https://doi.org/10.53964/jmer.2022008

https://www.innovationforever.com

Journal of Modern Educational Research

ISSN 2790-3192 (Online)

Open Access

Research Article

Experiences of University Staff in Online Proctored Examination: A Phenomenological Study

Subekshya Ghimire[1], Jeevan Khanal[1*]

[1]Faculty of Social Sciences and Education, Nepal Open University, Lalitpur, Nepal

[*]**Correspondence to: Jeevan Khanal, PhD, Assistant Professor,** Faculty of Social Sciences and Education, Nepal Open University, Kumaripati, Mahalaximisthan Road, Lalitpur 44700, Nepal; Email: jeevan.khanal@ymail.com

Received: July 14, 2022 **Revised:** August 21, 2022 **Accepted:** August 31, 2022 **Published:** November 24, 2022

Abstract

Objective: This research aims to explore the first and unique experiences of faculty members, administrators, and technical officers (staff) and their perception of opportunities and challenges using online proctoring tools in the final and entrance exams during the COVID-19 pandemic.

Methods: The qualitative approach of interpretive paradigm study was used to evaluate staff experiences in participating online proctored examinations. In mid-2021, eight faculty members, one administrator, and one technical officer participated for the first time in online proctored examinations and elaborated on their perceptions and concerns about their online proctored exam experiences.

Results: The study's findings provide new insight into the staff experiences of online proctored examinations, including their predominant concerns over consuming less time and effort, reducing huge administrative burdens, and organizing examinations frequently. The study also highlights challenges such as technology compatibility, doubts about academic integrity/reliability, and validity while implementing the online proctored examinations and their future impact.

Conclusion: The findings from this study contribute to the exploration opportunities and challenges of online proctored examination concerning the university staff perspectives of technologically developing countries.

Keywords: online proctored, examinations, COVID-19, university, staff

Citation: Ghimire S, Khanal J. Experiences of University Staff in Online Proctored Examination: A Phenomenological Study. *J Mod Educ Res*, 2022; 1: 8. DOI: 10.53964/jmer.2022008.

1 INTRODUCTION

There is a paradigm shift of literature towards the impact, needs, implications, and pros and cons of online proctoring assessments and examinations as well as e-proctored tools for exams and pointed out the need to conduct online exams effectively. Researchers made efforts to investigate different e-assessment and objective testing approaches and its implications on teachers[1], students[2], stakeholders'

needs and expectations of automated assessment[3], students satisfaction[4], teachers' challenges in introducing e-exams in a higher education context[5] pros and cons of online assessment[6], and attitude of students towards online proctored examination system[7]. The above mentioned studies showed promising evidence that emerging remote exams using online proctoring tools require technical infrastructure and professional human resources with skills different from usual face-to-face hall examinations. However, universities in Nepal were not equipped in terms of technical infrastructure, professional human resources, and skill sets needed to conduct the examination. Due to unpredicted COVID-19, staff encounter trouble in the online proctoring test conducted during the pandemic.

While face-to-face hall examinations became almost impossible, many universities across the globe started the online proctoring evaluation system to maintain the academic calendar[8]. In this emergent situation, the majority of the students and staff need to be informed about the opportunities and challenges in using the online proctoring tools[9] regarding entrance in assignments, mid-term and final-term tests, especially in technologically lagging societies. Given the possibility of encountering similar situations in the future, technical officers, faculties, and administrators' views are important to inform and guide future users to contribute to the process. Considering the present situation, this study aims to explore the emergent use of an online proctoring tool in Nepal and staff experiences. In this aspect, the opportunities and challenges in using online proctoring tools for entrance and final exams during COVID-19 and participants' experiences using them are investigated. The study further reveals the experience of university staff using an online proctoring tool for the exams, including feelings, satisfaction, challenges, and struggles they have encountered during the process. Therefore, the current study analyzed the online proctoring tool during the COVID-19 pandemic, what the university did, how the staff was involved, and the opportunities and challenges they perceived during the test. For this purpose, the following research questions were explored: (1) What opportunities and challenges did faculties experienced with the online proctoring test? (2) What opportunities and challenges did the administrator and technical officer experience with the online proctoring test?

1.1 Literature Review

1.1.1 Online or E-proctoring Tools

The online exam can be defined as the "high-stakes summative assessment events, mediated by digital technologies[10], often take place in a defined place or time and under secure conditions (e.g., invigilation, restrictions on access to course materials, notes, or communication)". Students at home or in a convenient location can take the exam, and an online proctor can invigilate each student during online exams by assessing their webcams, screens, and microphones[11] to check that students are engaging honestly and following the agreed rules and regulation of the university. Thus, online exams powered by remote proctoring are becoming popular in higher education institutions. Generally, the online proctor uses an artificial intelligence system that analyzes students' activities during examinations to decide whether to detect possible cheating behaviors[12]. These tools provide educational institutions with real-time online proctoring services from any place with internet access. In addition, universities provide examination schedules to the students, who are linked with their proctor through the online medium at the given schedule[13]. The university has access to students' computer microphones and webcams, including a 360-degree view of the students' places through an e-proctor to detect that no unauthorized materials are in use. Students must manage their own devices, including a computer with visual and audio connections, to proctor and verify their identity before the examination[14]. However, online proctoring was used in higher education before the pandemic but gained more popularity during the COVID-19 pandemic.

1.1.2 Context of Global Higher Education during COVID-19

Not only in developing countries like Nepal, but the COVID-19 pandemic also caused a sudden shift from face-to-face to distance learning at all levels of education worldwide[15]. The universities and school closures have led to the traditional classroom's paradigm shift to online and distance learning (remote teaching). The staff made a great effort to develop a curriculum that is compatible with online learning through the internet in 200 counties around the world during COVID-19 for more than 1.5 billion learners of all ages[16,17]. Thus, higher education institutions are the sector in which most educational assessment, evaluation, and accountability are affected since the teaching-learning mode is shifted to online and distance mode[18]. Many educational institutions were forced to conduct online proctored examinations due to the lockdowns during the COVID-19 pandemic[8].

Along with online proctored examinations, many studies have also been conducted on using online proctoring tools from a diverse perspective. For instance, a study investigated the perception and attitudes of students within online experiences and the impact of online proctored tools on students' performance[19], online test anxiety and students' performance[20], the level of trust in the privacy[21], academic integrity and highlighted benefits of using online proctoring examination as well as challenges from the students' perspectives. In this regard, Phillips[16] urged that teaching, learning, and evaluation systems must be re-imagined in the increasing uncertainty of pandemics. Moreover, this resulted in unprecedented challenges, especially in technologically backward countries[22] like Nepal. This crisis hastened the shift in the evaluation

system of students in universities from physical proctoring to online proctoring. Online proctoring evaluation system or examination was already practiced in some developed countries like Australia[23,24]. Thus university staff in developed countries have expertise in technology to transform the previous practices of handwritten physical proctoring examination into an online proctoring environment[10] and might have some ideas for resolving issues opposed to fair and accurate evaluation. Fair and accurate assessment of student learning achievement became the main feature in these areas[25]. Universities and teachers have paid enough attention to assessment methods during the early part of the pandemic since they were under enormous pressure to keep their 'business as usual[26].

1.1.3 Context of Higher Education of Nepal during COVID-19

Higher education in Nepal has been no exception to the global trend. Few universities deliberated on online education for the limited subject and limited students before the pandemic[27]. Since March 18, 2020, schools and universities in Nepal have been deeply affected by the COVID-19 pandemic, and the federal government ruled out all educational institutions, including universities in the country, to prevent the spread of COVID-19. Therefore, the closure of schools and universities has affected the education system in low-income South Asian countries like Nepal, which could have a long-lasting impact on Nepalese higher education[28,29]. Almost all universities except ABC University's students were affected by the COVID-19 pandemic. These universities were compelled to adopt new technology, create flexible program structures, and implement remote and accessible teaching, learning, and evaluation systems[30]. The need for extreme technological requirements, technical difficulties, and the additional cost associated[31] with each exam were the key factors that outweighed the benefits of the e-proctoring system. Even though technological, physical, and financial resources are limited, initiating remote learning and online proctoring in such a context is advantageous. As face-to-face teaching-learning methods have shifted, there has also been an equal shift in the students' evaluation, assessment, and examination plan during COVID-pandemic[32]. Nepalese higher education institutes grabbed the opportunities surrounding online teaching; however, the perceived advantages and challenges rooted in the online proctored examination are not yet revealed.

1.1.4 Advantages of Using Online Proctored Exam

The major opportunity over hall paper-based examination is that online proctoring test constitutes fully online and automated systems that accelerate the assessment validity and reliability of students' knowledge, skill, understanding, and competencies[33]. The online proctoring examination also increases the reliability of students' grades and the examination's trustworthiness[34]. Online proctoring test also helps to improve the efficiency of data management task such as scoring and storing the result, thus reducing the workload of faculty members, increasing ease the visibility[2], and reducing the time required in testing[35]. Similarly, the online proctored examination enhances the standards of the entrance examination and reduces the efforts of both invigilators and students[36]. Another study by Butler and Crawford[37] indicated that institutions can easily monitor the students' movement in the examination and minimizes the requirement for paper. A similar finding of Hameed and Abdullatif[38] uncovers that online proctored examinations minimize the time of preparation and time required in conducting the exams, contributing to speedier and more accurate results.

As an advantage of using the online proctored exam, it is highly practiced in higher education institutions worldwide to supplement or replace hall exams[39]. Another benefit is that the online proctoring examination helps in the internationalization of higher education and serves the national concern by increasing quality education and research, enticing international students through student exchange programs, and intensifying income through tuition fees[2,40,41]. However, the university staff's perceived advantage of using online proctored tools is still very limited[42], especially in a technologically underdeveloped country like Nepal. The literature review discussed the advantages of the online examination to ensure proper implementation of online proctored exams. Many developing countries, including Nepal, would require significant plans to mitigate challenges during online proctored examinations. Thus, online-proctoring examinations or evaluations will eventually be integrated into online teaching. Still, there will be issues if staff aren't well-prepared to be administered it according to the nature of online assessment or if the staff doesn't know how to cope with difficulties with the student's problems[21].

1.1.5 Challenges of Using Online Proctored Exam

Although proctoring systems appear to be a natural and effective way to assess students' online learning performance, the authors based them on flawed assumptions about educational fairness and authoritarian pedagogical techniques[26]. There is concern that using technological approaches to replicate high-stakes examinations in proctored online environments does not address the underlying problems of academic integrity such as cheating; as new technical solutions are implemented, "students discover alternative means of cheating[43]. Despite this, students voluntarily accept and utilize e-proctoring technology as docile bodies rather than confronting their immoral repercussions or fundamentally unequal social and educational institutions, resulting in educational stagnation rather than innovation[26]. Therefore, online proctored exams have received much criticism over the years. Therefore, a sizable group of individuals believes that online proctored

exam is fundamentally unsound and should stop when the situation becomes normal. Some people do not support the practice in all its form. Few people are raising the question of its legitimacy focusing on student cheating as a personal and interpersonal issue while ignoring the larger issue of social and educational inequity[44].

Likewise, there is an issue of transparency in using online-proctoring tools to administer the exam. Students are provided a different set of questions chosen randomly from a question bank or given individually, but there is a concern regarding the fairness of the process and the difficulty level of questions for each student[45]. Another issue is the validity of online exams, which scholars have seen critically. For example, the incorporation of multimedia elements, including virtual presence and internet link simulation, is made possible by using an online proctoring exam to assess the student's skills and knowledge of the provided topic[46]. Few scholars argued that the main challenges perceived by students and staff while using online-proctoring tools are related to the time and skills required to construct high-quality assessment tools[46-48]. For instance, a study on various universities in Pakistan on teachers' perceptions of computer-based *vs.* paper-based examinations revealed that most teachers were highly concerned about the challenges of making different forms of questions for the online proctoring test. Similarly, a study at Turku University of Applied Sciences in Finland by Kuikka et al.[5] revealed that teachers are resistant to changing the teaching style. From the students' point of view, James found that first-year undergraduates at an Australian university were familiar with the use of technology but inexperienced in the online education environment and showed concern about technical difficulties and internet connectivity. Similar findings were reported by Whitelock[47], who warns that system failure during an online exam can discourage both teachers and students from using such systems. Online proctored exams were difficult to carry out from different countries at once[49]. The other disadvantage was found by Berkey and Halfond[50] in a survey where 84% of 141 students agreed with the occurrence of student dishonesty in practice. Thus, this study aimed to explore what is perceived, sensed, and known from the staff's views on online proctoring examinations.

1.1.6 Conceptual Framework

The most influential factor when employing technology as an online proctoring tool in the examination is its quality management[14]. We wanted to discover how the quality of the test examination is perceived by staff and whether it provides demonstrable and tangible outcomes[34]. The influences of the environment while using online proctoring tools can be positive (opportunities) or negative (challenges). Some examples of experiences of using online proctoring tools for the exam can be seen in user comments, feedback, and suggestions. Other factors related to opportunities and challenges could be experienced in using online proctoring tools. Tan and Teo[51] highlight how compatibility could be an opportunity for the users when they experience motivation while adopting online proctoring tools. Hussein et al.[34] and Tan and Teo[51] provided the base for conceptualizing the opportunities and challenges in the online proctoring examination. The perceived usefulness could be the factor of opportunities for its sustainability. Moreover, we considered opportunities and challenges as perceived experiences of whether online proctored exams assist in accomplishing the anticipated objective or provide benefits over conventional exams. Staff experiences on online proctoring examinations can be trustworthy and reliable information regarding opportunities and challenges. In this regard, Dimeo[52] also stated that many administrators and faculty members considered online exam proctoring effective and vital in expanding online and distance learning. According to Turani et al.[53] several issues noted by the staff include the system's usability and security, as well as how challenging it is for a proctor to keep an eye on everything that occurs throughout the exam. Ladyshewsky[54] explored that there are no differences in grades obtained by the students in proctored tests and physical examinations. These studies provide concepts for examining the experiences of staff focusing on online proctored examinations. Therefore, the experience of staff regarding opportunities and challenges is examined through the phenomenological study.

2 MATERIALS AND METHODS

There might have different views on the opportunities and challenges experienced by the respondents; however, we believe that there is equally general agreement on respondents' core philosophical viewpoints as a belief that experience is central and understanding their subjective consciousness is important. We further believe that consciousness has specific structures which are a gateway to obtaining direct information or knowledge through respondent reflections[55].

The interpretive paradigm was selected to underpin the study because it is concerned with understanding people's experiences from their perspectives[56]. It is primarily concerned with understanding the meanings individuals construct to understand the world to which they belong[56]. Consistent with the interpretive paradigm, purposive and maximum variation sampling strategies were adopted to select the participants. These approaches offer a deliberate and flexible method of selecting context, events, or the most appropriate respondents for a given study[57]. Eight faculties, one administrator, and one technical officer were chosen to participate in the interview. Data were collected using a semi-structured interview technique and non-participant observation. The interview guides mainly focused on the perception and challenges while conducting proctored examinations and how they deal with challenges.

Moreover, we have selected a research design based on

the phenomenological study approach. In this approach, the researcher is interested in understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world[58]. This methodological approach is generally based on the in-depth depiction of the participants' subjective experiences under study[59]. Cohen et al.[55] argued phenomenology as the theoretical standpoint that reflects the lived experiences of the individuals as perceived by them, while experiences are crucial in shaping human experiences rather than the realities that are observed externally. We consider that this design allowed us to thoroughly investigate deeper issues and present an understanding built on the life experiences described by a university staff regarding online proctoring tests and evaluations through an in-depth interview[60]. Our findings are based on participants' view that the information about the world is rooted in human beings' experiences. The research of this study is to describe, understand, interpret and explain these experiences[61]. Therefore, the study aims to describe, explain and interpret a phenomenon of online proctoring tests and evaluation in terms of perceived opportunities and challenges to Nepalese universities, as claimed by Marshall and Rossman[62]. The study is based on descriptive phenomenology and is more focused on studying phenomena of online proctoring tests and evaluations perceived by staff.

Interpretive phenomenology explains the lived experiences by assuming the researcher's knowledge and understanding of the phenomenon as a fundamental component of the research, as the aim of such study is not restricted to understanding the phenomenon but also interpreting the circumstances over which the understanding takes place[63]. The core goal of this study is to explore the experiences of staff in universities in Nepal through the explanation and interpretation of lived experiences. The perceived experiences of participants as Giorgi[64] concluded that interpretive phenomenological research concerns experiences and meanings "to capture as closely as possible how the phenomenon is experienced within the context in which the experience takes place[27]".

2.1 Research Site and Population

This study was confined only to running universities in the country operating in the central part of the nation. The rationale behind choosing this particular university is that it recently introduced online-proctoring exams for entrance and final examinations at the graduate level. Furthermore, ABC University will provide heterogeneous data/information for the study as the university uses the online proctoring tool for entrance and final exams for undergraduate and graduate-level students in 7 different disciplines. Besides, the staff was fully engaged in administrating the test. Thus, the ABC university staff is taken as the population in the study because the sampling technique is controlled by interviewing staff of ABC University. This sampling technique allowed us to select study samples that are easily and readily accessible[65]. Only staff of the selected university are authentic sources in Nepal as they experienced the online proctored exam. The university was intentionally selected to obtain rich and in-depth information that cannot be achieved from other sources[65].

2.2 Demographic of the Participant

The selected participants were staff working at the university. A brief profile of each participant is provided here to appreciate the depth of their regional and global knowledge and expertise in the subject matter. The profiles will provide readers with the thematic aspects of the participant's background. For confidentiality, recorded interviews, respondents' names, institutions, and addresses were replaced by pseudo names and presented in Table 1.

2.3 Tools for Data Collection

The in-depth data/experiences regarding the use of the online proctoring tool for examination and related experience of participants, challenges faced by the faculties, administrators, and technical officers in exams are generated through semi-structured interviews. A sufficient time, even more than one hour, was provided with purposively selected ten participants from ABC University. Some examples of interview questions asked participants are (1) How reliable is the online examination? (2) Is there any difference in your experience while invigilating physical examination versus online? If yes, please explain. (3) What challenges did you encounter in online proctored examinations? And (4) Is this online assessment system's screen and interface design appropriate and convenient in Nepal?

The reason behind choosing a semi-structured interview was that it helps to comprehend themes of the lived world from the perspectives of the subject[66]. In doing so, participants could interpret the social reality of their lived experiences using online proctoring tools through their subjective meaning. As a researcher, we could get an opportunity to interpret that reality through participants' perspectives. This phenomenon allowed us to construct the knowledge-based theme using online proctoring tools in collaboration with the participants and gain in-depth data to uncover the participants' perspectives about the particular phenomena. A semi-structured interview protocol was constructed for an interview with participants. This interview protocol consists of suggested questions focusing on the subject's themes and posing extra questions[66] to generate the information instantly.

2.4 Data Collection and Data Analysis

The one-to-one interview was conducted in a favorable environment with the conveniently selected ten participants. Before the interview, consent was taken from each participant. Moreover, the notes were taken and referred

Table 1. Demographic Information of Participants

Name	Type of Staff	Qualification	Institutions	Positions	Year of Experience
Richa	Assistant Professor of Health Education	PhD	ABC	Subject coordinator of health education	8
Aakash	Associate Professor of Education	PhD	ABC	Program Coordinator, faculty of social sciences and education	20
Nisha	Assistant Professor of Mathematics Education	PhD	ABC	Subject Coordinator of mathematics education	10
Nikhil	Assistant Professor of Economics	PhD	ABC	Subject coordinator of economics	15
Bishnu	Assistant Professor	M. Phil.	ABC	Member of subject committee	16
Ananda	Technical Officer	Master of computer application	ABC	Head of technicians	6
Anjana	Assistant Lecturer	M. A., M.Ed.	ABC	Subject ordinator of bachelors of library sciences	5
Ganesh	Assistant Lecturer of English	M. Phil. in English	ABC	Admin officers, dean's office	10
Sagar	Lecturer of Nepali Language	M. Phil. in Nepali	ABC	Subject coordinator of M.Phil. in Nepali Language	12
Binita	Financial Manager	Bachelors in accounting and management	ABC	Head of accounting and book-keeping	7

throughout the interview using digital recorders. We simplified what the participants said and checked with the participants for the correctness of the paraphrasing. Each participant was asked about a convenient place and time, hoping they could focus more on revealing their experiences in detail so that exploration of their real story could be revealed more reliably to meet detailed and genuine consequences. All interviews were conducted in a quiet environment from distraction. The note-keeping helped us confirm our notes' correctness, simplify the participant's responses, and ask any follow-up questions after reviewing the transcript. Each interview was intended for 60min, but the length differed depending upon the amount of information each respondent shared about their experiences. Interviewing all the participants took a month. Each interview was transcribed accurately. The individual identities and expressed pauses items were removed from transcriptions. Afterward, We read the data to become acquainted with the obtained information because interpretive inquiry necessitates the full emergence of the researcher into the data for the researcher to comprehend the sense of the lived experiences depicted by participants[67]. In addition, pattern data coding was done to analyze the data as prescribed by Pietkiewicz and Smith, which incorporated several readings and annotation, transforming explanation into emergent themes, searching relationships, and clustering themes, including the thick description of the experiences of participants in using the online proctoring tool from staff along with "the participants' version of his or her experience" in their terms and "interpretive commentary of the researcher"[67].

3 RESULTS

3.1 Opportunities of Online Proctored Examination

Three themes emerged from this qualitative data analysis to emphasize the opportunities. The three themes regarding opportunities were: (1) consuming less time and effort, (2) reducing huge administrative burdens, and (3) running the exams frequently.

3.1.1 Consuming Less Time and Effort

Regarding opportunities for the online proctored exam, staff appreciated it as less time and effort is required in online proctored examinations because of the benefit of low cost, the ability to manage more students within a certain time, and the ability to examine with less human resource too. The theme of less time and effort is related to research question 1, thus ensuring data speak to "what are the opportunities and challenges that university faculties experienced with the online proctoring test"? And how do they describe it? When asked about experiences of taking the online proctored examination, their comparable experiences to traditional face-to-face pencil and paper tests can be seen. Almost all interviewed respondents mentioned their responses' advantages and benefits of less time and effort. All faculty members and administrators self-disclosed that online proctored examination is cost-effective and time-saving. Such an examination minimizes cost and saves time as both the invigilator and the student did not travel for the examination. Akash and Nikhil added value of this by mentioning:

- A proctored examination is cost-efficient compared to a physical examination. It is less time-consuming. We had to

go to different places to conduct the physical examination. In many cases, it was hard for students from remote areas to travel to a geographically difficult place (Akash).

- Students do not have to go to the exam center and search for their classes and symbol number. They do not have to face all these burdens (Nikhil).

Participants also strongly preferred the convenience and flexibility of conducting online proctored exams within the limited physical infrastructures. Administrators and faculty members indicated the inherent ability of online proctored examination, allowing them to control it from one room. Concern with conveniences to meet commitments of the exams, the participants mentioned that buildings were not necessary to conduct online proctored examinations, and examinations can be conducted at home. One of the faculty members conferred with the statement:

- We don't need many buildings like in conventional exams as the student can sit in their home and appear in the examination. Next, the transportation cost and time of both students and faculty are saved (Anjana).

Before the recorded interview, respondents confirmed in their member checking that their experiences of online proctored examination were beneficial, especially in the pandemic, as it stood out as the only possible alternative when it was difficult to conduct the physical examination. They stated that if the examiner and examinee are techno-friendly, then proctored examinations can be a good approach for examining as there is no need to travel, and one can take or give exams from their personal space. For example Bishnu and Pratik express:

- Due to the Pandemic, it is becoming difficult to create an environment where one can take the examination by attending the class directly. During COVID, various universities in the country could not conduct physical examinations in the center, forcing the students to study in the same category for 2 years. Therefore, looking at time, money, and analyzing from different angles, the proctored examination has many benefits. If the examiner and examinee are techno-friendly, then I think such exams are better. I don't think it is time-consuming, like the physical examination.

- Physical examination is a waste of time for both teacher and student. They have to reach the exam center for the examination. But in the case of online, one can sit in their private place and appear in the examinations (Pratik).

These responses highlight that flexibility and less time consumption as major factors compelling them in the online proctored examination. They appreciated that the online proctored examination allowed management of the test within the limited human resource.

3.1.2 Reducing the Huge Administrative Burdens

Respondents revealed the benefit of the online proctored examination and highlighted the opportunity of reducing the huge administrative burden. Generally, the culture of the Nepali examination is to run the exam in centers across the country by sharing the human resources of other institutions or colleges. Each center needs focal persons, presidents of the exam center, external and internal evaluators or invigilators, and administrative officers for each hall or class. If the online proctored examination is conducted properly, all these tasks can be done by a single person who reduces the huge administrative burdens; for instance, the statement of a faculty member and an administrator is represented here.

- For the physical examinations, lots of human resources are required. Invigilators, external examiners, admin, focal person, security persons, and other staff for cleanliness are involved in the physical examination. Remuneration is required for all these human resources, but online proctored examination requires a less human resource, and the administrative work is also get minimized (Binita).

- There are so many people involved in the proctored examination. The administration process and works are huge. Examination halls should be managed, and we also have to look after the teacher-student confrontation in the physical examination several times, which is required in the proctored examination (Sunil).

The previous expressions towards the opportunities created by the online proctored examination to the university highlight the possibility of alleviating the faculty member's and administrators' efficiency by reducing the administrative burden of the participants.

3.1.3 Running Exams Frequently

Some participants noted their positive experiences with online proctored examinations providing with extent of easiness to conducting exams frequently. The examination system of Nepalese universities is either annual or semi-annual. It is hard for these universities to conduct frequent examinations. But respondents in this study mentioned that instead of concentrating all the exams on a few big exam days, exams could be run more often and closer to the tuition period. These participants expressed that adopting an online proctored exam in Nepalese university provides a more relaxed atmosphere to conduct the exams frequently than the traditional, periodic paper pen-based exams. In many cases, these physical exams are not timely conducted, increasing the students' stress about not being able to graduate on time. The university heavily relied on a convenient environment to conduct the examination when

the pandemic resulted in lockdown.

- Our traditional examinations were pen and paper-based and conducted annually or semi-annually. We have an academic calendar for examining yearly or on a semester basis, but through the online proctored examination, we will be able to conduct the examinations anytime as per our need and convenience (Ganesh).

Respondents experienced that the relative opportunities of the online proctored examination allowed universities to not only conduct frequent test rather it also helps to maintain the academic calendar in a timely manner.

3.2 Challenges Faced by ABC University in Online Proctored Examination

Similarly, three themes generated under the challenges were: (1) technology compatibility, (2) doubt on academic integrity/ reliability and (3) validity.

3.2.1 Technological Compatibility

All respondents described challenges associated with the online proctored examination. Most of the respondents stated that managing the technical aspects is crucial and challenging in online proctored examinations. Participants described that such exams required extra technical planning and preparation, unlike the physical examination. Online examination seemed difficult to four respondents due to the technical aspects involved in the online proctoring examination. One of the IT officer and a faculty member added value to this theme.

- For me, the physical examination was easier because I didn't have to look after any technical issues. The faculty had to spend 4h preparing for the questions; the students had to spend 4h in a traditional examination, but I had to spend 16h in the online proctored examination. By this, I mean that a lot of technical planning and preparation is required in the proctored examination. I had to work harder to manage the proctored examination and deal with various IT issues, especially network issues (Ananda).

- The invigilator can be at the exam center 5min before and invigilate and get the copies after the exam is over in traditional examination, which is easy, but in online examination, the invigilator has to prepare and check things many times, and there are technical issues involved. Faculties should also know everything about the technical aspects as they need to guide them, and even after the exam is over, students came across the problem in uploading the files, and we had to give more time for that as well (Sagar).

The involved respondents defined their observational difficulties of online proctored examination by offering examples of poor infrastructure in a developing country. They pointed out the unstable electricity and bandwidth. In other words, respondents highlighted the lack of infrastructural development in a country like Nepal. Poor internet and frequent electricity cut-off were the common problems in the online proctored examination. Similarly, they also mentioned that students faced technical problems while uploading and collecting the answers shared by Pratik and Mahesh:

- Nepal is a developing country and still lacks advanced technological and infrastructural development, making it difficult to conduct online exams where the internet facility is poor. We have electricity cut off sometimes, and due to data overload, there occurred a problem in uploading the answers by the students, so we also let the students submit the answers through email (Pratik).

- Yes, there are some differences because, in the physical examination, students need to be invigilated face to face, but in the proctored examination, we should be aware of different aspects like Electricity and internet Backup (Mahesh).

Some participants described having an impactful memory of several failures that occurred while examining because of improper planning and poor infrastructure. A trial exam might have been beneficial to figure out the technical and other aspects of the condition, but the attempts to examine without any prior trials made it unsuccessful. Mahesh and Ananda gave an example to illustrate the failure of e-proctored examination as:

- The proctored examination failed twice in our management stream because the planning was not good, and our infrastructure was weak and insufficient. Taking mock tests would have given us the hint about the capacity of our infrastructure, which we didn't follow, which is why the proctored examination in the management got successful only in the third attempt.

- This is the first time any university has attempted an e-proctored examination in Nepal. Even TU, Nepal's oldest and biggest university, cannot conduct proctored examinations though it is trying (Ananda).

3.2.2 Doubt about Academic Integrity/Reliability

Maintaining academic integrity seemed like one of the most challenging aspects of e-proctored examinations. Respondents said that following the traditional assessment design may create a situation of cheating and doubt on academic integrity. As there were no proper detective measures, respondents reported some suspicious acts of cheating. Anjana and Bishnu indicated:

- I think cheating is quite easier in the proctored exam-

ination. While taking exams, the graduate student frequently said they had some technical issues and lost their connection. Saying this, I cannot say that was there were trying to cheat but there can be such possibilities. I didn't find any challenge for now but sometimes a student might try to cheat by going to the bathroom or drinking water.

- While taking exams, the graduate student frequently said that they got some technical issues and lost their connection, which might be true, but there can be the possibility of cheating (Bishnu).

Participants experienced that close monitoring is essential to prevent/or stop cheating. Some students suddenly left the examination and joined back after 4/5min. The invigilator reported that the reason behind leaving the exam given by the students was due to electricity cut off. Respondents doubt that the frequent electricity cut-off might be an excuse to cheat, but there is no evidence to prove it. This thought was evident in several participants' experiences. Sagar said:

- An evaluation system should be properly developed. Close monitoring software should be used to avoid cheating. I think there are possibilities of cheating in online proctored examinations. Students frequently said there was an electricity cut-off after a few minutes that might be their strategy to cheat, but we have no evidence to prove it.

Several participants noted suspicious behaviors of the students and discussed that they might have been trying to cheat but don't have evidence to claim it. Students might also copy answers directly from the internet. Though the respondents mentioned that they have been using software like Turnitin to detect the copied text, there is an urge to use different proctored tools to closely monitor the students' suspicious activities while the examinations are going on.

- There are chances of cheating in e-proctored examinations because we used Turnitin software to check if students have copied anything from the internet. Suspicious activities were seen in some students. Students were asked to mute their mikes, and some pretended they were reading the questions; there are chances of cheating in this process. They might have asked answers with someone pretending to be reading the questions (Nisha).

- To determine whether or not a student has plagiarized, we must use reliable methods of cross-evaluation. More human resources are needed to manage, which is difficult at times. In the conventional model, we distribute the question and papers and get them back after the students have finished writing. In the online proctored examination, we need to download and check the answers through different plagiarism software in the proctored examination. We couldn't transform this. The main problem is that we don't have proper administrative and expenditure policies. We have a problem with digitalization from the policy level. If we had proper technology, it would have been easier. We would design questions in the same manner. Everything would be automated and checked by machine, but we are in the middle, so it is difficult for us (Pratik).

3.2.3 Validity

Most of the respondents stated that traditional practices have been implemented in online proctored examinations, which has raised the question of its validity. They mentioned that the assessment method is unsuitable for assessing the attainment of genuine evaluation. e-Proctored examination required a different approach to setting questions and evaluating them differently. Participants emphasized creating a similar approach for teaching and testing.

- The traditional sets of questions are not appropriate in online proctored examinations in my point of view. Talking about the question patterns, the main focus is on what kind of students to produce. We need to make them research-oriented. So, the way of teaching should match the way of testing. Our teaching method was one type, our goal was another, and testing was yet another (Ganesh).

- In proctored examinations, we cannot give a complete set of questions, and we need to make research-based or open-book questions, and preparing open-book questions is challenging. All the tutors are not able to make the same level of questions. Some questions are rigorous, while some are very simple and do not match the level of other questions (Nisha).

Some participants shared that making a proper rubric is essential in the online proctored examination which would help in the proper and systematic evaluation of the students. Though the examination was conducted online and a unique set of questions was given to each student, the copies of the answer were downloaded and then checked in traditional style. According to them, the grading system was ineffective, which explains why the evaluation appeared to be inadequate.

- The evaluation system was weak. When I compared the grading system with the grading system of other faculties, I found problems because the rubric was not properly designed. For instance, I started to grade the students based on eight criteria, but the other faculty didn't set any criteria so it was challenging for him to evaluate the answers (Bishnu).

- It was difficult to make the question that suited the online proctored examination format as this was our first time. It was also difficult to convince the learners to give the exam in a new mode. Making a rubric for such an examination was difficult (Nikhil).

All participants commonly discussed the importance of transformation. Revising the evaluation seemed essential in maintaining the validity of the online proctored examination. Some participants discussed developing different types of questions and using a variety of tools to do so. In the physical examinations, all participant were provided with a single set of questions. However the e-proctored examinations was provided with several sets of question (unique set for each)

- I think the traditional mindset and attitude should be changed. Transformation is needed. Our overall learning achievement is the same whether it is conventional or online mode. The approach is distinct, which can be remedied by revising the curriculum. Assessment should also be changed. We have made different sets of questions for unwanted cheating and avoiding plagiarism and took the services of Turnitin. We have also designed a single set of questions for each student to check students' creativity more appropriately, but it isn't easy to make 50 different sets of questions for 50 students (Pratik).

Creating a unique set of questions compatible with online proctored examinations appeared as a major challenge for many of the question setters or faculties. They shared that designing several types of questions that would equally measure (same difficulty) the level of the student was challenging. Anjana described some struggles in her experience of preparing the question as

- All the units cannot be covered, the weightage of all the questions may not be the same, and maintaining that was a difficult task. However, we did it this time but designing the same level of questions with the same strength for all the students was a difficult task for the question developer. Those who moderated the exams also supported it. The scope of some questions may be huge and the scope of some questions may differ as each student got a unique set. These were the challenges.

4 DISCUSSION

This study viewed the advantages and challenges faced by the university while conducting an online proctored exam for the first time in Nepal.

4.1 Opportunities

The data analysis showed that less time and effort, reducing administrative burdens, accelerating the internationalization of education, and running exams more frequently are the advantages of the online proctored examination. Faculties, administrators, and technical officers in this study claimed that online proctored examination requires less time and effort compared to physical examination. Inconsistent with the finding[35], when e-proctored examinations are taken in student evaluation, it reduces the time required for the examination. Similarly, the online proctored examination can enhance the standards of the examination over the traditional method that requires additional efforts on the part of both invigilators and students[36].

Analyzing the experiences of many respondents, the faculty and administrators perceived that e-proctored examination reduces administrative burdens. The traditional examination requires pre-exam preparation, such as booking the exam hall, seating planning, distributing the admit cards, and preparing for the exams. The tasks include distributing answer sheets, invigilating the exam, and collecting the answer sheets during the examination. Post-exam efforts require checking the copies manually and publishing the results. Still, with an online proctored examination, all these tasks are not required, and examinations can be taken through a computer from the personal space. In the traditional examination system of Nepal, exams are conducted in different places where the faculties of one institution invigilate the exam of other institutions. Focal persons, presidents of the exam center, external evaluators or invigilators, and internal invigilators are required for each hall or class.

Thus, in the online proctored examination, all these tasks are unnecessary and can be handled by a single person, reducing the huge administrative burdens. Faculties were reluctant to adopt this new approach because students were told to submit the hard copies to the university's central office. It also requires fewer human resources to handle the examination. There is no need to submit hard copies for online proctored exams, but the traditional system of Nepal overlapped this new approach because the administrators were not familiar with using it properly. Moreover, the administrators were not comfortable with this approach realizing that e-proctored examination creates more technical problems. Although the motive of implementing e-proctored examination was to make the online exams smoother, the sample university could not completely adopt the new approach. The online examination added extra burden because, on the one hand, the exams were conducted online, but on the other hand, the hard copies were told to submit because there is the province that the hard copies should be preserved for 2 years or more which is a part of traditional practices. Hence, it was not a completely traditional approach neither it was a fully online approach. So, both approaches were adopted in the case of ABC university, which reduced the administrative burden to some extent, but if it had implemented all the tools and

techniques required for the e-proctored examination then the administrative burden would have been reduced to more extent. It's also possible that the administrators aren't familiar with it or unable to comprehend how it would benefit their work; they were not comfortable using what they disregard. Hence, the organizational culture of using e-proctoring exams is imperative to eradicate this resistance. The practice of e-proctored examinations is increasing worldwide as it reduces student and teacher time in exams. The study further indicated that institutions can effortlessly monitor the students' movement in the examination and also reduce the requirement for paper. This is concordant with the findings of Hameed and Abdullatif[38], revealing that online proctored examinations minimize the time of exam preparation and exam conduction, unlike physical examination, and produce more reliable results. In the traditional approach, the preparation for exams and the results was carried out manually, that demanded extra time.

The digital assessment system and e-learning resources influence and motivate the students to enroll in cross-culture classrooms. A few factors such as time difference between the different countries created difficulties in attending online learning, and online proctored exams were difficult to carry out from different countries at once. Participants argued that Nepalese universities lack international students because these universities could not conduct the evaluation and test across the border. Several studies stated that the internationalization of higher education has numerous advantages, as it creates an environment that increases the number of students attending programs across borders. This is consistent with a previous research[41] stating that, internationalization of higher education serves the national concern by increasing quality education and research, and enticing international students through student exchange programs which allow countries to develop soft power and further intensify their income through cultural interaction and tuition fees[40]. Likewise, the internationalization of educational institutions can also contribute to developing intercultural and international perceptive, promote the institution's profile, international student enrollment, diversifying students, and increase sources for income generation[2].

Respondents stated that it is difficult for the university to conduct the exams frequently. The universities of Nepal conduct the exams on an annual or semi-annual basis. They emphasized that implementing e-proctored exams might help to take exams in a convenient place which will be beneficial to evaluate the students on a timely basis and prepare them for their final exams. Consistent with the finding that frequent diagnostic assessments and feedback will direct higher education toward competency-based systems[68]. Physical examinations in an annual or semi-annual system focus on the final results and are indifferent to gathering information about their student's progress time-to-time. Hence, students are unaware of their level of progress. A study by Gallo et al.[69] suggested that frequent examinations can give a valuable overview of what students know, what areas require more practice, and how the students can achieve a higher level of proficiency.

4.2 Challenges

The transition to online learning and adapting to the new teaching-learning process and evaluation system is not tested and is an alien experience in developing countries. Findings indicated that students and some faculties were incompatible with the online teaching, learning, and testing mode. Adopting a new approach in a technologically lagging country like Nepal is extremely challenging. Respondents in this study also shared the staggering experience of encountering system failure resulting from improper planning and poor infrastructure while conducting e-proctored examinations, which has de-motivated some faculties to practice such a system.

The assurance of academic integrity as stated by faculties and administrators involved in this study seems doubtful in the online proctored examination, which is similar to the findings of Berkey and Halfond[50], where 84% of 141 students in a survey revealed that there is student dishonesty in the exams that are taken online. Using advanced proctored software would help maintain academic integrity during online proctored examinations**.** Therefore, building a reliable online examination protocol that prevents and detects suspicious activities or other forms of cheating is a crucial need and a challenge to uphold the academic integrity and reliability of the online examination. Using advanced proctoring software can limit the use in students' computers and enable them to engage in activities such as browsing the internet, copy-pasting, and keeping records of everything that students do on their computers. Likewise, Farzin[7] stated that cheating can be reduced when the same questions can be presented to each student in a different order from that of their neighbors in the exam room (225). Alternatively, each examinee can be given a different set of questions chosen randomly from a question bank. Faculties in this study highlighted that setting the traditional style of questions in the online proctored examination affected students' effective evaluation and assessment. They were unsure about the types of questions that suited the online proctored examination, which would evaluate the level of students in the true sense. Hence, different question styles need to be incorporated to make it effective and interactive[6]. Faculties also claimed that students get high scores in the e-proctored examination which contradicts the finding of Ladyshewsky[54], claiming that there are no differences between the grades students receive on e-proctored exams and physical exams and that, if the testing procedure is designed in a way that accurately assesses students' proficiency, students would perform better on e-proctored exams than on face-to-face ones.

5 CONCLUSION

The current study's findings contribute to the exploration opportunities and challenges of online proctored examination concerning the faculties and administrators' perspectives of technologically lagging countries. Participant perceptions and experiences within the institutional context reveal factors including less time and effort, reducing administrative burdens, and running exams more frequently under the themes of opportunities. In contrast, technology compatability, doubt in academic integrity/reliability, and validity are the themes that fall under the challenges. The e-proctoring examination allows complete remote proctoring without the physical presence of students and examiners. The educational institutions were forced to cope with the pandemic requirements to balance the qualities of teaching and maintaining the necessary educational processes. Thus, this study has sought to determine the effect of related e-proctoring factors in shaping faculties and administrators' experiences with this new automated process. These factors focused on the existing technical, environmental, psychological, cultural, and privacy concerns and other academic issues. By considering this list of influencing factors before adopting e-proctoring tools, education systems will enhance the likelihood of their success with this new form of technology. Despite reporting serious concerns about their overall experience with e-proctoring tools (e.g., privacy and environmental concerns), the participants disclosed both opportunities and challenges. Finally, this study contributes significant evidence to the academic body by highlighting the most prominent concerns about the practice of online proctored exams. The insights from this study can help minimize difficulties and relieve faculty and students' concerns about the technology, highlighting the need to weigh the benefits of the integrity and the convenience of its implementation and enhancing the academic understanding of the challenges faculties and administrators encounter.

Moreover, the COVID-19 pandemic has tested the readiness of educational institutions to deal with unexpected health and social situation. Nevertheless, several significant facts about the e-proctoring tool can be raised. Online proctoring cannot fully replace the traditional proctoring experience in the case of developing countries like Nepal, where technological barriers are still prevailing. However, online proctoring systems can be used as an alternative in critical situations. There is no doubt that the online proctoring examination certainly has numerous long-term benefits. The majority of Nepalese universities do not have international students because these universities cannot cross the border for evaluation and tests. E-proctored exams can enable the universities in Nepal to internationalize teaching-learning. The COVID-19 pandemic compelled universities to alter their assessments and communication approaches to deal with the crisis. Universities might use the capabilities explored during this technological transition to transmit new limitations of teaching and learning. To sum up, assessments, including online proctored examinations, must be utilized as they can both challenge and inspire academic institutions toward a new dimension in the educational sector.

This study informs academic institutions, faculties, and curriculum planners about the opportunities and challenges associated with e-proctored exams. Curriculum designers and administrators must also revise the curriculum, question types, and educational policy for such exams. Therefore, this study will help the concerned authorities to know and minimize challenges in conducting the online proctored examination. Our literature review did not precisely include noteworthy previous studies concerning challenges in the realm of proctoring. The few studies we came across do not deal with online proctoring (i.e., webcam-monitored examinations, especially those using live proctors). Online proctoring is relatively new and systematic research has not yet caught up with this technology. The findings of this study should pave the way for further exploration in this area and help us expand our understanding of the challenges and advantages of online proctoring. It has various limitations and is insufficient to explore connections between universities, policymakers, and students. Despite having an appropriate sample plan, the sample data was still confined to a single university. It is obvious that many factors interfered with exams during pandemic, which was beyond the control of this study; therefore, they were unlikely to be addressed within this study.

Challenges in e-proctored exams can be the basis for future research using a different philosophical research paradigm. This study recommends different research that can be carried out in other research designs with a greater number of respondents. Likewise, the different proctoring tools themselves could be examined. It might be beneficial to examine possible differences between vendors that engage human proctors instead of fully automated proctoring systems. Studies based on comparing the results and students' perceptions from different circumstances and comparing online proctored and conventional proctored exams in inputs and outputs are essential. The perspective and challenges of proctored examinations through students' eyes can be an interesting and important area to research.

Acknowledgements

Not applicable.

Author Contribution

Ghimire S and Khanal J made equal contributions to this manuscript. Both authors designed and conducted the research.

Conflicts of Interest

The authors declared no potential conflict of interest

concerning the research, authorship, and/or publication of this manuscript.

References

[1] Cook J, Jenkins V. Getting Started with e-Assessment. University of Bath. Accessed June 12, 2022. Available at http://opus.bath.ac.uk/17712

[2] Anna S, Milone, Angela M et al. The impact of proctored online exams on the educational experience. *Curr Pharm Teach Lea*, 2017; 9: 108-114. DOI: 10.1016/j.cptl.2016.08.037

[3] Dreher C, Reiners T, Dreher H. Investigating factors affecting the uptake of automated assessment technology. *J Inf Technol Educ*, 2011; 10: 161-181. DOI: 10.28945/1492

[4] Hodgson P, Pang MYC. Effective formative e-assessment of student learning: A study on a statistics course. *Assess Eval High Edu*, 2012; 37: 215-225. DOI: 10.1080/02602938.2010.523818

[5] Kuikka M, Kitola M, Laakso MJ. Challenges when introducing electronic exam. *Res Learn Technol*, 2014; 22: 1-17. DOI: 10.3402/rlt.v22.22817

[6] Baleni ZG. Online formative assessment in higher education: Its pros and cons. *Electron J e-Learn*, 2015; 13: 228-236.

[7] Farzin S. Attitude of students towards E-examinationination system: An application of e-learning. *Sci J Ed*, 2016; 4: 222-227.

[8] Raman RBS, Vachharajani H, Nedungadi P. Adoption of online proctored examinations by university students during COVID-19: Innovation diffusion study. *Educ Inf Technol*, 2021; 26: 1-20. DOI: 10.1007/s10639-021-10581-5

[9] Reedy A, Pfitzner D, Rook L et al. Responding to the COVID-19 emergency: student and academic staff perceptions of academic integrity in the transition to online exams at three Australian universities. *Int J Educ Integr*, 2021; 17: 9. DOI: 10.1007/s40979-021-00075-9

[10] Allan S. Migration and transformation: A sociomaterial analysis of practitioners' experiences with online exams. *Res Learn Technol*, 2020; 28: 1-14. DOI: 10.25304/rlt.v28.2279

[11] Njuguna AM. User experience of online examinations and proctoring: A case based study. *Int J Curr Sci Res Rev*, 2022; 5: 2326-2335. DOI: 10.47191/ijcsrr/V5-i7-12

[12] Nigam A, Pasricha R, Singh T et al. A systematic review on AI-based proctoring systems: Past, present and future. *Educ Inf Technol*, 2021; 26: 6421-6445. DOI: 10.1007/s10639-021-10597-x

[13] Hylton K, Levy Y, Dringus LP. Utilizing webcam-based proctored to deter misconduct in online examinations. *Comput Educ*, 2016; 92: 53-63. DOI: 10.1016/j.compedu.2015.10.002

[14] González-González CS, Infante-Moro A, Infante-Moro JC. Implementation of E-proctoring in online teaching: A study about motivational factors. *Sustain*, 2020; 12: 3488. DOI: 10.3390/su12083488

[15] Misirli O, Ergulec F. Emergency remote teaching during the COVID-19 pandemic: Parents experiences and perspectives. *Educ Inf Technol*, 2021; 26: 6699-6718. DOI: 10.1007/s10639-021-10520-4

[16] Phillips HN. Re-imagining higher education: A cohort of teachers' experiences to face the 'new normal' during COVID19. *Int J Educ Res Open*, 2021; 2: 100069. DOI: 10.1016/j.ijedro.2021.100069

[17] UNICEF. UNICEF and microsoft launch global learning platform to help address COVID-19 educationcrisis. Accessed February 4, 2022. Available at https://www.unicef.org/ukraine/en/press-releases/unicef-and-microsoft-launch-global-learning-platform-help-address-covid-19-education

[18] Guangul FM, Suhail AH, Khalit AH et al. Challenges of remote assessment in higher education in the context of COVID-19: A case study of Middle East College. *Educ Asse Eval Acc*, 2020; 32: 519-535. DOI: 10.1007/s11092-020-09340-w

[19] Kharbat FF, Abu DAS. E-proctored exams during the COVID-19 pandemic: A close understanding. *Educ Inf Technol,* 2021; 26: 6589-6605. DOI: 10.1007/s10639-021-10458-7

[20] Prakasha GS, Hemalathaa KY, Tamizh P et al. Online test anxiety and exam performance of international baccalaureate diploma programme students under online proctored exams amid COVID-19. *Probl Educ 21st Cent*, 2021; 79: 942-955. DOI: 10.33225/pec/21.79.942

[21] González-González CS, Infante-Moro A, Infante-Moro JC. Implementation of e-proctoring in online teaching: A study about motivational factors. *Sustain*, 2020; 12: 3488. DOI: 10.3390/su12083488

[22] Cooper V, Tschobotko A. COVID-19-Higher education and student related challenges. Accessed January 27, 2022. Available at www.bevanbrittan.com/insights/articles/2020/covid-19-higher-education-and-student-related-challenges

[23] Cramp J, Medlin JF, Lake P et al. Lessons learned from implementing remotely invigilated online exams. *J Univ Teach Learn Pract*, 2019; 16: 1-18. DOI: 10.53761/1.16.1.10

[24] Day K, Lawrence J. Implementing remotely invigilated online exams at scale. Transforming assessment webinar series. Accessed January 18, 2021. Available at http://transformingassessment.com/sites/default/files/files/TA_webinar_25_mar_2020_slides_extended.pdf

[25] Coghlan S, Miller T, Paterson J. Good proctor or "big brother"? Ethics of online exam supervision technologies. *Philos Tech*, 2021; 34: 1581-1606. DOI: 10.1007/s13347-021-00476-1

[26] Lee K, Fanguy M. Online exam proctoring technologies: Educational innovation or deterioration? *Brit J Educ Technol*, 2022; 53: 475-490. DOI: 10.1111/bjet.13182

[27] Ghimire S, Khanal J. COVID-19 and youth: Uncertainty, stress, anxiety. *Youth Voice J,* 2021; 11: 1-27.

[28] Ghimire S, Khanal J. The impact of COVID-19 and challenges of online learning: Evidence from technologically under-developed country. *J Mod Edu Res*, 2021; 1: 2. DOI: 10.53964/jmer.2022002

[29] Dawadi S, Giri R, Ashish SP. Impact of COVID-19 on the education sector in Nepal-Challenges and coping strategies [Preprint]. *Sage Submissions*, 2020; 1-16. DOI: 10.31124/advance.12344336.v1

[30] Khanal J, Ghimire S. Practices enacted by Nepal Open University for equity and access: A qualitative study. *Perspect Policy Pract High Edu,* 2022; 26: 78-84. DOI: 10.1080/13603108.2022.2043480

[31] Khanal J, Gaulee U, Simpson O. Higher education initiative

challenges based on multiple frames of leadership: The case of Nepal Open University. *Open Learn J Open, Distance e-Learn*, 2021; 1-18. DOI: 10.1080/10668926.2021.1902426

[32] Haider AS, Hussein RF, Saed HA. Jordanian University instructors' practices and perceptions of online testing in the COVID-19 Era. *Front Educ*, 2022; 7: 1-7. DOI: 10.3389/feduc.2022.856129

[33] Butler-Henderson K, Crawford J. A systematic review of online examinations: A pedagogical innovation for scalable authentication and integrity. *Comput Educ,* 2020; 159: 1-12. DOI: 10.1016/j.compedu.2020.104024

[34] Hussein MJ, Yusuf J, Deb AS et al. An evaluation of online proctoring tools. *Open Prax*, 2020; 12: 509-525. DOI: 10.5944/openpraxis.12.4.1113

[35] Tao J, Li Z. A case study on computerized take-home testing: Benefits and Pitfalls. *Int J Tech Teaching Learn*, 2012; 8: 33-43.

[36] Ismail R, Osmanaj V, Jaradat A. Moving toward e-university: Modelling the online proctored examinations. *AICMSE-AICSSH 2019 AUGUST (OXFORD):* 2019; 56-67.

[37] Butler-Henderson K, Crawford J. A systematic review of online examinations: A pedagogical innovation for scalable authentication and integrity. *Comput Educ*, 2020; 159: 1-12. DOI: 10.1016/j.compedu.2020.104024

[38] Hameed M, Abdullatif F. Online examinationination system. *Int Adv Res J Sci, Eng Technol,* 2017; 4: 106-110. DOI: 10.17148/IARJSET.2017.4321

[39] Nicol D. E-assessment by design: Using multiple-choice examination to good effect. *J Furth Higher Educ*, 2007; 31: 53-64. DOI: 10.1080/03098770601167922

[40] Wei H. An empirical study on the determinants of international student mobility: A global perspective. *Higher Educ*, 2013; 66: 105-122. DOI: 10.1007/s10734-012-9593-5

[41] Tsegay S, Maekele et al. Socio-cultural adjustment experiences of international students in Chinese higher education institutions. *Millenn Asia*, 2018; 9: 183-202. DOI: 10.1177/0976399618786342

[42] Milone AS, Cortese AM, Balestrieri RL et al. The impact of proctored online examinations on the educational experience. *Curr Pharm Teach Lea,* 2017; 9: 108-114. DOI: 10.1016/j.cptl.2016.08.037

[43] Stockwell S. Tech experts want online exam monitoring canned. Accessed January 18, 2021. Available at https://www.abc.net.au/triplej/progra ms/hack/online-exam-monitoring/12388630

[44] Isakov M, Tripathy A. Behavioral correlates of cheating: Environmental specificity and reward expectation. *PloS one*, 2017; 12: 186054. DOI: 10.1371/journal.pone.0186054

[45] Dermo J. E-assessment and the student learning experience: A survey of student perceptions of e-assessment. *Brit J Educ Technol*, 2000; 40: 203-214. DOI: 10.1111/j.1467-8535.2008.00915.x

[46] Kuikka M, Kitola M, Laakso MJ. Challenges when introducing electronic examination. *Res Learn Technol*, 2014; 22: 1-17. DOI: 10.3402/rlt.v22.22817

[47] Whitelock D. Electronic assessment: Marking, monitoring and mediating learning. *Int J Learn Technol*, 2006; 2: 264-276. DOI: 10.1504/IJLT.2006.010620

[48] Jamil M, Tariq RH, Shami PA. Computer-based *vs.* paper-based examination: Perceptions of university teachers. *Turk Online J Educ T*, 2012; 11: 371-381.

[49] Puente SMG. Internationalizing a master curriculum: Students' perspectives on online education. *Int J e-Learn Secur*, 2020; 9: 617-623. DOI: 10.20533/ijels.2046.4568.2020.0077

[50] Berkey D, Halfond J. Cheating, student authentication and proctoring in online programs. Accessed July 20, 2015. Available at https://nebhe.org/journal/cheating-student-authentication-and-proctoring-in-online-programs/

[51] Tan M, Teo TSH. Factors influencing the adoption of internet banking. *J Assoc Inform Syst*, 2000; 1: 5-8. DOI: 10.17705/1jais.00005

[52] Dimeo J. Online examination proctored catches cheaters, raises concerns. Accessed July 20, 2015. Available at https://www.insidehighered.com/digital-learning/article/2017/05/10/online-examination-proctored-catches-cheaters-raises-concerns

[53] Turani AA, Alkhateeb JH, Alsewari Abdul RA. Students online examination proctored: A case study using 360 degree security cameras. *Emerg Technoly Comput Commun Electronics*, 2020; 2. DOI: 10.1109/ETCCE51779.2020.9350872

[54] Ladyshewsky RK. E-learning compared with face to face: Differences in the academic achievement of postgraduate business students. *Australas J Educ Tec*, 2004; 20: 3. DOI: 10.14742/ajet.1350

[55] Cohen L, Manion L, Morrison K. Research methods in education. Routledge: London, UK, 2007. DOI: 10.4324/9780203029053

[56] Hennink M, Hutter I, Bailey A. Qualitative research methods. Sage Publications: Los Angeles, USA, 2011.

[57] Bryman A. Social research methods, 4th ed. Oxford University Press: New York, USA, 2012.

[58] Merriam S. Qualitative research: A guide to design and implementation. Jossey-Bass: San Francisco, USA, 2009.

[59] Patton MQ. Qualitative research & evaluation methods: Integrating theory and practice. Sage publications: Los Angeles, USA, 2004.

[60] Creswell JW. Qualitative inquiry & research design, 2nd ed. Sage publications: Los Angeles, USA, 2007.

[61] Hammersley M. What is qualitative research*?* Bloomsbury Academic: London, UK, 2013. DOI: 10.5040/9781849666084

[62] Marshall C, Rossman GB. Designing qualitative research, 6th ed. Sage publications: Los Angeles, USA, 2016.

[63] Gadamer, Hans, Georg. Philosophical hermeneutics. University of California Press: California, USA, 1976.

[64] Giorgi A. Phenomenology and psychological research. Duquesne University Press: Pittsburgh, PA, 1985.

[65] Taherdoost H. Sampling methods in research methodology; How to choose a sampling technique for research. *Int J Acad Res Manag*, 2016; 5: 18-27. DOI: 10.2139/ssrn.3205035

[66] Brinkmann S, Kvale S. Interviews: Learning the craft of qualitative research interviewing. Sage publications: Los Angeles, USA, 2009.

[67] Pietkiewicz I, Smith JA. A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Czasopismo Psychologiczne Psychol J,* 2014; 20: 7-14. DOI:

10.14691/CPPJ.20.1.7

[68] Bakia M, Shear L, Toyama Y et al. Understanding the implications of online learning for educational productivity. Accessed July 20, 2015. Available at https://files.eric.ed.gov/fulltext/ED532492.pdf

[69] Gallo A, Marie SD, Patton K et al. Assessment benefits and barriers what are you committed to? *JOPERD*, 2006; 77: 46-50. DOI: 10.1080/07303084.2006.10597926