner and institutional perspectives. The mock test examination environment was also observed to get an idea about the learners' and institutions' experiences. The teachers who participated in the research were members of the examination committee and knowledgeable about online examinations. Besides, the learners were non-resident Bangladeshis (NRBs) in South Korea, attending the Higher Secondary Certificate (HSC) examination at Open School,

Bangladesh Open University. The members of the support team were the staff of the Examination division and ICT & E-learning centre of BOU, who were directly involved in operating the online examination. The primary data was collected through face-to-face (f2f) interviews and online discussions using Zoom platform after receiving the respondents' verbal consent. The interview was carried out in the Bengali language to get a better graph of the information given by the interviewee. After collecting the data, it was sorted, analysed, and presented based on specific themes.

## **FINDINGS AND DISCUSSIONS**

### **Objectives 1 - to discover the different types of remote proctoring systems with advantages and disadvantages.**

**i) Remote Proctoring:** The Covid-19 lockdown moved traditional classroom-based teaching and learning activities into digital platforms (Minerva, 2020). Along with this, the online examination administration was extended. Several remote proctoring tools are readily available. These include: 1) Proctoring In-Person is the approach that requires that the students take the test in a classroom or at a testing centre under the supervision of human proctors. Typically, the proctor(s) verify student identification, and the students log on and take the examination using the Learning Management System (LMS). 2) Live proctoring system that arranges the test among small groups of students in the presence of one or more professors remotely through video conference in real-time. 3) Live proctoring with Safe Exam Browser (SEB), which is the same as the last option, but managed via a safe examination browser. This system controls access to the device's functionalities and other websites or apps (Santis et al., 2020). 4) Automated Proctoring is a type of proctoring system to reduce, even eliminate, the labor costs associated with proctoring. Moreover, machine learning and advanced artificial intelligence techniques are utilised to develop automated proctoring systems (Dadashzadeh, 2021). 5) Blended proctoring: This method is a combination of both live human proctoring and Artificial Intelligence (AI) proctoring (Mutawa & Sruthi, 2021). Current remote proctoring technology has become more sophisticated (Silverman et al., 2021). GMAT, LSATS and TOEFL have already adopted online testing via e-proctoring methods to cater to students attending these tests from the comfort of their homes (Prakasha et al., 2021).

**ii) Advantages of Remote-Proctoring:** There are many reasons for remote invigilation. Learners may take online tests conveniently and conveniently in their home's comfort

(and safety) (Coniam et al., 2021). Learners can attend the online examination from a distance as they do not need to come to the campus, saving transport costs and time. (Jha & Indiran, 2021). Increasing use of suitable mobile devices that are convenient for online assessment. Mobile devices, such as tablets or laptops, are used by practically every student nowadays (Baume, 2019). Online proctored exams offer many advantages in the eyes of users and educational institutions authorities. These range from time and location independence of the examination to versatile areas of application and improved user-friendliness to cost savings, as the university must provide a smaller overall infrastructure (Baume, 2019).

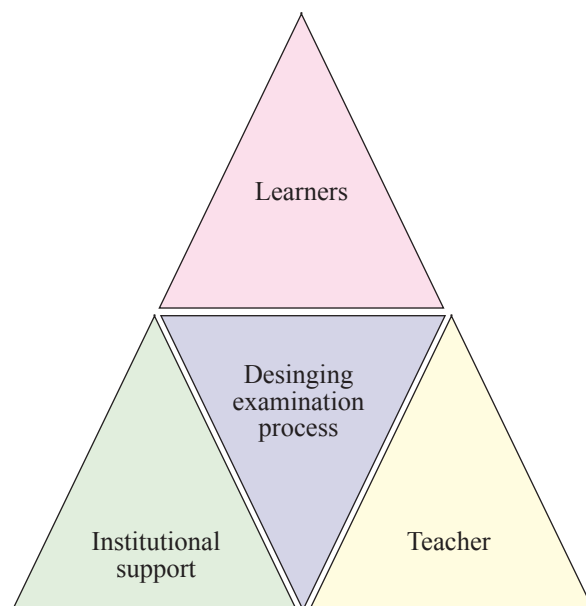
**iii) Challenges of Remote-Proctoring:** There are myriad concerns about remote proctoring technologies, including students' lack of access to technology, test anxiety, privacy and security concerns, and accessibility needs (Silverman et al., 2021). Several factors impact the overall adoption of online examination systems, such as the network infrastructure, hardware requirements, implementation complexity, and training requirements. Moreover, the lack of fully-fledged technical solutions is an objective factor influencing the provision of all forms of organising the educational process in a distance format. Security, cheating prevention and deterrence, privacy, and data protection are the main issues for adopting such systems. Examples include the sudden shift from classroom to online learning and examination proctoring (methods/strategies) and the adaptation and changing behavioural on how to use such systems (Han et al., 2022). Therefore, the lack of familiarity with the test-taking process may also increase test anxiety during online exams (Conijn et al., 2022). The learner faced the challenge of inadequate time during the online examination (Khalaf et al., 2020). In online proctoring settings, candidates cannot see online proctors, and neither they nor their assessors have access to how the software works, disrupting normal trust relations of examination hall invigilation. Examinees are disadvantaged since their behaviour is minutely recorded, while their understanding of what proctors do and observe is nearly absent (Fawns & Schaepekens, 2022).

**Objectives 2 - to analyse the planning and designing procedure of remote proctoring at BOU.**

**i) Planning of Live proctoring examination:** Ultimately, the primary priority of BOU was to develop and retain reliable online evaluation procedures. OS BOU emphasised developing a remote proctoring system for overseas students in South Korea in 2021.




So, it has planned and constructed the online examination procedure by considering the three views of students, instructors, and institutions (See figure 1). Before establishing the online assessment procedure, students' behavioural, attitude, and circumstances were studied. Their technical proficiency, the availability of gadgets, internet access, and the state of the space were crucial considerations in the creation of the evaluation procedure. The learners expressed anxiety about attending the online examination as it was new to them.



**Figure 1 : Planning and designing the online examination process through live proctoring.**

*source:Guangul et al., 2020 &Selwyn et al., 2021*

Moreover, time constraint and technical difficulties hampered their concentration during the examination. BOU permitted instructors/course teachers to begin online proctored exams. Techno-savvy course instructors organised pilot groups for teachers, performed introductory seminars, and supported the early administration of tests in general. Teachers took on the extra responsibilities of developing appropriate assessment tasks and establishing proctoring criteria. The team had to meticulously examine each assessment's content to see whether it was compatible with the programme. Instructors were often authorised to adjust their settings, causing problems throughout the test. BOU teachers prepared the question paper in pdf format after moderation. BOU administration staff (Exam division, ICT, and E-learning centre) assisted the learners and teachers in planning and designing the online examination. The BOU institutional



support staff evaluated the present infrastructure and facilities. They worked on finding suitable online platforms, creating the cover page of answer scripts, preparing examination instructions such as guidelines developed to inform students of prohibited items such as cell phones, headphones, hats, or smart watches and provide guidance on minimising distractions that may generate a flag by the proctoring system (eg, looking away frequently, talking, or leaving the room). Notably, university administrators also highlighted their lack of control over the technology. Substantial attempts were made to integrate online proctoring technology into academic practices like conducting practice/mock tests, Q&A sessions, familiarisation workshops, providing authorised institutional ID etc. BOU staff worked hard to get examinations completed with minimal disruption. Altogether, teachers and staff preferred to select the Google classroom platform for conducting online examinations and Zoom platform for live proctoring to resolve technical issues during the examination.

**ii) Designing Live Proctoring platforms:** BOU implemented live proctoring systems where people (learner, teacher, and staff) play an essential role. Rather than adopting remote proctoring software as one focused solution, BOU emphasised a people-centered approach. A few technology-based solutions have been proposed and employed to address the problem of learner authentication in online exams. One of them is using a Web-based camera (Webcam) for facial recognition to authenticate users in exams in online learning systems (Hylton et al., 2016). In the days before examinations, students enrolled in the system to authenticate their identities, examined their equipment according to technical recommendations, downloaded the necessary apps and software (Zoom, camscanner), and took their mock exams at home. Teachers and staff of BOU prepared examinations in advance, reserved the proctoring system's usage, and provided students with Google classroom login information and passwords. At the final examination, multiple platforms were used for live proctoring, including Google Classroom and Zoom (See figure 2).

The questions were moderated and checked by the examination committee member and converted into a pdf file so the question paper could be easily accessible. Before uploading the question papers to Google Classroom, the questions were verified by a small number of trained faculty. The cover page of examination papers was made accessible to students automatically on the due date and time. Each examination started with an approximately 30-minute check-in process comprising a video recording of the student's ID and environment. After the end of examination time, 30 minutes were



allowed to take a picture in pdf format and upload the pdf file. Learners were required to join Zoom meetings to get immediate support in case of internet disconnection with the invigilators in a ratio of one invigilator to seven students. The meetings were conducted using smartphones, allowing seamless connection with the invigilator. The mobile phone was placed to the side of the student (Figure 3) to allow the invigilator to verify if the student was looking at any material behind the PC/laptop's camera. Learners who had lost access to the examination portal because of internet disconnection notified their respective invigilators instantly by telephone. They were placed in a one-to-one call on support teams with their respective invigilators to avoid disturbing other students in the invigilator's group. The invigilator provided reassurance and technical guidance to the students through a prepared troubleshooting guide.

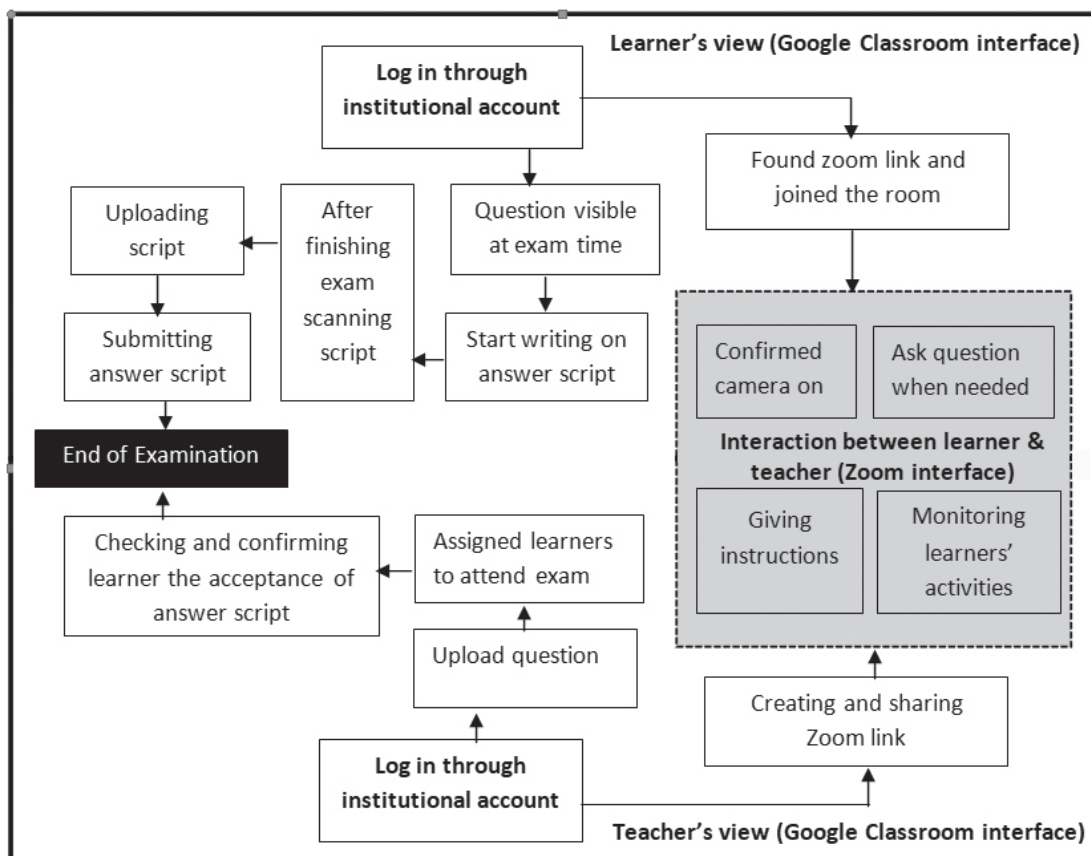
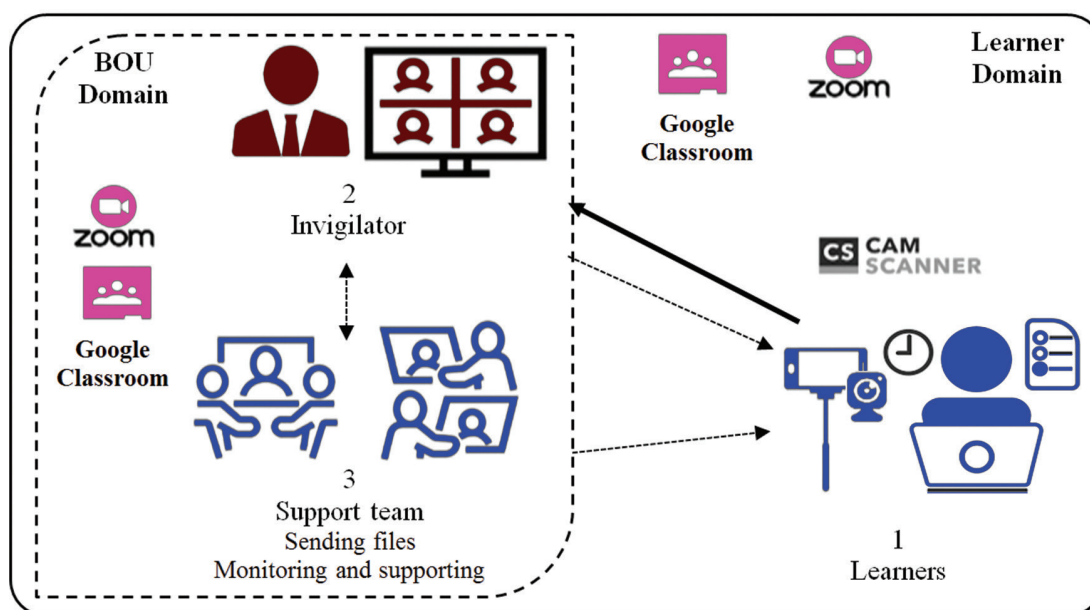


Figure 2: Flow of activities during the online examination (Developed by author)



**Figure 3: Live proctored online examination setup for the written examination**

*Source: Khalaf et al., 2020*

1. Learners attending online examination using Google classroom, & zoom and scanning answer script by camscanner;
2. Invigilator monitoring and instructing using Google classroom and Zoom, and
3. Support team assisting invigilator and learners during the examination using zoom and google classroom.


In such a scenario, after students reviewed the new guidelines and receive training, they should be provided with a mock examination or quiz to familiarise themselves with the software. A mock examination also allows faculty to correct any student behaviours that may be flagged as a breach of integrity by the software, including poor positioning of the webcam, insufficient lighting, excessive movement (i.e., getting up/walking around), or reading questions aloud during the assessment. Overall, students should be reminded of the importance of adhering to academic integrity expectations and online testing policies and procedures during all assessments.

**Objectives 3 - to suggest the necessary recommendations.**

This research provides some recommendations for using the remote proctoring system in the online examination. These are:

- (i) Necessary investment is needed in ongoing faculty and staff development on online assessment and the e-proctoring system and owning remote proctoring services.
- (ii) Collaboration is needed with other educational institutions and associations for initiating and maintaining the online examination system.
- (iii) It is vital to use Artificial Intelligence (AI)-based remote proctoring technologies in higher education to impact the rights of students, with a focus on the fundamental rights to privacy and security, legal implications, ethical issues, data protection, and non-discrimination (Han et al., 2022).
- (iv) The absence of surveillance during online exams can increase the opportunity to engage in misconduct. Therefore, relevant technology such as Web-based proctoring can be employed to counter deception and dishonesty in online exams (Hylton et al., 2016).
- (v) Educational developers, instructional designers, academic technologists, and deans must be prepared to support and motivate learners extensively, faculties and staff to implement the online examination system and live to proctor (Silverman et al., 2021).
- (vi) Building trust among students, instructors, and the administration is essential. Institutions that want to resist remote proctoring have an opportunity to develop a shared critical digital literacy between instructors and students by discussing the ethical problems associated with remote proctoring and building a shared understanding of academic integrity in the digital age.
- (vii) Proper proctor training should be provided by developing a faculty handbook with specific guidance (Sando et al., 2021).
- (viii) To implement successful online examinations, teachers need to be more friendly, accommodating, cooperative and empathetic to students (Bashir et al., 2021).
- (ix) Compelling online examination and remote proctoring policies should be developed
- (x) The teacher and staff need to motivate and educate the learners to reduce dishonest behavioural.



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- (xi) The teachers and staff should give technological, and psychological support to the learners.
  - (xii) A sense of accountability should be formed as a value and principle to develop a transparent online examination system.
  - (xiii) Rather than using multiple apps and software, an online examination system should be a customised as an one-stop solution.
  - (xiv) In addition, students need to be trained to use the proctoring tools integrated into learning management systems such as Google Classroom, Blackboard, Moodle, etc.
  - (xv) The technical capability and readiness of universities, faculties, and students must be assessed. BOU needs to have robust infrastructures that can accommodate a large number of students who must access the server simultaneously (as several exams are often scheduled simultaneously) and whose proctored videos are recorded and uploaded to the university server (Halaweh, 2021).

## CONCLUSIONS

Undoubtedly, the Covid-19 pandemic's paradigm has allowed us to implement and verify innovative approaches to disseminating education, specifically in learners' assessment (Pettit et al., 2021). This study found that diverse types of remote proctoring systems and approaches with unique characteristics were initiated and implemented by the educational institutions. Though remote proctoring is challenging, it offers plentiful advantage and may perhaps be the catalyst for long-term transformation. In this study, one of the objectives was to analyse the planning and designing procedure of remote proctoring system adopted by BOU. This research found that BOU followed a systematic procedure for remote/live proctoring however it needed more groundwork and training. This research expressed the experiences and lessons learned during the live proctoring process, which can be helpful to other educational developers. However, it is evident that each campus is unique and that the dynamics that affected BOU's experience with the transition to remote proctoring, are not universal. Further research is needed to discuss strategies for limiting the use of remote proctoring in different contexts to develop a robust, people-centred tool kit for supporting remote assessment in diverse educational institutions contexts.

In the future, it may be meaningful to repeat the research at another institution and within a different type of programme or course. As this research was only focused on NBR learners attending the HSC examination, the future study can be conducted on a larger sample and different types of student populations for more comprehensive results. However, the research pointed out the need for taking careful steps by stakeholders while making academic decisions, especially in the 11 and 12 grades level of education.


## REFERENCES

- Akhter, S. H., & Rahman, M. M. (2022), Evaluating Offshore Open School Learners of Bangladesh Open University: Challenges and Problems. *International Journal of Open Schooling*, 1(1).
- Balyer, A., & Öz, Ö. (2018). (2018), Academicians' views on digital transformation in education. *International Online Journal of Education and Teaching (IOJET)*, 5(4), 809-830
- Dijkstra, S., Tennyson, R. D., Seel, N., & Schott, F., (1997), *Instructional design: International perspectives (Vol. 1)*. Erlbaum, Mahwah, NJ.
- Khan, R., Jahan, A., Sultana, S., NaushadKabir, M. Md., Haider, Md. Z., & Roshid, M. M. (2021), Accessing Online Instruction amidst Covid-19 in Bangladesh: Barriers and Coping Strategies. *Language Teaching Research Quarterly*, 22–33.
- Kumar, R. (2014), *Research Methodology: a step-by-step guide for beginners* (K. Metzler, Ed.; 4th ed.). Sage Publications.
- Pettit, M., Skukla, S., Zhang, J., Sunil Kumar, K. H., & Khanduja, V. (2021), Virtual exams: has Covid-19 provided the impetus to change assessment methods in medicine? 2 (2).
- Schwab, K. (2016), *The Fourth Industrial Revolution: what it means, how to respond*. World Economic Forum.
- Woodhouse, T. (2021), *Affordability Report 2021*.
- Yin, R. K. (2018), *Case study research and applications: Design and methods*, Sage Publications, Ed.; 6th ed.
- Bangladesh Open University (2022), Bangladesh Open University-Home <https://bou.ac.bd/>

- Balash, D. G., Kim, D., Shaibekova, D., Fainchtein, R. A., Sherr, M., & Aviv, A. J. (2021), Examining the Examiners: Students' Privacy and Security Perceptions of Online Proctoring Services [www.usenix.org/conference/soups2021/presentation/balash](http://www.usenix.org/conference/soups2021/presentation/balash)
- Bashir, A., Uddin, M. E., Basu, B. L., & Khan, R. (2021), Transitioning to online education in English departments in Bangladesh: Learner perspectives. *Indonesian Journal of Applied Linguistics*, 11(1), 11–20 <https://doi.org/10.17509/ijal.v11i1.34614>
- Baume, M. (2019), Online Proctored Exams: Where and How are they used? *INTED2019 Proceedings*, 1, 5216–5225 <https://doi.org/10.21125/inted.2019.1301>
- Coniam, D., Lampropoulou, L., & Cheilari, A. (2021), Online Proctoring of High-Stakes English Language Examinations: A Survey of Past Candidates' Attitudes and Perceptions. *English Language Teaching*, 14(8), 58 <https://doi.org/10.5539/elt.v14n8p58>
- Conijn, R., Kleingeld, A., Matzat, U., & Snijders, C. (2022), The fear of big brother: The potential negative side-effects of proctored exams. *Journal of Computer Assisted Learning* <https://doi.org/10.1111/jcal.12651>
- Dadashzadeh, M. (2021), The online examination dilemma: to proctor or not to proctor? *Journal of Instructional Pedagogies*, 25 <http://www.aabri.com/copyright.html>
- Fawns, T., & Schaepkens, S. (2022), A Matter of Trust: Online Proctored Exams and the Integration of Technologies of Assessment in Medical Education. *Teaching and Learning in Medicine*, 1–10 <https://doi.org/10.1080/10401334.2022.2048832>
- Guangul, F. M., Suhail, A. H., Khalit, M. I., & Khidhir, B. A. (2020), Challenges of remote assessment in higher education in the context of Covid-19: a case study of Middle East College. *Educational Assessment, Evaluation and Accountability*, 32(4), 519–535 <https://doi.org/10.1007/s11092-020-09340-w>
- Halaweh, M. (2021), Are universities using the right assessment tools during the pandemic and crisis times? *Higher Learning Research Communications*, 11, 1–9 <https://doi.org/10.18870/hlrc.v11i0.1184>
- Han, S., Nikou, S., Ayele, W. Y., Lekamalage, B., Balasuriya, P., & Svee, E.-O. (2022), Digital Proctoring in Higher Education: A Systemic Literature Review. 6–18 [https://aisel.aisnet.org/ecis2022\\_rp/57](https://aisel.aisnet.org/ecis2022_rp/57)



- Hylton, K., Levy, Y., & Dringus, L. P. (2016), Utilizing webcam-based proctoring to deter misconduct in online exams. *Computers and Education*, 92–93, 53–63 <https://doi.org/10.1016/j.compedu.2015.10.002>
- Jha, A., & Indiran, L. (2021), Merit and Challenges of Online Teaching in India and Malaysia. *International Journal of Academic Research in Progressive Education and Development*, 10(2) <https://doi.org/10.6007/ijarped/v10-i2/10491>
- Khalaf, K., El-Kishawi, M., Moufti, M. A., & al Kawas, S. (2020), Introducing a comprehensive high-stake online exam to final-year dental students during the Covid-19 pandemic and evaluation of its effectiveness. *Medical Education Online*, 25(1) <https://doi.org/10.1080/10872981.2020.1826861>
- Khan, R., Jahan, A., Sultana, S., NaushaadKabir, M. M., Haider, M. Z., & Roshid, M. M. (2021), Accessing online instruction amidst Covid-19 in Bangladesh: Barriers and coping strategies. *Language Teaching Research Quarterly*, 22, 33–48 <https://doi.org/10.32038/ltrq.2021.22.03>
- Minerva, T. (2020), Educational dinosaurs in the digital-pandemic era: The need for a digital framework and an emergency framework in education. In *Journal of E-Learning and Knowledge Society* (Vol. 16, Issue 3, pp. I–III). Italian e-Learning Association <https://doi.org/10.20368/1971-8829/1135348>
- Mutawa, A. M., & Sruthi, S. (2021), Students' Perspective Towards Online Proctoring in Exams During Covid-19. *Journal of Engineering Research* <https://doi.org/10.36909/jer.14749>
- Ookla. (2023), Speedtest Global Index <https://www.Speedtest.Net/Global-Index>. <https://www.speedtest.net/global-index>, (2023)
- Prakasha, G. S., Hemalathaa, K., Tamizh, P., Bhavna, B., & Kenneth, A. (2021), Online Test Anxiety and Exam Performance of International Baccalaureate Diploma Programme Students under E-Proctored Exams amid Covid-19. *Problems of Education in the 21st Century*, 79(6), 942–955 <https://doi.org/10.33225/pec/21.79.942>
- Raman, R., Sairam, B., Veena, G., Vachharajani, H., & Nedungadi, P. (2021), Adoption of online proctored examinations by university students during Covid-19: Innovation diffusion study. *Education and Information Technologies*, 26(6), 7339–7358 <https://doi.org/10.1007/s10639-021-10581-5>

- 
- Sando, K., Medina, M. S., & Whalen, K. (2021), The Need for New Guidelines and Training for Remote/Online Testing and Proctoring Due to Covid-19 <http://www.ajpe.org>
- Santis, A. de, Bellini, C., Sannicandro, K., & Minerva, T. (2020), Students' Perception on E-Proctoring System for Online Assessment. European Distance and E-Learning Network (EDEN) Proceedings. <https://doi.org/10.38069/edenconf-2020-rw0018>
- Selwyn, N., O'Neill, C., Smith, G., Andrejevic, M., & Gu, X. (2021), A necessary evil? The rise of online exam proctoring in Australian universities. Media International Australia <https://doi.org/10.1177/1329878X211005862>
- Silverman, S., Caines, A., Casey, C., Garcia de Hurtado, B., Riviere, J., Sintjago, A., & Vecchiola, C. (2021), What Happens When You Close the Door on Remote Proctoring? Moving Toward Authentic Assessments with a People-Centered Approach. To Improve the Academy, 39(3) <https://doi.org/10.3998/tia.17063888.0039.308>
- Szopiński, T., & Bachnik, K. (2022), Student evaluation of online learning during the Covid-19 pandemic. Technological Forecasting and Social Change, 174 <https://doi.org/10.1016/j.techfore.2021.121203>