



Original Research

Unpacking the Challenges of Proctored Online Examination in Higher Education: A Case Study of a Ghanaian University

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Abstract: The literature suggests that proctored online examinations face several challenges, yet the specific nature of these challenges in Ghanaian Higher Education Institutions (HEIs) remains unclear due to limited research in this area. This qualitative case study aimed to explore these challenges using twenty participants purposively selected from one university in Ghana, the oldest provider of distance learning in the country. Data were analyzed using Braun and Clarke's technique for thematic analysis. The findings revealed that the university's efforts to implement proctored online examinations were hindered by a lack of consultations with key stakeholders, insufficient training for examination officials, inadequate computer resources, and unreliable internet connectivity. The study recommends that for successful implementation, universities should prioritize stakeholder consultations to identify and address potential challenges, establish comprehensive training programs for examination officials, and invest in infrastructure improvements such as adequate computer resources and reliable internet connectivity. Additionally, sustainable strategies for long-term stakeholder engagement and detailed funding models or potential collaborations with government and educational partners should be considered to strengthen these recommendations. These recommendations aim to enhance the integrity, effectiveness, and accessibility of online examinations in Ghanaian HEIs and similar educational settings worldwide.

Keywords: Distance Learning, University, Higher Education, Proctoring, Online Examinations

Introduction

The rapid advancement of technology has transformed the distance education landscape, with online learning and examinations becoming increasingly popular (Sušnjak 2022). One of the advantages of online examinations is the potential for improved reliability and efficiency in the assessment process (Shraim 2019). Online examinations can be graded automatically, reducing the potential for human error and ensuring consistent and unbiased scoring. They allow for the quick and convenient delivery of results, saving time and effort for both students and faculty. They are also flexible and accessible because students can take examinations remotely, at a time and location that is convenient for them, eliminating the

need for travel and the logistical challenges associated with coordinating traditional in-person exams (Muzaffar et al. 2021; Shraim 2019). This important feature of online examinations promotes inclusive higher education because it allows students with disabilities to also partake in examinations with ease (Kulikowski et al. 2022).

The emergence of the COVID-19 pandemic led to a surge in the adoption of online examinations in higher education (HE), compelling institutions to quickly transition from face-to-face learning and evaluations to remote learning and assessment methods (Udor et al. 2023; Quesada et al. 2023; Al-Hassan 2023; Agyekum 2022). This paradigm shift was embraced by many Ghanaian universities, which were already exploring strategies to strengthen their distance learning programs to make them more flexible and accessible in the highly competitive global HE sector (Salifu and Abonyi 2022). However, as with any new system, the abrupt transition to remote learning and assessment methods by Ghanaian universities engendered challenges such as the difficulty with verifying students' identities and cheating in online examinations, especially using artificial intelligence (AI) in recent times. Although AI is beneficial in automating many manual processes involved in examination preparation and grading (Dave and Patel 2023), its ease of use also creates potential misuse, as some university students in Ghana depend on AI chatbots, such as ChatGPT and Microsoft Copilot, to complete assessments that do not emanate from their intellectual effort (Biney and Salifu 2024).

Some Ghanaian HEIs have recently introduced proctored online examinations (see Literature Review section for explanation), perhaps to address the illicit use of AI and other forms of cheating in online examinations. The literature suggests that proctored online examinations have challenges. Nevertheless, the nature of the challenges hampering the success of proctored online examinations in Ghanaian HEIs is unclear due to the lack of research in the area. To fill this void and contribute to the growing literature in the field of distance learning, the present study explores the nature of the challenges confronting proctored online examinations in Ghanaian HEIs using one university, the oldest provider of distance learning in the country. We, thus, posed the question: What is the nature of the challenges confronting proctored online examinations in Ghanaian HEIs?

This research makes significant contributions to the field of educational assessment by addressing the practical challenges of implementing proctored online examinations. The study's findings and recommendations provide valuable insights for policymakers, educators, and administrators seeking to improve the online examination process. Further, the findings of this study have broader implications beyond Ghanaian HEIs. The recommendations provided can be applied to educational institutions worldwide, particularly those in developing countries facing similar challenges. By emphasizing the practical application of knowledge and experiential learning, this research aligns with the principles of pragmatism and offers innovative solutions to real-world problems.

Literature Review

Versions of Proctored Online Examination

Proctored online examinations are timed tests conducted on network platforms where candidates' desktop activities are monitored throughout the assessment process to detect any potential instances of academic dishonesty (Sabrina et al. 2022; eExam, n.d.). There are three main forms of online proctoring.

Live Proctoring

A human proctor monitors the exam in real time, either in person or through a webcam (Sabrina et al. 2022; Questionmark 2022). This version requires in-person invigilators to monitor online assessments at an examination center, as in traditional pen-and-paper exams. Human proctors are typically trained professionals tasked with verifying the identity of students and watching for any warning signs, such as unusual eye or facial movements or the presence of unauthorized devices, which may suggest cheating (Sabrina et al. 2022; Mitra and Gofman 2016; Gautam 2017). Proctoring with the use of a webcam demands more technological competence and extra vigilance than in-person online proctoring (Mitra and Gofman 2016).

Recorded Proctoring

This involves technology-based solutions that record candidates' desktop activities and forward them to an external proctoring service for evaluation (Questionmark 2022). This system enables students to take examinations at any time, allowing multiple examinations to occur simultaneously. However, it still requires human intervention to review the recordings. Reviewing hours of examination videos for each student can be expensive and impractical for large classes, making it nearly impossible to detect cheating (Masud et al. 2022).

Automated Proctoring

This uses AI and machine learning algorithms to detect and prevent cheating (Sabrina et al. 2022; Han et al. 2023). Automated proctoring employs technologies such as facial recognition, eye-tracking, and behavior monitoring to verify the identity of the exam-taker and detect any suspicious activities during the examination (Han et al. 2023). In this form, human proctors do not oversee the entire examination; rather, the proctoring system flags critical incidents that could suggest fraudulent activity or cheating. The proctor is then notified to examine these incidents for any misconduct that might have taken place (Sietes 2016). Online proctoring of this nature tends to be more convenient for both students and faculty, as it removes the need to coordinate live proctors for tests and examinations, thereby overcoming challenges related to scheduling, location, and human proctor availability.

Moreover, it is highly scalable as it substitutes human proctors with AI or algorithms, which enhances cost-effectiveness (Jose 2024). However, Sietes (2016) revealed that students' familiarity with this system may lead to the development of evasive strategies to prevent fraud detection. Additionally, this form of proctoring can easily produce false positives, flagging innocuous events as potential fraud.

Challenges of Proctored Online Examinations in Higher Education

One of the primary challenges facing the implementation of proctored online examinations in HE is technological accessibility and reliability. Many students, particularly those from underprivileged backgrounds or remote regions, may lack access to the hardware, software, and stable internet connectivity required to participate in these examinations effectively (Maddumapatabandi and Gamage 2020; Langenfeld 2020; Ochieng and Ngware 2022). Furthermore, technical glitches, system failures, and internet disruptions can lead to significant disruptions during the examination process, causing anxiety and frustration among students and potentially compromising the fairness and validity of the assessment (Huan et al. 2020; Buch et al. 2019; Kharbat and Abu Daabes 2021).

Another key challenge is the potential for academic dishonesty and cheating. While proctoring technologies aim to mitigate these concerns, they are not infallible, and savvy students may find ways to circumvent the system, compromising the integrity of the examination (Alessio et al. 2018; Sabrina et al. 2022; Opatye 2022). Additionally, the use of proctored online examinations raises privacy concerns, as students may be required to grant access to their devices, personal information, and even their physical environments, leading to concerns about data security and the protection of personal information (Opatye 2022; Balash et al. 2023; Kharbat and Abu Daabes 2021; Chand and Hussein 2022; Sabrina et al. 2022; Dyer et al. 2020).

The implementation of proctored online examinations can create additional logistical and administrative challenges for HEIs, as they must ensure the consistent and equitable deployment of these technologies across their student population, provide adequate technical support, and address any issues that may arise during the examination process (Rovai and Downey 2010; Smale and Regalado 2016; Alduraywish et al. 2021; Hegde et al. 2019). Additionally, the psychological and emotional impact of proctored online examinations on students has been reported. The sense of being constantly monitored and the potential for technical issues can heighten anxiety and stress levels, which may adversely affect student performance and well-being (Opatye 2022; Kharbat and Abu Daabes 2021; Balash et al. 2021; Xu and Wang 2023; Alessio et al. 2018).

In response to the limitations of online proctoring, several initiatives have been proposed. These include exploring alternative assessment methods that reduce the reliance on high-stakes examinations. These approaches include incorporating more authentic assessment tasks, such

as projects, presentations, and collaborative assignments, that require students to apply their knowledge and skills in real-world contexts (Gabriel 2024; Sabrina et al. 2022).

Further, the effective implementation of proctored online examinations mandates a collaborative endeavor involving faculty, students, and technology support personnel. Faculty members are pivotal in designing assessments that are suitable for the online environment and in providing students with explicit guidelines and expectations regarding examination procedures (Mate and Weidenhofer 2021). Students must be educated about the purpose of proctoring and the significance of upholding academic integrity, as well as being furnished with adequate technical support and resources to ensure a seamless testing experience (Alessio and Messinger 2021; Balash et al. 2023; Langenfeld 2020). Technology support personnel are tasked with maintaining the functionality and security of the proctoring systems, in addition to offering technical assistance to both students and faculty. Open communication and transparency are crucial for fostering trust and ensuring that all stakeholders are comfortable with the utilization of proctored online examinations (Fiano et al. 2021).

Moreover, as technology continues to advance, institutions must remain vigilant in adapting their proctoring strategies to the emerging challenges and opportunities. The advent of more sophisticated cheating techniques, such as the use of AI-powered tools to generate answers or circumvent proctoring systems, necessitates a continuous cycle of innovation and adaptation (Han et al. 2023; Langenfeld 2020).

Theoretical Underpinning

Pragmatism

The theory underpinning this study is pragmatism. Pragmatism in education is a philosophical approach that focuses on the practical application of knowledge and the value of learning through experience (Makumane et al. 2021). One of the key principles of pragmatism is the belief that the value of an idea or theory should be judged by its practical consequences and its ability to solve real-world problems (Freehill 1953). This emphasis on practicality and problem-solving has led pragmatist educators to focus on developing critical thinking, decision-making, and problem-solving skills (Taasila and Raij 2012). Further, the pragmatists argue that students should be actively engaged in the learning process and that knowledge should be constructed through a process of inquiry and experimentation (Taasila and Raij 2012). Dewey, a pioneering figure in the pragmatist movement, argued that education should be a dynamic and interactive process, where students and teachers collaborate to explore and understand the world around them (Hall 1996). He believed that the primary aims of schooling should be to foster initiative, adaptability, and habits of inquiry and that this could be best accomplished by continuously reconstructing experiences into organized bodies of knowledge (Hall 1996). The theory of pragmatism is relevant to online examinations in the following ways.

Experiential Learning

Pragmatism advocates for learning by doing, where students engage in hands-on activities and real-world applications. In the context of online examinations, this means that students and examination officials should be actively involved in the process, gaining practical experience with the technology and protocols involved. This approach aligns with Dewey's belief that education should be rooted in experience, preparing learners for active participation in complex environments.

Problem-Solving

Pragmatism emphasizes the importance of problem-solving and critical thinking. The challenges identified in the implementation of proctored online examinations, such as technological accessibility, training, and infrastructure, require practical solutions that can be developed through collaborative efforts and active engagement with stakeholders. By addressing these challenges through a pragmatic lens, educational institutions can enhance the effectiveness and reliability of online examinations.

Student-Centered Learning

Pragmatism places the learner's interests and experiences at the center of the educational process. In the context of online examinations, this means considering the diverse needs and experiences of students, including their familiarity with technology and their psychological well-being. Providing support mechanisms and training programs tailored to students' needs can help them navigate the online examination process more effectively.

Flexibility and Adaptability

Pragmatism advocates for flexibility in curriculum and educational practices, adapting to societal needs and changes in the world. The rapid transition to online examinations during the COVID-19 pandemic exemplifies the need for adaptability in educational practices. By adopting a pragmatic approach, institutions can develop strategies to address the evolving challenges of online examinations and ensure their successful implementation.

Collaborative Learning

Pragmatism encourages teamwork, discussion, and cooperative problem-solving. In the context of proctored online examinations, collaboration between students, teachers, and examination officials is essential to identify and address potential challenges. Sustainable strategies for long-term stakeholder engagement can foster a sense of ownership and commitment to the success of online examinations.

By applying the principles of pragmatism to the study of proctored online examinations, this research aims to provide practical solutions to the identified challenges and enhance the overall effectiveness and accessibility of online assessments in HEIs.

Methodology

Design and Participant Selection

The study employed a qualitative single case study design (Creswell 2013; Yin and Yuan 2021; Eshun and Agyekum 2022). According to Yin and Yuan, the purpose of a case study is to investigate a topic and come to a thorough understanding of a specific phenomenon, enabling the discovery of an insider's viewpoint. This approach was chosen to understand the challenging experiences of conducting proctored online exams in Ghana.

Participant Selection

The purposive sampling technique was used to select one university in Ghana, chosen for being the oldest provider of distance learning in the country (Eshun and Salifu 2025). This university, referred to as the Case, operates a blended form of distance education with eleven regional learning centers across Ghana and its head office located in Accra, the capital of Ghana. The Case runs degree and diploma programs in diverse fields such as nursing, education, humanities, and computer science.

Participants were selected based on their knowledge and experience related to the subject of the study. According to Merriam (2009), purposive sampling involves choosing participants who are well informed about the research topic. Van Wyk and Toale (2015) add that purposive sampling is consistent with qualitative research as it focuses on in-depth analysis rather than statistical representativeness. Based on these criteria, twenty participants were selected, comprising fourteen students, four invigilators, and two examinations coordinators. This selection aimed to capture a diverse range of perspectives and experiences related to the implementation of proctored online examinations.

Profile of the Case

The university used as a case study operates the live version of proctored online exams, where in-person invigilators monitor the online exams at an examination center. Academic staff have the option to choose the type of examinations they prefer, whether sit-in pen-and-paper examinations, unproctored online examinations, or proctored online examinations at their regional learning centers. Academic staff interested in proctored online examinations set their questions in advance and submit them to a central processing unit made up of IT professionals who upload the questions on the university's learning management system (LMS). At the regional learning center, an examination coordinator and invigilators oversee the administration of the examination.

Data Collection and Analysis

Interview Process

Semi-structured interviews were conducted in English, lasting between twenty-three and thirty-eight minutes. The semi-structured format allowed for flexibility in exploring participants' experiences while ensuring that key topics were covered. Prior to the interviews, informed consent was obtained from all participants, and they were assured of their anonymity throughout the study. The interviews were conducted between April and June 2024, either in person or via online platforms, depending on the participants' availability and preferences. Interview questions for the study were as follows: Please describe your experience during the proctored online examination? What are the challenges you encountered during the proctored online examination? What are your recommendations to improve the implementation of proctored online examination?

Data Analysis

The data analysis included several stages, following Braun and Clarke's (2013) technique for thematic analysis. Initially, the interview transcripts were read and re-read to identify emerging themes from the participants' perspectives. Themes and sub-themes with similar interpretations were then coded into conceptual categories, reducing the overall number of themes. To ensure the reliability and authenticity of the data, a senior researcher with expertise in qualitative studies reviewed the original recorded interviews and transcripts after the data analysis was complete. Additionally, member checking was performed, where participants were asked to verify the accuracy of the data and the interpretations derived from their responses.

Results

Poor Consultation on the Implementation of Proctored Online Examination

Participants believe that an exercise like this, which is new to the University, should be implemented only after consulting all stakeholders and incorporating their views into the planning process. However, it appears that the decision to implement the proctored online exams was made abruptly at the top management level without consulting students, invigilators, and exam coordinators. One participant, an exam coordinator, stated:

I was informed about the proctored online exams a few weeks before the exams. As new as it is, we needed to be consulted formally for this exercise so that we could also share our views on it. But this is the way sometimes decisions are made in the university. (PK)

Interestingly, all the invigilators we interviewed mentioned that the first time they had heard about proctored online exams was on their first day of invigilating the proctored online examination. “I was told the students are going to use computers to write the exams online while we invigilate. It was my first time hearing this” (AT). A student also mentioned: “The center manager sent a message on our WhatsApp platform about this type of exam about a week before the exams. Although I have been doing some exams online, I didn’t know how we were going to be invigilated, and that got me worried for a while” (MO).

Lack of Training on Online Proctored Examinations

Exam coordinators, invigilators, and students did not receive any training before the implementation of the proctored online examination. An exam coordinator mentioned:

I wasn’t given any training for this exercise. I was only instructed to install a “safe exams browser” (software) on the computers, which I learned is meant to prevent students from accessing any other website apart from the learning management system where the exam is taking place. This is why the first exam session was challenging. I wasn’t able to install the software well, and some of the students did the exams without using the safe exams browser. (AF)

An invigilator also mentioned: “I didn’t know what else to look for aside from confirming the identity of students and ensuring that they do not communicate at the exams center. If they were cheating on the computer, I couldn’t detect it because I wasn’t trained on what to look for” (MA).

An exam coordinator further reported that some students lack knowledge in the use of computers, which was a major challenge for them. He mentioned:

There were two students who didn’t know how to use a desktop computer. Even handling the mouse was a big challenge. We had to assign an extra invigilator for these particular students. The student would choose or mention the answers, and the invigilator would click or type on the computer. It was really difficult. I think we should train them, especially the older ones, on the use of computers before we implement this type of exam. (SE)

Difficulty experienced by some students in using computers is concerning and suggests that students may not be completing unproctored online tests independently. Some students confirmed that technical challenges and low efficacy in using the computer sometimes forced them to meet in groups to assist each other in completing unproctored online examinations.

As for the online exams that we take in our homes, we have been helping ourselves. In my class, not all of us are good at using computers. Some even don’t have computers.

So we can decide to meet in the house of one of us or where we have our tutorials to take the exams. This way we are able to help each other solve the questions. (AI)

Inadequate Computers

A major challenge reported by the participants is the inadequacy of computers at the examination center for the proctored online exams. One exam coordinator mentioned that students were initially asked to bring their own computers to tide over the shortfall.

We have just six computers at our center, and our student population is around 150. Though all will not be writing at the same time, mostly, the students that have registered for a course scheduled for the online exams are more than 15. To mitigate this, we asked the students to come with their laptops. (FA)

However, the difficulty in preparing students' computers for the examination led to the cancellation of that idea. An exam coordinator mentioned:

We needed to install a "safe exams browser" on the students' computers. Several of their laptops were not supportive, and the installation process was delaying the exams. Other students also complained about unfairness. They indicated that those with higher-speed computers would be advantaged in the exams compared to those with lower-speed computers. Finally, we had to drop the idea of using students' computers and resort to writing the exams in batches. (SE)

Writing the proctored online examination in batches also came with its own challenges. Students complained about having to wait for longer hours before they were called in to take the exams. "One time I came to take my exams and was asked to wait for others to complete before. I had to wait for more than seven hours before it got to my time. I left the exam center late in the evening" (NF).

It was also reported that students who had completed the examination mostly met with their peers who were yet to take the exam to discuss questions encountered in the exams, which were likely to be repeated for the next batch. A center coordinator mentioned: "whenever the first batch is done, you notice them grouped with the batch that is yet to take the exams. I believe they are discussing the questions for the first batch" (MA). A student also added: "I always don't want to be in the first batch. I prefer the second or third batch. When others come out of the exam room, they tell us possible questions to prepare for, and that can be very helpful" (WM).

Internet Connectivity Challenges

Unstable internet connection is also a major challenge for the participants. Participants expressed worry that the internet connectivity at the center is not stable and often disrupts

the examination. They explained that the exams are timed with no consideration for unstable internet connection. A student mentioned: “In all my exam sessions, I was confronted with a poor network. It is so annoying and frustrating. As you are waiting for the network to come back, the time is not waiting” (GO). Another student added: “Most often when the internet goes off, the computers get frozen. We would have to restart the computers before we could regain access to the exams...hmm, it is so bad” (TP).

Invigilators were also concerned that student frustrations with the network put them under a lot of pressure, compromising the integrity of the examination.

When the internet goes off, students become very angry and they turn their frustrations on us. I have been disrespected by students on a number of occasions. We are always under pressure as we attempt to restore internet connection, and as a result, we sometimes overlook some other security checks such as confirming students' identity. (EK)

However, the exam coordinators noted that whenever the internet goes off for an extended period, they are able to request additional minutes to make up for the lost time.

Mmm, the internet is a problem. In fact, it is frustrating for us all. But we are able to request additional time for the students. We normally call the head office in Accra to report such issues. Students that are affected are given additional minutes to make up for the lost time. (FA)

Discussion

This study has revealed that major stakeholders at the case institution were not consulted in the decision to implement proctored online examination. González-González et al. (2020) cited user satisfaction, environmental influence, compatibility with user values, user attitude, motivation, and trust in security and privacy among the factors to be considered for the effective implementation of online examinations. These factors can be addressed only through proper consultations. Pragmatism advocates for collaboration and active engagement between students, teachers, and other stakeholders to solve educational challenges. In this context, involving stakeholders in the planning process ensures that their perspectives and experiences are considered, leading to more effective and sustainable solutions. Sustainable strategies for long-term engagement with stakeholders are essential to foster a sense of ownership and commitment to the success of proctored online examinations.

The study has shown that students, invigilators, and exam coordinators were given no training before the implementation of proctored online examination. Although the literature suggests that online proctored examinations can be an effective assessment method, their success depends heavily on proper design and implementation, which requires training and

support for both faculty and students (Raman et al. 2021). As evident in this study, without such training, students may struggle to navigate the technological requirements, understand the examination protocols, and cope with the heightened sense of anxiety and scrutiny associated with online examinations. This underscores the need for practical preparation. Pragmatism emphasizes the importance of experiential learning, where individuals gain knowledge through hands-on experience and experimentation. Comprehensive training programs would equip stakeholders with the necessary skills and knowledge to navigate the technological requirements and understand examination protocols. This approach aligns with the pragmatist principle of developing critical thinking, decision-making, and problem-solving skills through active engagement in the learning process. Studies have shown that students who receive comprehensive training and orientation on the use of online proctoring platforms tend to perform better and report higher levels of satisfaction and confidence in the assessment process. In contrast, those who are thrust into these unfamiliar assessment environments without adequate preparation may experience increased stress, anxiety, and difficulty demonstrating their true knowledge and abilities, ultimately resulting in poorer academic performance (Lyndon et al. 2014). The impact of inadequate training on online proctored examination extends beyond individual student outcomes, possibly with broader implications for the overall validity and fairness of the assessment process. When students are not properly equipped to navigate the technological and logistical requirements of online proctoring, the integrity of the examination results may be compromised, potentially skewing the assessment of student learning and undermining the credibility of the academic institution (Dyer et al. 2020).

We also reported inadequate computers and unstable internet connectivity as challenges that confronted the proctored online examination at the case institution. These are commonly associated with resource-constrained countries in Africa and Ghana, in particular (Eshun et al. 2025; Agyekum et al. 2024; Salifu and Odame 2022). The availability of a stable and high-speed internet connection is fundamental to the effective implementation of proctored online examination. Disruptions in internet connectivity, such as fluctuations in bandwidth, latency issues, or complete loss of connection, can have severe consequences for students attempting to complete their assessments. These connectivity challenges can lead to interruptions during the examination, potential data loss, and in some cases, the inability to submit responses altogether, undermining the integrity of the assessment process and creating significant stress and anxiety for the test-takers. Moreover, the reliance on specific hardware and software requirements for proctored examination introduces additional technological barriers that can further exacerbate the challenges faced by students (Opataye 2022; Balash et al. 2021; Silverman et al. 2021). The impact of unstable internet and technological difficulties is not limited to students alone but also poses significant challenges for the educators and institutions responsible for administering these online examinations.

As shown in this study and in the literature, disruptions in the proctoring process can hinder effective monitoring and supervision of the exam, leading to concerns about academic integrity and the validity of the assessment results (Dyer et al. 2020; Alessio and Maurer 2018; Langenfeld 2020; Balash et al. 2021, 2023). Pragmatism advocates for the practical consequences of ideas and theories, emphasizing the importance of solving real-world problems. Investing in infrastructure improvements, such as adequate computer resources and reliable internet connectivity, would address these challenges and create a conducive environment for online examinations.

The psychological and emotional impact of proctored online examinations on students is another critical finding. Pragmatism recognizes the importance of addressing the holistic needs of learners, including their emotional well-being. Providing support mechanisms to help students cope with the heightened sense of anxiety and scrutiny associated with online examinations would enhance their overall experience and performance. This approach aligns with Dewey's belief that education should foster initiative, adaptability, and habits of inquiry, creating a dynamic and interactive learning environment (Hall 1996).

Conclusion

This study investigated the nature of the challenges hampering the success of proctored online examinations in Ghanaian HEIs. The findings revealed several critical issues, including the lack of consultations with key stakeholders, inadequate training for examination officials, insufficient computer resources, and unreliable internet connectivity. These challenges have significant implications for the implementation and effectiveness of proctored online examinations.

Implications for Practice and Policy

Stakeholder Consultations

The lack of stakeholder consultations in the decision-making process highlights the need for more inclusive and participatory approaches. Engaging students, invigilators, and examination coordinators in the planning and implementation phases can ensure that their perspectives and experiences are considered, leading to more effective and sustainable solutions. Sustainable strategies for long-term engagement with stakeholders are essential to foster a sense of ownership and commitment to the success of proctored online examinations. Such strategies could include the formation of online examinations committees that hold regular pre- and post-examination meetings with students, administrators, and faculty to address emerging issues.

Training Programs

The absence of training for examination officials and students underscores the importance of comprehensive training programs. Proper training and support are crucial for navigating the

technological requirements and understanding exam protocols. Training programs should be tailored to the specific needs of different stakeholders, enhancing their confidence and competence in using online proctoring platforms. This approach aligns with the principles of pragmatism, emphasizing experiential learning and practical problem-solving.

Infrastructure Improvements

The challenges related to inadequate computers and unreliable internet connectivity highlight the need for significant infrastructure improvements. Investing in adequate computer resources and reliable internet connectivity is fundamental to creating a conducive environment for online examinations. Detailed funding models or potential collaborations with government and educational partners should be explored to support these infrastructural improvements. Addressing these technological barriers is essential to ensure the fairness and validity of online assessments.

Psychological Support

The psychological and emotional impact of proctored online examinations on students is a critical consideration. The sense of being constantly monitored and the potential for technical issues can heighten anxiety and stress levels, adversely affecting student performance and well-being. Providing support mechanisms, such as counseling services and stress management workshops, can help students cope with the heightened sense of scrutiny associated with online exams. This holistic approach aligns with the pragmatist emphasis on addressing the overall needs of learners.

Quality Assurance Mechanisms

Implementing quality assurance mechanisms is essential to maintain the integrity and effectiveness of online examinations. Robust technical support during examinations can address any issues that arise, ensuring a fair and valid assessment process. Quality assurance measures should include regular evaluations of the proctoring system, feedback from stakeholders, and continuous improvements based on identified challenges.

Limitations of the Study

While this study provides valuable insights into the challenges hampering the success of proctored online examinations in Ghanaian HEIs, several limitations must be acknowledged.

Sample Diversity

The study is limited to a single university in Ghana, which may restrict the generalizability of its findings. The inclusion of more institutions would enhance the universality of the results.

The findings may not fully represent the experiences and challenges faced by other universities in Ghana or in different geographical regions. Future research should consider a broader sample that includes multiple universities to provide a more comprehensive understanding of the challenges associated with proctored online examinations.

Small Number of Research Participants

The study involved relatively few participants (20): fourteen students, four invigilators, and two examinations coordinators. The smallness of the sample size may limit the robustness of the findings and the ability to draw definitive conclusions. The perspectives and experiences of a larger and more diverse group of participants could provide a richer and more nuanced understanding of the challenges. Future studies should aim to include a larger sample size to enhance the reliability and validity of the findings.

Selection Bias

The purposive sampling technique used in this study may introduce selection bias, as participants were chosen based on their knowledge and experience related to the subject of the study. This approach may exclude individuals who have different perspectives or experiences, potentially skewing the results. To mitigate selection bias, future research should consider using random sampling techniques, which ensure a more representative sample of the population.

Temporal Limitations

Limiting the data collection period to a few months (April to June 2024) may have failed to capture the full range of experiences and challenges associated with proctored online examinations over a longer period. Longitudinal studies that track the implementation and outcomes of proctored online examinations over an extended period would provide a more comprehensive understanding of the evolving challenges and solutions.

Technological and Contextual Factors

The study's findings are influenced by the specific technological and contextual factors present at the case institution. Variations in technology infrastructure, internet connectivity, and institutional policies may affect the generalizability of the results. Future research should explore the impact of different technological and contextual factors on the implementation of proctored online examinations in diverse settings.

By recognizing these limitations, this study provides a foundation for future research to build upon and address the identified challenges in a more comprehensive and representative manner. Addressing these limitations will contribute to a deeper understanding of the factors influencing the success of proctored online examinations in HEIs.

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Informed Consent

The authors have obtained informed consent from all participants. Participants were informed of the study's purpose, procedures, potential risks and benefits, and their right to withdraw at any time without penalty.

Conflict of Interest

The authors declare that there is no conflict of interest.

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