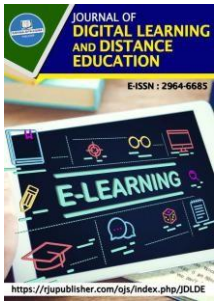

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Lecturers' and Students' Perceptions on Online Assessment in Offline Science Courses in Higher Education in South-East Geo-Political Zone, Nigeria

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Abstract

This study investigated lecturers' and students' perceptions of online assessment in science courses traditionally taught offline in higher education institutions across South-East Nigeria. A quantitative descriptive survey design was adopted, guided by three research questions and three null hypotheses. Using a multi-stage sampling technique, a sample of 62 lecturers and 379 students was selected from three states. Data were collected via Google Forms using two validated instruments: the lecturers' perception of online assessment in offline courses questionnaire (LPOAOCQ) and the students' perception of online assessment in offline courses questionnaire (SPOAOCQ), with reliability coefficients of 0.771 and 0.723, respectively. Data were analyzed using descriptive statistics, independent t-tests, and ANOVA at a 0.05 level of significance. The results indicated no significant difference between the overall perceptions of lecturers and students. However, while lecturers' perceptions did not vary significantly based on gender or qualifications, students' perceptions differed significantly according to gender and age, although not by academic level. The findings highlight the inherent challenges of assessing psychomotor skills through online formats, particularly in science education, where hands-on activities are essential. Consequently, the study emphasizes the need for authentic, context-rich assessments that reflect real-world scientific practice. It is recommended, among others, that institutions adopt blended assessment models that integrate digital tools with hands-on evaluations to effectively measure the full range of student competencies.

Keywords: Online assessment, offline science courses, higher education, lecturer and student perceptions.

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Introduction

Assessment in higher education is a systematic process of collecting and evaluating evidence of students' knowledge and skills, serving as a vital guide for instructional decisions and educational outcomes (Ehiemere & Chikezie, 2025). Ideally, effective assessment should encompass three fundamental domains: cognitive (thinking), affective (attitudes), and psychomotor (manual skills). Traditionally, assessment was dominated by paper-and-pencil tests; However, the advent of Information and communication technology (ICT) has catalyzed the rise of online assessment, or e-assessment. Online assessment utilizes digital technology to infer student abilities and is often viewed as a digital extension of classroom activities (Heil & Ifenthaler, 2023). While this method offers convenience, flexibility, and immediate feedback for diagnostic, formative, and summative purposes, the shift to a digital format poses significant pedagogical challenges—especially for science courses that traditionally rely on hands-on, experiential approaches.

In many tertiary institutions in Nigeria, science instruction follows a conventional model where lectures are supplemented by laboratory exercises. These exercises, which often utilize demonstration methods (Doménech et al., 2024), are specifically designed to develop procedural knowledge and manipulative competencies. Consequently, assessments at the conclusion of an instructional session should reflect this practical engagement. Science learning is fundamentally activity-based, yet online assessments frequently struggle to capture these nuanced, process-oriented aspects of learning (Pordanjani & Salehi, 2025). Authentic assessments in science should mirror professional practice, requiring critical thinking and procedural fluency rather than the simple selection of answers from a list. Over-reliance on multiple-choice formats in online platforms can obscure a student's actual mastery of science process skills, such as observing, measuring, and communicating.

Despite the growing popularity of digital testing, its suitability for "offline" (face-to-face) science courses that demand high psychomotor engagement remains underexplored. Previous studies have examined general perceptions of online exams (James, 2016), but there is a notable research gap regarding science disciplines within the South-East Geo-Political Zone of Nigeria. This study, therefore, aims to bridge this gap by investigating the perceptions of lecturers and students concerning the integration of online assessments into traditional science curricula. This research is grounded in two theoretical frameworks: the technology acceptance model (TAM) (Davis, 1989), which posits that perceived usefulness and ease of use determine technology adoption, and constructivist learning theory, which is active and contextual learning. These frameworks provide a lens to understand stakeholders' perceptions of digital tools in a practical-heavy discipline. To guide this investigation, the study addresses the following research questions (RQ):

1. What are the differences in lecturers' and students' perceptions regarding online assessment in offline science courses?
2. How do lecturers' perceptions vary based on gender and highest academic qualification?
3. How do students' perceptions vary based on gender, age, and academic level?

Research hypotheses:

1. $H_0$1: There is no significant difference between lecturers' and students' perceptions regarding online assessment in offline science courses.
2. $H_0$2: There is no significant difference in lecturers' perceptions based on gender and highest academic qualification.
3. $H_0$3: There is no significant difference in students' perceptions based on gender, age, and academic level.

Methodology

Design of the study

This study adopted a quantitative approach employing a descriptive survey research design. This design was selected as it allows for the systematic collection of data from a representative sample of lecturers and students to generalize the findings to the broader population within the study area.

Participants and sampling procedure

The population of this study comprised lecturers and students from tertiary institutions in the South-East geo-political zone of Nigeria. A multi-stage sampling procedure—combining simple random, stratified, and purposive sampling—was utilized.

1. Stage 1: Three states (Abia, Ebonyi, and Imo) were randomly selected from the five states in the zone.
2. Stage 2: Institutions were stratified by type (universities, polytechnics, and colleges of education) to ensure balanced representation.
3. Stage 3: Lecturers and students were purposively selected from the sampled institutions to reflect diversity in academic disciplines and levels. The final sample consisted of 62 lecturers and 379 students. Detailed demographic characteristics are presented in Table 1.

Table 1. Demographic information of participants used in the study

Category	Levels	Frequency	Percentage
Lecturer classificatory factors			
Gender	Male	29	46.8
	Female	33	53.2
Qualification	Masters	21	33.9
	Ph.D	41	66.1
Students classificatory factors			
Gender	Male	139	36.7
	Female	240	63.3
Age	16 – 20 years	65	17.2
	21 – 25 years	199	52.5
	26 – 30 years	83	21.9
	31^{+} years	32	8.4
Level of study	100 level	66	17.4
	200 level	93	24.5
	300 level	86	22.7
	400 level	56	14.8
	500^{+} level	78	20.6

Instrument for data collection

Two researcher-developed instruments were used: the “Lecturers' perception of online assessment in offline courses questionnaire” (LPOAOCQ) and the “Students' perception of online assessment in offline courses questionnaire” (SPOAOCQ). Each instrument consisted of two sections:

- Section A: Demographic information.
- Section B: 20 items focusing on the ease of use, impact, and drawbacks of online assessment.

The items were rated on a 5-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), Strongly Disagree (1), and Not Applicable (0).

Validity and reliability

The instruments were validated by experts in Measurement and Evaluation as well as Educational Technology. Internal consistency was determined using Cronbach's Alpha, yielding reliability coefficients of 0.771 for the LPOAOCQ and 0.723 for the SPOAOCQ. These indices confirmed the instruments were reliable for data collection. The questionnaires were administered digitally via Google Forms and distributed through lecturers' and students' WhatsApp platforms.

Data analysis

The research questions were answered using mean ($\bar{\chi}$) and standard deviation (SD). Since the instrument used a Likert scale with a theoretical midpoint, a weighted mean score of 2.50 or higher (representing a cumulative score of 40.0 or above for the 20-item scale) was set as the criterion for a positive perception. In contrast, scores below this threshold indicated a negative perception. Furthermore, the null hypothesis was tested at a .05 level of significance using independent t-tests and one-way analysis of variance (ANOVA). The decision to reject or retain the null hypothesis was based on the p-value; a hypothesis was rejected if the p-value was $\leq .05$.

Results

This section presents the findings of the study based on the data collected from the respondents. The results are organized according to the research questions and hypotheses, starting with the demographic profile of the participants as shown in Table 1 below.

Demographic characteristics of participants

Table 1 presents the distribution of respondents based on gender, qualification, age, and academic level. The lecturer sample (n=62$) consisted of 29 (46.8%) males and 33 (53.2%) females, with 21 (33.9%) holding a Master's degree and 41 (66.1%) holding a Ph.D. The student sample (n=379) comprised 139 (36.7%) males and 240 (63.3%) females. The majority of students were aged 21–25 years (52.5%), followed by 26–30 years (21.9%), 16–20 years (17.2%), and 31 years and above (8.4%). Regarding their level of study, the distribution ranged from 100 levels (17.4%) to 500+ levels (20.6%).

RQ1: What is the difference between lecturers' and students' perception of online assessment in offline science courses in higher education in South-East, Nigeria?

Table 2. Mean and standard deviation of perception scores

Variables	N	$\bar{\chi}$	SD
Lecturers	62	49.55	8.97
Students	379	50.84	7.83

As presented in Table 2, the mean scores and standard deviations of lecturers were ($\bar{\chi}$ = 49.55, SD = 8.97). For students ($\bar{\chi}$ = 50.84, SD = 7.83). The results implied that students have slightly more positive perception than lecturers about online assessment of offline science courses in higher education.

RQ2: What is the lecturers' perception of online assessment in offline courses in higher education in South-East, Nigeria across gender and highest academic qualification?

Table 3. Lecturers' perception by gender and qualification

Lecturers' perception	Variables	N	$\bar{\chi}$	SD
Gender	Male	29	50.21	9.34
	Female	33	48.67	9.30
Qualification	Masters	21	51.52	8.94
	Ph. D	41	49.64	9.09

Data in Table 3 indicates that male lecturers ($\bar{\chi}$= 50.21, SD = 9.34) have a more positive perception than their female counterparts ($\bar{\chi}$ = 48.67, SD = 9.30). Regarding qualifications, lecturers with a Master's degree ($\bar{\chi}$ = 51.52, SD = 8.94), reported a more positive perception than those with a Ph.D. ($\bar{\chi}$ = 49.64, SD = 9.09).

RQ3: What is the students' perception of online assessment in offline courses in higher education in South-East, Nigeria across gender, age, and level of study?

Table 4. Students' perception by gender, age, and level

Students' perception	Variables	N	$\bar{\chi}$	SD
Gender	Male	139	49.70	8.09
	Female	240	51.47	7.56
Age	16-20 years	65	55.06	4.91
	21-25 years	199	49.87	8.59
	26-30 years	83	48.73	3.90
	31^{+} years	32	53.50	8.58
Level of study	100	66	50.44	7.48
	200	93	51.11	7.92
	300	86	48.51	5.36
	400	56	49.63	6.33
	500^{+}	78	52.03	8.86

Table 4 reveals that female students ($\bar{\chi}$= 49.70, SD = 8.09) hold a more positive perception than male students ($\bar{\chi}$= 51.47, SD = 7.56). In terms of age, students aged 16–20 years reported the highest mean score ($\bar{\chi}$= 55.06, SD = 4.91), followed by those aged 31+ years ($\bar{\chi}$= 53.50, SD = 8.58). Regarding the level of study, 500+ level students showed the highest positive perception ($\bar{\chi}$ = 52.03, SD = 8.86). followed by 200 level students ($\bar{\chi}$= 51.11, SD = 7.92).

Hypothesis testing

Hypothesis 1: There is no significant difference between lecturers' and students' perception of online assessment in offline courses in higher education in South-East, Nigeria.

Table 5. Independent t-test for lecturers vs. students

Variables	N	$\bar{\chi}$	SD	t-value	df.	Sig
Lecturers	62	49.55	8.97			
				1.183	439	.237
Students	379	50.84	7.83			

The t-test results in Table 5 show that t (439) = 1.183 and p = .237$. Since p > .05, the null hypothesis is retained. There is no significant difference between lecturers' and students'

perceptions.

Hypothesis 2: There is no significant difference in the lecturers' perception of online assessment in offline courses in higher education in South-East, Nigeria across gender and highest academic qualification.

Table 6. Independent t-test for lecturers

Variables	Category	N	$\bar{\chi}$	SD	t-value	df.	Sig
Gender	Male	29	50.21	9.34	.650	60	.518
	Female	33	48.67	9.30			
Qualification	Masters	21	51.52	8.94	.779	60	.439
	Ph. D	41	49.64	9.09			

Table 6 revealed that the independent t-test analysis for gender was t-value (60) = .650 and p- value (0.518) > alpha level (.05). Based on this result, the null hypothesis was confirmed meaning that there is no statistically significant difference in the lecturers' perception of online assessment in offline courses in higher education across gender. Similarly, for qualification, was t-value (60) = .779 and p-value (0.439) > alpha level (.05). This result implied that the hypothesis that postulated that there is no significant difference in the lecturers' perception of online assessment in offline courses in higher education across academic qualification was retained.

Hypothesis 3: There is no significant difference in the students' perception of online assessment in offline courses in higher education in South-East, Nigeria across gender, age, and academic level.

Table 7. Statistical analysis of students' perception across gender, age, and academic level

	Variables	N	$\bar{\chi}$	SD	t-value	df.	Sig
Gender	Male	139	49.70	8.09	2.139	377	.033
	Female	240	51.47	7.56			

ANOVA of students' perception of online assessment in offline courses in higher education across age and academic level

Age	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1938.018	3	646.006	12.298	.000
Within Groups	19697.782	375	52.527		
Total	21635.799	378			
Level	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	592.799	4	148.200	2.757	.082
Within Groups	20105.744	374	53.759		
Total	20698.544	378			

Table 7 showed that the independent t-test analysis for students' gender was t-value (377) =.2.139 and p-value (.033) < alpha level (.05). Based on this result, the null hypothesis was rejected, meaning that the male and female students' perception of online assessment in offline courses in higher education is statistically significant. Similarly, the ANOVA table on students' perception based on age indicated F-ratio (3. 375) = 12.298 and p-value (.000) < alpha level (.05)

implied that the hypothesis that postulated that there is no significant difference in the students' perception of online assessment in offline courses in higher education across age ranges was rejected. Conversely, the ANOVA table on students' perception based on level of study revealed that F-ratio (4. 374) = 2.757 and p-value (.082) > alpha level (.05). This implies that the hypothesis that postulated that there is no significant difference in the students' perception of online assessment in offline courses in higher education across age ranges was upheld, meaning that there was no significant difference.

Post-hoc analysis (Age)

However, the F-ratio was significant. further multiple comparison test was done and is presented in Table 8.

Table 8. Scheffe multiple comparison test on mean differences based on age

					95% Confidence Interval	
(I) Age	(J) Age	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
16-20	21-25	5.18717*	1.03541	.000	2.2795	8.0948
	26-30	6.32660*	1.20041	.000	2.9556	9.6976
	31+	1.56154	1.56512	.802	-2.8337	5.9567
21-25	16-20	-5.18717*	1.03541	.000	-8.0948	-2.2795
	26-30	1.13943	.94700	.695	-1.5200	3.7988
	31+	-3.62563	1.38038	.077	-7.5020	.2508
26-30	16-20	-6.32660*	1.20041	.000	-9.6976	-2.9556
	21-25	-1.13943	.94700	.695	-3.7988	1.5200
	31+	-4.76506*	1.50809	.020	-9.0001	-.5300
31+	16-20	-1.56154	1.56512	.802	-5.9567	2.8337
	21-25	3.62563	1.38038	.077	-.2508	7.5020
	26-30	4.76506*	1.50809	.020	.5300	9.0001
	31+	-3.62563	1.38038	.077	-7.5020	.2508
26-30	16-20	-6.32660*	1.20041	.000	-9.6976	-2.9556
	21-25	-1.13943	.94700	.695	-3.7988	1.5200
	31+	-4.76506*	1.50809	.020	-9.0001	-.5300
31+	16-20	-1.56154	1.56512	.802	-5.9567	2.8337
	21-25	3.62563	1.38038	.077	-.2508	7.5020
	26-30	4.76506*	1.50809	.020	.5300	9.0001

Scheff's test analysis as presented in Table 8 revealed four possible pair wise comparison of mean difference in the students age ranges. Significant mean differences were observed between 16- 20 years and 21-25 years groups (5.19), 16-20 years and 26-30 years groups (6.33) and finally between 26-30 years and 31 years and above (4.77). The results presented above provide a detailed statistical overview of the perceptions held by lecturers and students, serving as the basis for a more in-depth discussion on the implications of digital assessment in science education

Discussion

The findings of this study provide critical insights into the perceptions of lecturers and students regarding online assessment within offline science courses in South-East Nigeria. The descriptive analysis (Table 2) and subsequent t-test (Table 5) revealed that both lecturers ($\bar{\chi}$=49.55)

and students ($\bar{\chi}$=50.84) maintained a positive perception of online assessment, with no significant difference between the two groups (p = .237). This alignment suggests a collective readiness to integrate digital tools into science education. From the perspective of the technology acceptance model (TAM), this positive perception indicates that both stakeholders recognize the "perceived usefulness" of e-assessments, likely due to the immediate feedback and flexibility they offer (Heil & Ifenthaler, 2023). The study found that gender and academic qualifications do not significantly influence how lecturers perceive online assessment (Table 6). Whether male or female, or holding a Master's or Ph.D., lecturers share a statistically similar outlook. This suggests that in the South-East geo-political zone, technological adoption among faculty is becoming more standardized, possibly due to increased institutional pressure or personal professional development that transcends demographic boundaries.

Unlike the lecturers, students' perceptions of online assessment were significantly influenced by both gender and age, as evidenced by the results in Table 7. Female students reported a significantly more positive perception compared to their male counterparts (p = .033), a finding that challenges traditional myths regarding gender gaps in ICT and suggests that female students in science disciplines may find online formats more organized or less intimidating for their specific learning styles. Furthermore, the ANOVA results (p = .000) and subsequent Scheffe post-hoc test (Table 8) identified that the youngest demographic (16–20 years) held the most positive views. This alignment with the concept of "digital natives" suggests that younger students, having been immersed in digital environments from an early age, experience a much higher "perceived ease of use" within the TAM framework than many of their older peers. Interestingly, the 31+ age group also exhibited high levels of positivity, which likely reflects the advanced maturity and self-directed learning traits inherent in adult learners within higher education.

The study examined lecturers' and students' perceptions of online assessment in science courses traditionally taught offline within higher education institutions in South-East Nigeria. The findings revealed that both groups shared relatively similar perceptions toward online assessment, with no statistically significant differences overall. This outcome corresponds with the technology acceptance model (TAM) (Chen et al., 2025; Denovan & Marsasi, 2025), which posits that perceived usefulness and perceived ease of use are critical determinants of technology adoption. In this case, both lecturers and students likely perceive online assessment tools as useful for efficiency and accessibility, even while acknowledging limitations in assessing practical competencies. Building on this, the absence of significant perceptual differences between lecturers and students echoes findings by (Žerovnik, 2024; Sarker et al., 2025; Henderikx et al., 2025), who noted that both instructors and learners recognize the convenience and immediacy of feedback afforded by online assessment systems. However, the shared skepticism regarding their applicability in science disciplines aligns with (Yu & Cai, 2022; Akhtar & Perea-Borobio, 2025), who emphasized that online formats often fail to adequately measure psychomotor skills, which are integral to scientific learning. This underscores the continued need for authentic, context-based assessment in science education, a key feature of constructivist learning environments (Al-Barakat et al., 2025).

Furthermore, the finding that lecturers' perceptions did not differ significantly by gender or academic qualification is consistent with (Ravi & Besharat, 2025), who found that educators' attitudes toward e-learning adoption are generally shaped by institutional context rather than demographic variables. The slightly higher mean score among lecturers with master's degrees suggests greater openness among relatively younger or more recently trained academics. This observation aligns with (Okpaluba, 2025), who noted that younger educators tend to be more adaptive to digital innovations in teaching and assessment. In contrast, students' perceptions were influenced by gender and age. Female students exhibited more positive attitudes toward online assessment than male students, who observed that female learners often report greater engagement and adaptability in digital environments. Age-related differences, with the youngest (16–20 years) and oldest (31+ years) students showing more favourable perceptions, may reflect differing levels of technological fluency and academic maturity. Similar findings by suggest that exposure to technology and active learning

experiences enhance acceptance of digital tools.

Finally, the study reinforces concerns about the limitations of traditional online assessments particularly multiple-choice and true/false formats in evaluating complex, process-oriented tasks. This is consistent with the work of who argue that such methods fail to capture students' procedural knowledge, critical thinking, and laboratory skills essential in science education (Taconis & Bekker, 2023; Bou Saad et al., 2025). Consequently, there is a growing need for blended assessment models that combine online and practical components. This recommendation aligns with who emphasize that authentic assessment must mirror real-world practice. Similarly, caution that while electronic assessments provide scalability, they must be complemented with face-to-face evaluations to ensure validity and fairness.

Conclusion

The integration of digital tools in higher education has raised questions about their efficacy in practical-heavy science courses. This study aimed to evaluate the perceptions of lecturers and students in South-East Nigeria regarding online assessment in offline science curriculum. The findings reveal that both stakeholders hold a positive outlook on digital assessment, recognizing its usefulness despite its limitations in evaluating hands-on psychomotor skills. While no significant difference was found between lecturers and students, individual factors such as gender and age significantly influenced student perceptions, with younger and female students showing higher acceptance. These results imply the need for a balanced "blended assessment" model that combines digital convenience with practical rigor. While the study provides a snapshot of the South-East zone, its reliance on survey data remains a limitation. Future research should adopt mixed-methods approaches to explore the actual technical barriers faced during practical science assessments and extend the investigation to other geopolitical zones to ensure a more inclusive digital strategy in Nigerian science education.

Conflicts of interest

The author declares that there are no conflicts of interest related to this research.

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Author contributions

Amaka C. Okoye: Conceptualization; Methodology; Software. **Ijeoma J. Chikezie**: Data curation; Writing-Original draft preparation. **Ijeoma J. Chikezie** and **Amaka C. Okoye**: Visualization; Investigation. **Amaka C. Okoye**: Supervision. **Amaka C. Okoye**: Software; Validation. **Ijeoma J. Chikezie** and **Amaka C. Okoye**: Writing-reviewing and editing. All authors have read and agreed to the published version of the manuscript.

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