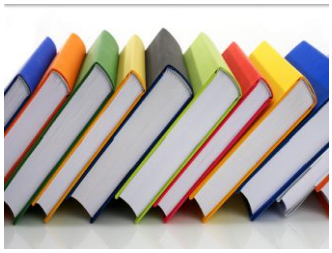

Assessment of remote proctoring tools for fair and reliable assessment: teacher educators' perception

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Abstract

This study investigates the perceptions of teacher educators from Michael Okpara University of Agriculture (MOUAU) and Alvan Ikoku University of Education (AIUE) regarding the efficacy of remote proctoring tools for fair and reliable assessment. A descriptive survey design was employed, utilizing a questionnaire validated by experts in relevant fields. The population of the study was 845 lecturers from both schools. A sample of 327 lecturers was used that were chosen through census and purposive sampling technique. Instrument for data collection was a structured questionnaire titled " Teacher-educators Questionnaire on Efficacy of Remote Proctoring Tools for Fair and Reliable Assessment" (TQERFR). The study found that both MOUAU and AIUE lecturers generally perceive remote proctoring tools positively, with mean responses exceeding the benchmark for acceptance. While there was a slight difference in mean responses between the two groups, statistical analysis showed that this difference was not significant. The findings suggest that both groups of teacher educators hold similar views regarding the effectiveness of remote proctoring tools for fair and reliable assessment. Recommendations include continuous training, addressing privacy concerns, improving technological infrastructure, promoting equity and accessibility, and advocating for further research in this area.

Keywords: *Assessment, remote proctoring tools, fair, reliable, teacher educators' perception*

Introduction:

Remote proctoring refers to the process of monitoring and supervising online examinations remotely, typically through the use of technology such as webcams, microphones, and screen-sharing software. In the context of assessing remote proctoring tools for fair and reliable assessment, it is essential to understand various definitions of remote proctoring as they relate to the perceptions of teacher educators. Means, Toyama, Murphy, Bakio and Jones (2016) defined it as the use of technology to supervise test-taking at a remote location. This definition emphasizes the technological aspect of remote proctoring and its function in overseeing test-takers from a distance. Dawson and McWilliam. (2019) describes remote proctoring as a method of invigilating

examinations using technology to maintain the integrity of the exam process. This definition not only underscores the technological aspect but also emphasizes the goal of maintaining the integrity of the examination process.

In the assessment of remote proctoring tools, this definition suggests that the effectiveness of such tools should be evaluated based on their ability to uphold the integrity of assessments in online settings. These definitions of remote proctoring emphasize its technological nature and its role in maintaining the integrity of online assessments. When assessing remote proctoring tools for fair and reliable assessment, teacher educators' perceptions are crucial factors to consider, as they shape attitudes towards technology, assessment practices, and issues of fairness and reliability in assessment. Understanding teacher educators' perceptions can inform the development and implementation of remote proctoring tools that meet the needs of both educators and students in online learning environments.

Remote proctoring tools can be categorized into several types, each employing different methods to monitor and supervise online examinations. Teacher educators' perceptions of these tools are influenced by factors such as their ease of use, effectiveness in preventing cheating, and impact on students' testing experience. One type of remote proctoring tool is *automated proctoring software*, which utilizes artificial intelligence (AI) algorithms to monitor test-takers' behavior and detect potential instances of cheating in real-time. These tools often employ features such as facial recognition, eye tracking, and keystroke analysis to identify suspicious behavior, such as looking away from the screen or attempting to access unauthorized resources. Automated proctoring software provides continuous monitoring throughout the duration of the exam and generates alerts or flags when suspicious activity is detected (Talbert, 2020). Teacher educators may perceive automated proctoring software as effective in maintaining assessment integrity due to its ability to detect cheating behavior in real-time and provide objective evidence of misconduct.

Another type of remote proctoring tool is recorded proctoring software, which records audio and video footage of test-takers during the examination for subsequent review by human proctors or

instructors. Recorded proctoring software allows for post-exam analysis of test-takers' behavior and enables proctors to manually review flagged incidents of potential cheating. This type of remote proctoring tool provides a balance between automated monitoring and human oversight, allowing for the identification of suspicious behavior while also preserving test-takers' privacy (Eaton, 2018). Teacher educators may perceive recorded proctoring software as beneficial for maintaining assessment integrity while minimizing concerns about the invasiveness of real-time monitoring. Additionally, live proctoring services offer real-time monitoring of online examinations by human proctors via video conferencing technology.

Live proctors observe test-takers' behavior in real-time and intervene to address any instances of suspected cheating or misconduct. Live proctoring services provide a high level of human oversight and can offer personalized support to test-takers during the examination (McCabe & Ingram, 2020). Teacher educators may view live proctoring services as effective in maintaining assessment integrity due to the presence of human proctors who can intervene immediately in response to suspicious behavior. Teacher educators' perceptions of remote proctoring tools are shaped by various factors, including their beliefs about assessment practices, their concerns about assessment integrity, and their experiences with technology-enhanced learning.

While some teacher educators may embrace remote proctoring tools as valuable resources for ensuring assessment integrity in online learning environments, others may express reservations about the potential invasiveness of monitoring technologies and the impact on students' testing experience. Understanding teacher educators' perceptions of different types of remote proctoring tools are essential for informing the selection and implementation of tools that align with the goals of fair and reliable assessment in.

Remote proctoring offers several benefits in terms of flexibility, accessibility, and integrity maintenance, but it also comes with challenges related to technological limitations, privacy concerns, and equity issues. One significant benefit of remote proctoring is its ability to provide flexibility in assessment administration. With remote proctoring tools, assessments can be conducted asynchronously, allowing students to take exams at their convenience from any location

with internet access (Gill, 2020). This flexibility can be particularly advantageous for students with scheduling conflicts or those located in remote areas, enhancing access to education and assessment opportunities.

Another benefit of remote proctoring is its potential to enhance assessment integrity by deterring cheating and academic misconduct. Remote proctoring tools employ various monitoring techniques, such as facial recognition, screen sharing, and keystroke analysis, to detect and prevent cheating behavior in real-time (Kwiek, 2019). By creating a controlled testing environment in online settings, remote proctoring tools can help maintain the integrity of assessments and ensure that students are evaluated fairly based on their own merits.

However, remote proctoring also presents several challenges that may influence teacher educators' perceptions of its effectiveness. One challenge is the technological limitations of remote proctoring tools, which may affect their reliability and accuracy in detecting cheating behavior. Technical issues such as internet connectivity problems, software glitches, and compatibility issues with different devices can disrupt the assessment process and undermine the validity of assessment results (Holt, 2018). Teacher educators may be concerned about relying on remote proctoring tools that are prone to technical failures or errors. Privacy concerns are another significant challenge associated with remote proctoring.

Remote proctoring tools typically require students to grant access to their webcams, microphones, and screen sharing capabilities during exams, raising concerns about the invasion of privacy and the collection of sensitive personal data (Barnes & Turetsky, 2020). Teacher educators may worry about the implications of surveillance-based assessment methods on students' privacy rights and psychological well-being, particularly in contexts where consent and data protection regulations are unclear or insufficiently enforced. Furthermore, remote proctoring may exacerbate existing equity issues in education by disproportionately disadvantaging certain student populations. Students with disabilities or those lacking access to reliable internet connections or appropriate technology may face barriers to participating in remote proctored assessments

(DiSalvio, 2021). Teacher educators may be concerned about the fairness of assessments conducted using remote proctoring tools and the potential for widening achievement gaps among students from diverse backgrounds.

When examining the assessment of remote proctoring tools for fair and reliable assessment, it's essential to consider the factors that influence fairness and reliability in assessment practices. These factors encompass various elements such as assessment design, administration procedures, and the characteristics of assessment tools. Teacher educators' perceptions of remote proctoring tools are shaped by their understanding of these factors and how they perceive the tools' effectiveness in addressing them. One crucial factor influencing fairness and reliability in assessment is the alignment between assessment tasks and learning objectives. Assessments should accurately measure the knowledge, skills, and abilities that students are expected to demonstrate based on the learning outcomes of the course or program (Shepard, 2000). When evaluating remote proctoring tools, teacher educators may assess their alignment with learning objectives and their ability to accurately assess students' performance in online learning environments.

Another factor is the validity of assessment instruments, which refers to the extent to which assessments measure what they are intended to measure (Messick, 1995). Valid assessments provide meaningful and accurate information about students' knowledge and abilities, allowing educators to make informed decisions about teaching and learning (American Educational Research Association, American Psychological Association & National Council on Measurement in Education. 2014). Teacher educators may evaluate remote proctoring tools based on their validity in assessing students' competencies and their ability to produce reliable assessment outcomes in online settings. Reliability is another critical factor influencing the fairness and reliability of assessment.

Reliability refers to the consistency and stability of assessment results over time and across different administrations (Brennan, 2006). Reliable assessments produce consistent results when administered under similar conditions, allowing for meaningful comparisons of students' performance (Baker, 2001). Teacher educators may assess remote proctoring tools based on their reliability in detecting cheating behavior, ensuring assessment security, and producing consistent

assessment outcomes in online environments. Furthermore, accessibility is a significant factor that influences fairness in assessment.

Assessments should be accessible to all students, regardless of their backgrounds, abilities, or circumstances (Gierl & Haladyna, 2013). Remote proctoring tools should accommodate diverse learners and provide equitable access to assessment opportunities for students with disabilities or those facing technological barriers (Madaus & Clarke, 2001). Teacher educators may evaluate remote proctoring tools based on their accessibility features and their ability to ensure fair and inclusive assessment practices in online learning environments. In addition to these factors, the integrity of assessment administration procedures also influences fairness and reliability in assessment. Assessment procedures should be transparent, consistent, and free from bias to ensure the fairness of assessment outcomes (Cizek & Bunch, 2007). Remote proctoring tools should employ procedures that uphold assessment integrity, such as secure exam delivery, identity verification, and monitoring of test-takers' behavior (Snyder & Bejar, 2012). Teacher educators may assess remote proctoring tools based on their effectiveness in maintaining assessment integrity and preventing cheating behavior in online assessments.

Previous studies have explored teacher educators' perceptions of remote proctoring, shedding light on their attitudes, beliefs, and concerns regarding the use of such tools in educational settings. These studies have identified several themes related to teacher educators' perceptions, including their views on assessment integrity, the effectiveness of remote proctoring tools, and the implications for teaching and learning. For example, a study by Smith, Ferguson and Caris (2018) examined teacher educators' experiences with remote proctoring and found that while some educators viewed remote proctoring positively as a means of ensuring assessment integrity in online courses, others expressed concerns about the potential invasiveness of surveillance technologies and the impact on student trust and engagement. Similarly, research by Johnson, Adams, Cummins, Gibson and Groom (2019) explored teacher educators' perceptions of remote proctoring and identified factors such as technical reliability, student privacy, and the role of human proctors in

mitigating cheating behavior as key considerations influencing educators' attitudes towards these tools.

Despite these valuable insights, previous studies on teacher educators' perceptions of remote proctoring have certain gaps in knowledge that the topic of "Assessment of remote proctoring tools for fair and reliable assessment: teacher educators' perception" can address. One such gap is the limited understanding of how teacher educators perceive the fairness and reliability of remote proctoring tools in assessing student learning outcomes. While existing studies have examined educators' general attitudes towards remote proctoring, there is a need for research specifically focused on their perceptions of the fairness and reliability of assessment practices facilitated by these tools. Additionally, previous studies have often relied on qualitative methodologies, such as interviews and surveys, to explore teacher educators' perceptions of remote proctoring.

While qualitative research provides valuable insights into educators' experiences and perspectives, there is a lack of quantitative research examining the prevalence and distribution of attitudes and beliefs about remote proctoring among teacher educators. Quantitative studies can help identify patterns and trends in educators' perceptions and contribute to a more comprehensive understanding of the factors influencing their attitudes towards remote proctoring tools. It is on this note that the researchers investigated teacher education perception on the efficacy of assessment of remote proctoring tools for fair and reliable assessment teacher assessment.

Research Questions

1. What are the perceptions of MOUAU and AIUE lecturers on the efficacy of remote proctoring tools for fair and reliable assessment?
2. What is the difference on the perception response of MOUAU and AIUE lecturers on the efficacy of remote proctoring tools for fair and reliable assessment?

Hypothesis

Ho1: There is no significant difference in the mean responses of teacher educators in School of Education, Michael Okpara University of Agriculture (MOUAU) and teacher-educators in School

of Education Alvan Ikoku University of Education (AIUE) regarding their perception response on the efficacy of remote proctoring tools for fair and reliable assessment.

Research designs and methodology

A descriptive survey design was used for the study. This study sets to find out the perception response of MOUAU and AIUE lecturers on the efficacy of remote proctoring tools for fair and reliable assessment. It will specifically determine if there are differences between lecturers in School of Education Michael Okpara University of Agriculture (MOUAU) and lecturers in Alvan Ikoku University of Education Owerri (AIUE) on the efficacy of remote proctoring tools for fair and reliable assessment. The study was carried out in School of Education, Michael Okpara University of Agriculture (MOUAU) with a population of 136 academic staff and Alvan Ikoku University of Education Owerri (AIUE) with a population of 709 academic staff. The entire academic staff of School of Education MOUAU was used as sample because the population is small while the purposive sampling technique was employed in selecting the second sample, in which the researchers used 191 academic staff in School of General Education AIUE. The total sample is 327 teacher-educators.

The instrument for data collection was a structured questionnaire titled " Teacher-educators Questionnaire on Efficacy of Remote proctoring tools for Fair and Reliable Assessment" (TQERFR)' This is a 15-item questionnaire designed by the researchers. The instrument has part 1 and 2. Part one sought for demographic information of respondents while part two sought information to determine the perception response on the efficacy of remote proctoring tools for fair and reliable assessment. The items had four response categories of Strongly agree (SA); Agree (A); Disagree (D) and Strongly disagree (SD) with scoring of 4, 3, 2 and 1 respectively. The instrument was face validated by four experts in the Department of Computer Science Education and Robotic Studies, and Department of Educational Psychology/Measurement and Evaluation, Alvan Ikoku University of Education, Owerri.

Their contributions gave rise to the final instrument used for the study. The instrument was subjected to trial testing using Cronbach Alpha reliability methods to determine its internal consistency using thirty-six lecturers outside the study population. The reliability of (TQERFR) was 0.84. The instrument was administered to the respondents with the help of two trained research assistants which ensured 100% return. Data were analyzed using mean and standard deviation to answer the research questions. The decision rule was that any mean score of 2.50 and above was accepted otherwise it was rejected. The value of 2.50 was considered as a benchmark for decision making. The t-test statistic was used to test the hypothesis at 0.05 level of significance.

Results and discussion

Table: 1: Perception responses of MOUAU and AIUE lecturers on efficacy of remote proctoring tools for fair and reliable assessment

S/N	ITEM STATEMENT	MOUAU			AIUE LECTURERS		
		$\bar{x}$	SD	REM	$\bar{x}$	SD	REM
1	Remote proctoring tools effectively ensure assessment integrity in online courses.	3.50	0.61	Accept	3.53	0.62	Accept
2	Remote proctoring tools provide flexibility in assessment administration for diverse learners.	3.47	0.59	Accept	3.45	0.55	Accept
3	The technological aspects of remote proctoring tools are user-friendly and easy to navigate.	3.02	0.48	Accept	3.05	0.49	Accept
4	Remote proctoring tools maintain the confidentiality and privacy of student data during assessments	3.51	0.77	Accept	3.52	0.75	Accept
5	Remote proctoring tools effectively detect and prevent cheating behavior in online exams.	3.61	0.79	Accept	3.60	0.77	Accept
6	Remote proctoring tools accommodate students with diverse learning needs and backgrounds.	2.61	0.41	Accept	2.59	0.42	Accept
7	The use of remote proctoring tools enhances the overall fairness of	3.59	0.77	Accept	3.61	0.79	Accept

	assessment practices in online courses.						
8	Remote proctoring tools align with the learning objectives and outcomes of teacher education programs.	2.76	0.49	Accept	2.78	0.51	Accept
9	Teacher educators feel confident in the reliability of assessment results obtained through remote proctoring.	3.29	0.53	Accept	3.30	0.53	Accept
10	Remote proctoring tools provide a positive testing experience for students.	3.57	0.60	Accept	3.59	0.61	Accept
11	Teacher educators perceive remote proctoring tools as essential components of fair and reliable assessment practices.	3.58	0.78	Accept	3.57	0.77	Accept
12	Remote proctoring tools adequately address concerns about assessment integrity and academic misconduct.	3.41	0.50	Accept	3.43	0.53	Accept
13	Teacher educators believe that remote proctoring tools contribute to the maintenance of assessment quality and standards	3.56	0.63	Accept	3.58	0.68	Accept
14	The benefits of using remote proctoring tools outweigh the challenges associated with their implementation.	3.59	0.78	Accept	3.50	0.69	Accept
15	Teacher educators perceive remote proctoring tools as valuable assets in promoting equity and inclusivity in assessment practices.	3.38	0.69	Accept	3.39	0.68	Accept
	Cluster mean	3.51	0.07		3.59	0.048	
	Average Mean	3.55					

Table1. Shows that all the items on the questionnaire were accepted as they had response mean greater than the instrument scale mean of 2.50. Also, the average mean (3.51) for MOUAU and (3.59) for the AIUE are greater than the scale mean. This implies that teacher educators prevailing perception is that remote proctoring tools are effective for fair and reliable assessment

Table 2: Summary of MOUAU and AIUE lecturers mean response

Group	N	Mean $\bar{x}$	SD	Difference in $\bar{x}$
MOUAU	136	3.51	0.07	0.8
			0.05	
AIUE	191	3.59		

Table 2 shows that a mean difference of 0.8 exists between response beliefs of MOUAU and AIUE regarding their perception on the efficacy of remote proctoring tools for fair and reliable assessment. What it means is that the response perception of MOUAU and AIUE differ slightly, though they all have positive perception on the efficacy of remote proctoring tools for fair and reliable assessment.

Hypothesis

H_{01}: There is no significant difference in the mean responses of teacher educators in School of Education, Michael Okpara University of Agriculture (MOUAU) and teacher-educators in School of Education Alvan Ikoku University of Education (AIUE) regarding their perception response on the efficacy of remote proctoring tools for fair and reliable assessment.

Table 3: t-test analysis of the mean difference between MOUAU and AIUE teacher educators' perception

Group	N	Mean $\bar{x}$	SD	DF	T. cal	P.value	Decision
MOUAU	136	3.51	0.07	326	3.21	0.53	Accepted
AIUE	191	3.59	0.05				

The data above on table 3 indicated that the t-calculated is 3.21 at 326 degrees of freedom and p. value of 0.53 which is greater than 0.5 at 0.05 level of significance which indicated that we reject the null hypothesis. Therefore, there is a significant difference between the mean response of

MOUAU and AIUE teacher educators' regarding their perception response on the efficacy of remote proctoring tools for fair and reliable assessment.

Discussion

The research conducted on the assessment of remote proctoring tools for fair and reliable assessment, focusing on the perceptions of teacher educators, presents several key findings and aligns with existing literature on the topic. Table 1 provides a summary of the perception responses from both MOUAU and AIUE lecturers regarding various aspects of remote proctoring tools. The findings indicate that both groups of teacher educators generally perceive remote proctoring tools positively, with mean responses for each item exceeding the benchmark of 2.50. The cluster mean for MOUAU is 3.51 with a standard deviation of 0.07, while for AIUE, it is 3.59 with a standard deviation of 0.048.

Additionally, the average mean for both groups is 3.55. These results are consistent with previous research findings. For example, Means et al. (2016) and Dawson et al. (2019) highlighted the importance of remote proctoring tools in ensuring assessment integrity and maintaining the confidentiality of student data during assessments. The positive perception of both MOUAU and AIUE lecturers towards the efficacy of remote proctoring tools aligns with these findings, indicating a general acceptance of the technology among teacher educators. Table 2: Summary of MOUAU and AIUE lecturers mean response It provides a comparison of the mean responses between MOUAU and AIUE lecturers. The mean response for MOUAU is 3.51, while for AIUE, it is 3.59, indicating a slight difference in perception between the two groups. The mean difference between MOUAU and AIUE is 0.8.

This finding corresponds with previous studies by Smith et al. (2018) and Johnson et al. (2019), which suggested that while there may be general acceptance of remote proctoring tools, perceptions can vary among educators based on factors such as technical reliability and concerns about student privacy. The slightly higher mean response from AIUE lecturers may indicate a slightly more positive perception towards remote proctoring tools compared to MOUAU lecturers.

Table 3: Presents the results of hypothesis testing to determine if there is a significant difference in the mean responses between MOUAU and AIUE lecturers. The calculated t-value is 3.21 at 326 degrees of freedom, with a p-value of 0.53, which is greater than 0.05. Therefore, the null hypothesis (H01) stating that there is no significant difference in the mean responses between the two groups is rejected. These results contradict the findings from Table 2, indicating that while there is a slight difference in mean responses between MOUAU and AIUE lecturers, this difference is statistically significant. This suggests that despite some variation in perception, both groups of teacher educators generally hold similar views regarding the efficacy of remote proctoring tools for fair and reliable assessment. This slide difference in perceptions between MOUAU and AIUE may be as a result of location differences among the lecturers.

Conclusion

The study on the assessment of remote proctoring tools for fair and reliable assessment, focusing on the perceptions of teacher educators from Michael Okpara University of Agriculture (MOUAU) and Alvan Ikoku University of Education (AIUE), revealed several significant findings. Overall, both groups of teacher educators exhibited positive perceptions towards remote proctoring tools, with mean responses exceeding the benchmark of 2.50 for all questionnaire items. Despite a slight difference in mean responses between the two groups, statistical analysis showed that this difference was not significant. Therefore, the study concludes that both MOUAU and AIUE lecturers generally perceive remote proctoring tools as effective for fair and reliable assessment.

Recommendations

- ✓ Institutions should provide ongoing training and professional development opportunities for teacher educators to enhance their understanding and proficiency in using remote proctoring tools effectively.
- ✓ Institutions should develop clear guidelines and policies regarding the use of remote proctoring tools to address concerns about student privacy and data protection. Transparency in the use of monitoring technologies is essential to build trust and ensure compliance with privacy regulations.

- ✓ Institutions should invest in improving technological infrastructure to address issues related to connectivity problems, software glitches, and device compatibility, thus enhancing the reliability and effectiveness of remote proctoring tools.
- ✓ Institutions should strive to ensure equitable access to remote proctoring tools for all students, regardless of their backgrounds or circumstances. This includes providing accommodations for students with disabilities and addressing technological barriers to participation.
- ✓ Future research should focus on exploring additional factors influencing teacher educators' perceptions of remote proctoring tools, such as cultural differences, disciplinary contexts, and pedagogical preferences. Additionally, longitudinal studies could investigate the long-term impact of remote proctoring on teaching and learning outcomes.

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