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Generative Artificial Intelligence for Educational Assessment in Universities: Experts Skill Gap

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Abstract

Generative artificial intelligence (GenAI) is currently having a revolutionary impact on different facets of life though with concerns on its guided usage considering its rapid integration into everyday system. Yet, its relevance in education especially in developing countries remains under tapped and reason behind this shortfall yet to be fully explored. In view of this, we investigated the level of awareness and utilisation of generative AI by measurement experts in Nigerian universities, and also identified the institutional supports and resources provided by universities to help fill the skill gaps in utilizing such technologies. Our cross-sectional survey study examined 101 measurement experts (male = 43.6%; female = 56.4% with mean age = 2.26 ± 1.05) from ten universities using a Generative Artificial Intelligence questionnaire (Q_GenAI) developed by the researchers for the data collection. The questionnaire has a reliability estimate of .958 validating its usage. Results revealed that the level of awareness, and the utilization of the GenAI tools were high among measurement experts. Further findings revealed that a number of institutional supports and resources were provided for our respondents. We recommended among others, that institutions should intensify effort in provision of support documents as ethical guidelines to help put users of GenAI in proper check.

Keywords: Educational Assessment, Generative AI, Skills Gap, Higher Education

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1. **Introduction**

In recent years, the integration of artificial intelligence (AI) technologies into various sectors has reformed processes and outcomes, including teaching, learning and assessment in education. Particularly in the context of educational assessment, AI holds immense potential for transforming traditional assessment methods into more efficient, accurate, fast and personalized approaches, this requires advanced resources with an ecosystem of thriving experts and innovators (Chen et al., 2020; Pedro, 2019). Assessment involves documenting a learner's knowledge, skills, attitudes, and beliefs in measurable terms (Capraro et al. 2011). It supports and enhances students' learning (Shams & Iqbal, 2019), ensures and sets standards (Suwandi 2023), and benefits both teachers and learners (Yamtima & Wongwanich 2014). Educational assessments enable universities to gauge how well students are meeting their academic goals, ensuring the quality and effectiveness of education. This process provides valuable feedback for students, parents, and management on areas that need improvement.

Nigerian universities currently employ various traditional methods for educational assessment, including written exams, assignments, project reports, presentations, practical work, and oral exams. These methods rely heavily on manual administration and grading, presenting several challenges. Traditional assessment methods often struggle to effectively evaluate the complex skills and competencies demanded in today's rapidly evolving job market. Additionally, the lack of specialized expertise in assessment design and evaluation further exacerbates these challenges, hindering the development of robust evaluation frameworks aligned with international standards (Hossain & Shahadat 2021). Teachers also face difficulties in planning, implementation, utilizing diverse methods, time constraints for assessment, and interpreting assessment policies and data (Lumadi, 2013; Refu & Asmamaw, 2018). Evaluating students' achievement-related behaviors, accountability concerns, and assessments conducted by professionals lacking proper training are also problematic areas (Stiggins, 1991). Additionally, experts struggle with time constraints in designing, administering, and grading assessments,

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particularly with large class sizes or multiple courses.

Traditional assessments, especially those involving open-ended questions, can be subject to teacher bias, leading to potential disparities in outcomes. More so, in the Nigerian higher education system, universities strive to enhance assessment methodologies and bridge skill gaps among educators. Recognizing these challenges, there is a need to explore innovative assessment approaches that enhance learning outcomes, promoting deeper learning, critical thinking, and problem-solving skills, moving away from rote memorization and the adoption of generative artificial intelligence (GenAI) presents a promising platform for this innovation.

GenAI, a subset of artificial intelligence, capable of creating new content such as text, images, questions, projects, assignments and images, based on learned patterns and data inputs (Zhou & Lee 2024). These systems mimic human creativity by learning patterns and structures from existing data and producing new, original content (Baidoo-Anu & Ansah, 2023; Mannuru et al., 2023). For example, a generative AI model trained on a large dataset of written text can generate new text following similar patterns and styles. This capability extends to generating images and videos.

2. Why do we need generative artificial intelligence in educational assessment

In educational assessment, generative AI technologies can create adaptive and tailored evaluation tools that accommodate varied learning styles, address personalised learning needs, and provide timely feedback to students (Baidoo-Anu & Ansah 2023). For example, a generative AI model trained on a large dataset of written text can generate new text following similar patterns and styles. Generative artificial intelligence models have diverse applications, from creating art and multimedia content to scientific research. Examples include ChatGPT, Bard, DALL-E, MuseNet, Grammarly, and Nerd AI Tutor (Lawton, 2023). These models are developed using techniques like generative adversarial networks (GANs), variational auto-encoders (VAEs), auto-regression models, transformers, recurrent neural

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networks (RNNs), and flow-based models (Bandi et al., 2023). By leveraging these technologies, educational assessment can become more efficient, objective, and tailored to individual learning needs. Generative artificial intelligence (AI) is gaining attraction in educational assessment for its ability to provide personalized evaluations of students' knowledge and skills (Ruiz-Rojas et al. 2023). Its applications include automated essay scoring, which analyzes coherence and vocabulary to assign scores, thereby saving educators' time and enabling scalable assessment (Sevcikova, 2018; Hussein et al., 2019). It also involves creating new test items tailored to specific learning objectives and varying difficulty levels, dynamically adjusting question difficulty based on student responses to create personalized learning paths (Bhutoria, 2022; Gierl, 2015) and recreating real-world scenarios or experiments for assessment purposes (Haase, 2023).

Generative AI can provide multimodal assessments, analyzing texts, images, and other data forms to comprehensively evaluate students' competencies and generate effective feedback. Thus, generative AI is a transformation tool for enhancing educational outcomes (Rajaratnam, 2024). However, awareness of these capabilities is crucial for their adoption and effective implementation (Ibrahim, 2024). Research shows varying levels of awareness and usage of GenAI technologies among educators worldwide (Luckin & Holmes, 2016; Chassignol et al., 2018). For instance, Kohnke et al. (2023) found that while many educators were aware of ChatGPT, they lacked confidence in using it for language teaching and assessment. Ali et al (2024) designed a GenAIChatbot application to support students self-directed learning and self-assessment. In a mixed method study, carried out by Bower et al (2024), involving 318 participants, most teachers believed that GenAI would significantly influence learning and assessment. Additionally, higher levels of awareness of GenAI was linked to a greater perceived impact. Specific studies on the awareness of generative AI for educational assessment among Nigerian university instructors are scarce, hindering the adoption of innovative methods and framework that could significantly enhance the educational experience and aligned with international standards (Hossain & Shahadat, 2021). Studies in Nigeria are

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mostly focused on artificial intelligence(AI).

Investigating the use of GenAI tools among measurement experts in Nigerian universities is essential. Despite evidence supporting GenAI's benefits in education (Chassignol et al., 2018), practical application remains limited in Nigeria where major focus is on AI. A study by Ezekiel and Akinyemi (2023) revealed that although 90% of lecturers at the University of Ibadan were positive about adopting AI tools, their usage was constrained by a lack of skills. Inadequate training and limited access to resources further contributed to the low utilization rate. Those who do use generative AI tools typically employ them for basic functions like automated grading and plagiarism detection, while advanced applications such as adaptive testing and personalized feedback systems are rarely utilized, indicating a significant under-utilization of generative AI's potential in educational assessment (Ibrahim, 2024; Lumadi, 2013; Refu & Asmamaw, 2018). This under-utilization can be attributed to a skills gap.

To effectively leverage generative AI for educational assessment, measurement experts in Nigerian universities need a diverse set of skills. These include knowledge of AI principles, proficiency in using AI software, and the ability to interpret AI-generated data (Aydin & Karaarslan, 2022). This encompasses understanding neural networks, deep learning architectures, and natural language processing techniques. Experts must also be capable of implementing and fine-tuning generative models to produce high-quality and diverse assessment items tailored to specific learning objectives. Additionally, expertise in data pre-processing and management is crucial for handling large datasets and ensuring data quality and integrity. Strong programming skills, particularly in languages such as Python, and familiarity with AI libraries and frameworks like TensorFlow or PyTorch, are also essential. Moreover, Yelamarthi et al. (2024) emphasize the need for a solid understanding of assessment theory and a strong foundation in engineering education and practice to design assessment frameworks that align with educational objectives and standards.

The emergence of generative AI necessitates adaptation among lecturers, including continuous learning, shifting

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job responsibilities, building stronger digital competencies, and empowering students as independent learners (Barros et al., 2023). Effective communication and collaboration skills are also vital for engaging with stakeholders, including educators, administrators, and policymakers, to ensure the successful integration of generative AI tools into educational assessment practices. The current study examines the extent to which measurement experts in Nigerian universities possess the necessary skills for utilizing generative AI, acknowledging a notable skills gap. Teachers recognize the need for curriculum, pedagogy, and assessment changes due to generative AI (Bower et al (2024) and development of new skills and competencies relevant for effective usage are vital (Preiksaitis & Rose, 2023). A skills assessment survey by Ibrahim (2024) found that the adoption of AI is significantly hampered by technical barriers, a lack of necessary skills, and a knowledge gap. This situation is partly due to limited targeted interventions and support mechanisms to help experts navigate this new field. The rapid pace of technological advancement exacerbates this skills gap, outpacing the rate at which educators can acquire new competencies, thus highlighting the urgent need for continuous professional development and training programs focused on generative AI and its educational applications.

3. Need for addressing skill gap

Addressing the skills gap in utilizing generative AI for assessment in Nigerian universities requires robust institutional support and resource allocation. However, Yeralan and Lee (2023) noted that many university administrators are ill-equipped to fully understand and appreciate the significance of these new technologies. This implies that institutional support may play crucial role in bridging the skill gaps and promoting the effective use of generative AI in educational assessment. This position is upheld by Ezekiel and Akinyemi, (2023), and Ibrahim, (2024;) who are of the opinion that lack of institutional support is a significant barrier to the adoption of generative AI in educational assessment. Mannuru et al. (2023), equally observed that lecturers' awareness levels could be influenced by factors such as institutional support, access to resources, and collaboration

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opportunities with international experts or organizations at the forefront of AI research. Institutional support refers to the various forms of assistance and resources provided by educational institutions to help lecturers effectively integrate and utilize generative AI technologies in their teaching and assessment practices. This includes providing access to AI tools, funding for training programs, and fostering a culture of innovation within the academic community (Ibrahim, 2024). In essence, universities need to invest in infrastructure that supports AI initiatives. This includes creating AI research centers, establishing partnerships with technology companies, providing funding for AI-related projects and focus on curriculum development to include AI education at both undergraduate and postgraduate levels. This study therefore intends to also find out from measurement experts, the institutional support and resources they consider necessary to fill the awareness and skills gaps in the utilization of generative AI in assessment.

4. Research Questions

The following research questions guided the study;

1. What percentage of measurement experts in Nigerian universities are aware of the generative AI tools for educational assessment?
2. To what extent do measurement experts in Nigerian universities utilize generative AI tools for educational assessment purposes?
3. What institutional support and resources are provided by Nigerian universities to fill the skill gaps in the utilisation of generative AI for assessment practices?

4. Methodology

The study adopted a descriptive survey design. and was conducted across the 265 universities in Nigeria (private - 149 (56%), state - 63 (24%) and federal universities - 53 (20%) (NUC, 2024). The population comprised an estimate of 565 measurement experts in Nigerian universities. The 101 measurement experts from 10 universities that gave their consents were used for the study. Multi-stage sampling procedure was used to select the samples for the study. First, ten universities were randomly drawn from each Geopolitical Zone of the country, then all the measurement experts in each of the universities that

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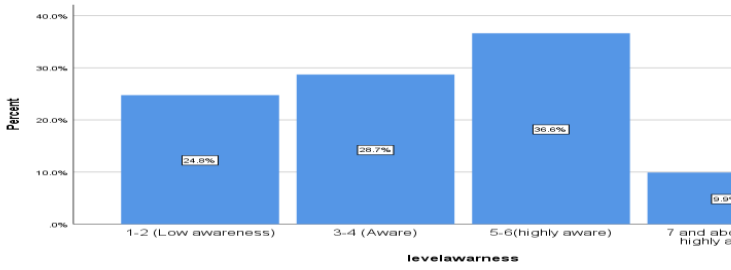
consented totaling 101, were sampled. Data were collected from the respondents using online questionnaire sent through their various whatsApp pages and telegram accounts. A total of 101 measurement experts completed and submitted their forms which were used for data analysis.

A researcher-developed structured questionnaire titled Questionnaire on Generative Artificial Intelligence (Q GenAI) was used for data collection. It consisted of two sections – A and B. Section A was designed to obtain personal data of the respondents while Section B consisted of four clusters. Cluster I was made up list of GenAI tools aimed at identifying the ones the respondents are aware of and potential applications. Cluster II has five items designed to assess the extent to which the respondents utilize the identified generative artificial intelligent tools for assessment. Similarly, Cluster III consisted of thirteen items which sort to identified the institutional supports needed to fill the skill gap of utilisation of GenAI among measurement experts. The instrument was validated by three experts, one from the field of computer science and two from the field of measurement and evaluation. The reliability estimate of .958 was established using Cronbach Alpha reliability technique which tests the consistency and stability of the instrument. This stability coefficient indicate that the instrument was fit for the investigation. Also, the data obtained yielded Cronbach Alpha for the three clusters as follows: Cluster I = .867, Cluster II = .897 and Cluster III = .943. These coefficients indicate the items measured the same trait. This is in agreement with the postulation of Frost (2024) that at .7 and higher, items sufficiently consistent to indicate the measure is reliable. Research question one was answered using percentage while research questions two and three were answered using means and standard deviations.

5. Results

Awareness of generative AI for educational assessment and its potential applications.



Note: *Awareness of GenAI tools: 1-2 = low awareness; 3-4 AI tools = Aware;*

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5-6 AI tools = highly aware; more than 7 AI tools = very highly aware.

Figure 1: Level of awareness and potential use GenAI tools for educational assessment (*N* =101).

Figure 1 shows the percentage of respondents in each level. The modal and median level is highly aware with the categories ranging from 1-2 for low awareness to 7 and above for very high awareness. The percentage distribution indicates that more than one-third of measurement experts are at the highly aware level (36.6%) while most others are in aware and low awareness level (28.7% and 24.8%); only 9.9% selected very highly aware.

Utilisation of generative artificial intelligence tools for educational assessment purposes by measurement experts in Nigerian universities

Table 1: Mean Responses on GenAI Tools for Assessment (*N* =101)

S/N	Items	Mean	Std. Error	*SD*	Decision
1	To what extent do you use the GenAI tools for Questions generation?	2.11	.097	.979	Utilised
2	To what extent do you use the GenAI tools for interactive tutoring and assessment?	2.40	.116	1.167	Highly Utilised
3	To what extent do you use the GenAI tools for Language learning and assessment?	2.43	.121	1.219	Highly Utilised
4	To what extent do you use the GenAI tools for creating images, words or videos for assessment?	1.86	.072	.722	Not Utilised
5	To what extent do you use the GenAI tools for adaptive assessment?	1.82	.074	.740	Not Utillised

Note: *Below 2.00 -- Not Utilised; 2.00 - 2.39 -- Utilised; 2.40 and above -- Highly Utilised; criterion mean -- 2.00*

Table 1 shows the mean responses on the extent of utilisation of GenAI tools for educational assessment purposes by measurement experts in Nigerian universities. The results revealed that measurement experts highly use GenAI for language learning, tutoring, question generation and assessment with the means above 2.00. Though not

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used for adaptive assessment, creating videos and images for assessment

Institutional support and resources provided by institutions to fill the skill gaps in the utilisation of generative AI for assessment practices.

Table 2: Mean response on institutional support and resources provided by institutions. (N=101)

S/N	Items	Mean	Std. Dev.	Decision
1	Workshops on Gen AI usage	2.36	.729	P
2	institution sponsored Certificate programmes on GenAI	2.27	.819	P
3	Online courses and tutorials organised on the use of GenAI	2.16	.915	NP
4	Accessible e-platforms that enhances the use of GenAI	1.80	.085	NP
5	Accessible e-resources library	2.39	.133	P
6	IT support team are readily available in times of challenges with my GenAI soft	2.50	.122	P
7	Ethical guidelines for AI usage	2.15	.086	NP
8	Policies on data collection, storage, and usage in the use of AIin order to protect privacy and maintain legal standards	2.05	.087	NP
9	Established school assessment standards in the use of AI	2.30	.126	P
10	Sponsored mentorship programs on AI utilisation	1.50	.064	NP
11	Availability of established feedback mechanism on use GenAI	1.80	.056	NP
12	School-Sponsored collaboration among researchers	2.41	.123	P
13	Regular evaluation of AI tools used by lecturers to ensure they meet educational objectives and adapt to evolving needs.	2.34	.234	P

Note: *Below 2.50 -- Not Provided (NP); 2.50 and above -- Provided (P)*

Table 2 shows whether institutional support and resources are provided by Nigerian institutions to experts in measurement to facilitate their appropriate use of GenAI in educational assessment. Out of the 13 items listed in the Table, 7 items were reported to be provided in higher institutions whereas 6 were reported not be provided in the institutions. Most of the resources and supports revolved around in-service training/workshops and collaborations on GenAI. Most issues revolving around policies, feedback and ethical regarding AI were not provided in the institutions.

6. Discussion of findings

This study aimed to examine measurement experts' level of awareness and use of generative artificial intelligence tools for educational assessment. Also

investigated in our study were the institutional support and resources provided by universities to promote adequate use of generative artificial intelligence tools by these experts. Results indicated that greater percentage of measurement experts in Nigerian universities are aware of generative artificial intelligent tools and their use. Reports from respondents revealed that these tools were used by teachers for tutoring, generating test items for assessment and giving feedback on assignments and projects. This implies that these experts employ these tools in service delivery. It is possible that they have realized the potential usefulness of AI tools in assessment practices enabled by their digital skills. This is to say that GenAI tools help educational practitioners in building stronger digital skills and empowering students as independent learners (Bower et al., 2023). These in experts' views would have a groundbreaking impact on education and schooling (Open Innovation Team and Department for Education Report, 2024). For instance, if teachers properly harness GenAI tools, they could save a lot of teaching time which would be channeled to research writing and other productive ventures. It can also improve teaching effectiveness and even enhance students' accessibility, engagement and inclusion in teaching and learning to benefit students with special abilities. This technology is reportedly used by teachers in creating personalised educational resources, automated marking and generating feedback on students' works (Ghimire et al., 2024). Bower et al., (2023) asserted in their mixed method study that majority of teachers were aware of generative artificial intelligence tools and believed the tools would have profound impact on teaching and assessment since higher level of awareness predicted higher impact. Also, Ghimireet al., (2024) unmasked in their survey that most teachers have at least heard and tried out these tools.A greater number of the teachers (more than 40%) agreed they use these tools almost all the time.

Another finding of this study divulged that measurement experts highly use generative artificial intelligence tools not only for assessment but for varying situations as in question generation, language learning and tutoring. This implies that these AI tools act as partners in teaching and influence modern teaching practices.Furthermore, van den Berg

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(2024), in his exploratory case study, reported that teachers use GenAI to personalise teaching, plan lesson, assess and create critical thinking tasks. However, the results also showed that these tools were not frequently used for adaptive assessment, videos and images creation which could be attributed to level of technological skill. Ghimireet et al. (2024) viewed that in addition to lack of technical understanding of the tools, poor digital skills, ignorance and paucity of infrastructure could be factors for non usage despite the fact that the technology in its robustness can attend to many issues. Despite the widespread and benefits of the use of GenAI, scholars have shown lots of concerns ranging from student and teacher over reliance, examination malpractice to data privacy, the inability to assess whether a model is appropriate for a certain type of use (Birhane et al., 2023; Liu & Jagadish, 2024; Liebrenz et al., 2023; Ray, 2023; Zhuo et al., 2023) and other ethical issues related to its usage. The Open Innovation Team and Department for Education Report, (2024), also raised that artificial intelligence (AI) in general posses a big threat to teacher's job security benefits notwithstanding.

Important also, is the finding that revealed the institutional support systems and resources provided by Nigerian universities. Evidently, schools are becoming compliant with the innovative technologies and putting up frantic effort to support their use. Out of the 13 support systems identified in the study, seven of them were reported to be provided in the universities whereas six were reported not provided. Most of the resources and supports provided centered on in-service training/workshops and collaborations on GenAI. Most issues revolving around policies, feedback and ethical considerations were not provided in the institutions. Workshops and seminars, e-resource libraries and Sponsored collaboration research on the use of generative artificial intelligence were reported to be provided. This agrees with Liu and Jagadish (2024), who recommended that providing training, and building research collaboration as crucial for supporting the teachers to efficiently use GenAI and also fill skill gap. The present study also revealed that ethical guidelines on the use of GenAI were not available in schools. To this, Kohnke (2023) agreed that universities have not done enough in providing needed guidelines for the

use of GenAI to help teachers keep up with the accelerating development of generative AI tools. This negates the stance of (Liu et al., 2022) who posited that there is need developed clear guidelines, requirements, and incentives on the use of GenAI to help unravel its rigor and reproducibility effects.

7. **Conclusion**

The findings of this study were of two-fold. First, overall perceptions concerning measurement experts awareness and utilisation of generative artificial intelligence for assessment purposes. Considering the invasion of teaching, learning and assessment process by artificial intelligence, we establish that measurement experts are highly aware of GenAI tools and what they could be used for and the findings have positive Second, part of our findings revealed the institutional support and resources provided for effective use of these new technology. The study established that though most supports and resources were provided, there critical resources that are still not provided. This calls for serious attention since their non-availability can pose serious threat to effective use of GenAI. This finding is similar to theresults of Srivastava et al. (2022), who reported that when GenAI is used unethically, learning and development of critical thinking skills are hindered.

8. Recommendations

Due to the implications of the findings of this study to teaching and learning, it was recommended that more seminars and workshops should be provided to encourage users and also help them know the dangers/risks of over usage of GenAI. We also recommended that ethical guidelines and polices should be made available to keep users in proper check since generative artificial intelligence is still new and evolving.

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