# Digitalising Educational Assessments in a Nigerian University: An Examination of Undergraduate Students' Digital Behaviours and Experiences

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**Abstract:** This study investigated whether undergraduate students' cognitive experiences of using digital devices influenced their behaviour towards the conduct of e-assessment in Nigerian universities. It also examined if students' experiences of digital space in various ways using different platforms significantly influences their behaviour towards the conduct of e-assessment in Nigerian universities. The investigation was for the purpose of improving the assessment process and removing barriers that impede digital assessment in Nigerian universities. Ex-post-facto research design was adopted in the study. The sample consisted of an intact class of 280 Part 3 undergraduate students selected from a public university in Jigawa state during the 2020/2021 academic session. A self-developed instrument tagged: "Digital Learning and Assessment Questionnaire (DLAQ)", was used to collect data. Data were analysed using Pearson Product Moment Correlation and Chi-Square ($\chi^2$) statistics. Also, percentile analysis was done using simple percentage statistical method. The results revealed that students' digital experiences significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities. Also, students' digital experiences significantly influenced their perceived efficiency of e-assessment delivery in Nigerian universities. Further, students' experiences of digital space in various ways using different platforms significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities. It was concluded that the need for fair assessment of undergraduate students becomes imperative through digital devices. Thus, the heterogeneity of student digital experiences raises some key considerations for Nigerian universities to rethink practices and to adopt diversified approaches to assess and examine their students.

**Keywords:** Digitalisation, Educational Assessment, Undergraduate Student, Cognitive Experience, Behaviour.

## INTRODUCTION

As the COVID-19 pandemic played out, Nigerian universities shifted to e-learning to allow classes to flourish as students complete their studies. The large majority of the Nigerian universities used digitalisation for classroom engagement and for maintaining pedagogical relationships with their students. The COVID-19 pandemic, which saw universities worldwide migrate many of their learning activities to online, awakened the university management to haste their digital education strategies to digital campus as a necessary alternative to in-person teaching, learning and assessment delivery (Ibrahim & Hudu, 2020).

As the COVID-19 pandemic has forced most universities in the country into using online classes, to make the adjustment, universities adopted technology-based media such as Zoom, Google, or Blackboard Collaborate, at their various campuses to teach, assess and examine their students. Thus, the use of Information Communication Technology (ICT) has become the tradition in public and privately-owned universities in the country. For example, ICT apps/media like WhatsApp, Zoom, Google Meet, Webinar, and Telegram, are some of the digital tools used for academic purposes on campus. This shows that Nigerian universities have swiftly adopted e-learning, as students were integrated into a hitch-free academic culture that ensures that the COVID-19 pandemic did not stunt the academic activities on campuses (Ibrahim, 2022).

Nonetheless, a plausible threat that existed relates to the use of digital apps and media for conducting students' assessments amidst the pandemic, especially where there is a tendency to perpetuate examination malpractices as well as other academic frauds by undergraduates online. There are serious privacy concerns over the use of algorithms

by Google, Facebook, and Zoom in invigilating exams and conducting continuous assessment, hence the need to explore and discover new innovative online assessment strategies and how to manage academic integrity in the online learning world instead of traditional invigilated examinations (Ibrahim & Iliyasu, 2021).

Noteworthy, digitalizing learning tools has made possible different e-learning assessment strategies which includes ways of assessing students, teachers and all university-based educational programmes (degrees). According to Adarkwah (2020), assessment should respond to more modern Information Communication and Technology (ICT) developments like on-screen assessment designs, e-marking, e-banking of examination questions for use, e-shuffling and reshuffling of examination questions for producing different sets of the same examination.

Bennett (2012) argues that the "incorporation of technology into assessment is inevitable" (p.14). Indeed, Bennett (2012) goes on to acknowledge that "it is similarly inevitable that incorporation will not be easy" (p. 16). Also, the are challenges and threats that digitalization of academic activities brings, as well as in its use for assessment. Hence, assessment with the use of digital technologies provides immediate feedback, potentially increases learners' autonomy, agency and self-regulation, support for collaborative learning, provides authenticity, widens the range of measurement, flexible and appropriate responses, increases efficiency and reduces lecturers' workloads, improves student's performance, integrates formative and summative assessment, improves assessment validity and reliability (Whitelock et al., 2006; Pellegrino & Quellmalz, 2010; Winkley, 2010).

On undergraduate students' digital behaviour and experiences, Ibrahim (2021) affirmed that students are struggling with a tremendous overload of information covering everything from studies to well-being over a plethora of platforms such as Learning Management Systems (LMS) and social media sites. Additionally, students have been experiencing the digital space in a variety of ways and using different platforms, thus showing diversity in their behaviours and experiences. Further, Mbodila et al. (2014) observed that students love digital and online engagement and would all take to online or remote education easily. What institutions

have learned in the last two years is that the diversity of students' digital experiences needs to be recognised if higher education wants to engage successfully with new generations of students in the digital environment. In particular, an institution's digital engagement has to be designed and scaffolded as students need to be shown how and where to get information and how to engage online, recognising that there is a diversity of experiences and digital literacies.

Ibrahim and Iliyasu (2021) examined the perceived conduct of e-assessment of undergraduate courses in Nigerian universities and compared access to e-assessment among undergraduate students in universities in the country. The results showed that there existed a significant difference in students' perception of the conduct of e-assessment in Nigerian universities. Also, there was a significant difference in access to e-assessment among undergraduate students in the universities. Further, a significant relationship existed between e-assessment-based accountability and test fairness in the conduct of e-assessment in Nigerian universities. The study concluded that improper conduct of e-assessment forms a major threat to the fairness and validity of online assessment of students.

Likewise, Oladele et al. (2021) studied the prospect of online instructional delivery amongst undergraduates of the University of Ilorin, Nigeria. The results showed that a Google Classroom held prospects for innovative instructional approach for university undergraduates' learning. Specifically, the findings showed a statistically significant challenges of using Google Classroom as an innovative learning approach such as undergraduate students' need for assistance in commencing Google Classroom, in turning in assignments, ease of Google Classroom, slow network connection, high cost of Internet, erratic power supply, and difficulty in connecting to the Internet and cost of devices.

Similarly, Ibrahim and Yakasai (2021) investigated whether undergraduate students' use of academic social media networking sites influence their perceived creative and innovative capacity. They also examined if undergraduate students' use of academic social media networking sites had an influence on their perceived cognitive playfulness and creativity-enhancing practices. The results revealed that there was a significant influence of

undergraduate students' use of academic social media networking sites on their perceived cognitive playfulness and creativity-enhancing practices amongst undergraduate students. It was concluded that if undergraduate students' use of social media is limited to a specific academically inclined social networking sites there is a tendency that a higher level of creative and innovative capacity could be exhibited by students in the University.

As a delineation from above Okoroafor (2020) stated that the quick shift to e-learning and teaching laid bare the gaping digital divide amongst countries and institutions themselves. While some universities were able to embrace this evolution and use the opportunity to strengthen their digital learning curricula, it highlighted major discrepancies in digital access and digital usage. Thus, the digital gap challenges meant that many universities in low-income countries struggled to put in place quality digital education programmes. As a result, millions of students all over the world have suffered learning loss and emotional distress.

Almost immediately, however, the efficiency of assessment delivery to student communities was called into question. Nigerian universities started to realise that the diverse student body was engaging with the digital environment in different ways. Hence, the need for fair assessment of undergraduate students becomes imperative through digital devices. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020), fair assessment is the assessment in which students are given equitable opportunities to demonstrate what they know, and should serve the interests of individual student, the school and wider society.

In the same vein, the National Academy of Education (NAEd) (2021) postulated that fair assessments are sensitive to the design, development, and delivery of the e-assessment results., hence the need to implement equitable e-assessment in Nigerian universities. Thus, equitability in the sense that students are assessed using methods and procedures most appropriate to them. A fair assessment should not discriminate between learners, except on the grounds of the ability being assessed, especially in the high-stakes examinations like university examinations, which are expected to be standardized. According to Ibrahim (2018), test fairness is a crucial issue in e-assessment because one of the important factors, which should be considered in ensuring the validity of any test, is the issue of fairness and equity. Therefore, this study sought to establish the direction of the pull and push of the relationship between undergraduate students' digital experiences, their perceptions of the efficiency of e-assessment delivery, and the behaviour of Nigerian universities in conducting e-assessments. Toward this end, this study will offer the university management and community the opportunity to understand how best to use technology to address challenges associated with learning and assessment. This is because the COVID-19 crisis has necessitated the need to adopt new ways of promoting learning and assessment among undergraduate students. During this period of digital learning, lecturers are being challenged to find other ways of tracking how much their students understand. The limitations they are facing now could open the door to more meaningful ways of assessing students' progress even when in-person classes resume.

**OBJECTIVES OF THE STUDY**

The study investigated whether undergraduate students' cognitive experiences of using digital devices influence their behaviour towards the conduct of e-assessment in Nigerian universities. In order to achieve this goal, the specific objectives of this study were to:

1. determine whether students' digital experiences influence their behaviour towards the conduct of e-assessment in Nigerian universities.
2. examine whether students' digital experiences influence their perceived efficiency of e-assessment delivery in Nigerian universities.
3. whether students' experiences of digital space in various ways using different platforms influence their behaviour towards the conduct of e-assessment in Nigerian university.

**RESEARCH HYPOTHESES**

Based on the objectives of this study, three null hypotheses were postulated and tested at 0.05 level of significance.

1. Students' digital experiences will not significantly influence their behaviour towards the conduct of e-assessment in Nigerian universities.

2. Students' digital experiences will not significantly influence their perceived efficiency of e-assessment delivery in Nigerian universities.

3. Students' experiences of digital space in various ways using different platforms will not significantly influence their behaviour towards the conduct of e-assessment in Nigerian universities.

## THEORETICAL BACKGROUND

Digital assessment is imperative in contemporary educational and psychological assessment post-COVID-19. Digital assessment is the use of technology to develop, deliver, score, and analyze examinations. It is also known as e-Assessment, online testing, online assessment, internet-based testing, computer-based testing, and computer-assisted testing (Ibrahim, 2021; Ibrahim, 2022). According to Ibrahim (2022), digitalization of assessment in Nigerian universities refers in this study to any use of digital technology for the purposes of formal educational assessment. Hence, it is known as Technology-Enhanced-Assessment (TEA), E-Assessment (EA), Online Assessment (OA), Computer-Assisted Assessment (CAA), On-Screen-Testing (OST), to mention only a few.

Scholars have suggested that digital-assessment offers traditional assessment practices potential catalysts for change and responds to growing assessment challenges (Whitelock & Watt, 2008). Noteworthy, digital-assessment has made frequent and varied assessment strategies possible in the university system. According to Agu and Joshua (2018), assessment should respond to more modern developments. A key question that universities must address as they develop assessments to measure the undergraduate students' achievement is how best to draw upon cutting-edge assessment methodology while not forfeiting any progress that has been made over the past decades in inclusion and accessibility of assessments for students in the universities. The challenge for both psychometricians and practitioners is how best to use advances in technology and psychometrics to provide accessible assessments to individual undergraduate students while maintaining the validity of inferences based on the scores from the tests they are developing. In this study, we explore the use of technology to increase both the undergraduate students' cognitive

experiences of using digital devices and the accessibility of assessments for individual students in the university. Most of the discussion focuses on the use of digital assessments and how digitizing assessments can help meet the challenges of assessing populations with diverse characteristics and needs, specifically, individual undergraduate students in Nigerian universities.

For instance, Rodríguez-Abitia et al. (2020) proposed a framework to assess the level of digital maturity in universities, based on their ability to provide an appropriate IT infrastructure, collaboration and organizational platforms to integrate processes and people. The ability of universities to attain these objectives is severely restricted by contextual constraints in the political, social, and economic domains.

As demonstrated in this study, a critical impediment to promoting digital assessment is posed by the generational differences between the digital native students and the ICT-adopting faculty, dovetailing to promoting a policy that enables both infrastructure and innovative learning environments to meet the needs of the Industry 4.0 and Society 5.0 eras. Thus, intensive faculty training and awareness development component amongst students are imperative (Balyer, 2018). However, the characteristics of the so-called digital natives have been controversial material for extensive discussion among researchers (Rowlands et al., 2008). An analysis by Rowlands et al., (2008) of what would be defined as the Google generation (born in 1993 or later) concluded that the concept that children of this generation were more web-literate than others could be overturned, since they could not critically assess the information retrieved. They did, however, show greater familiarity with and ease of use of computers and constant connectivity. They, however, are more competent in the use of technology, prefer interactive platforms over passive information consumption, have high expectations of IT, prefer visual information over text, and tend to engage in plagiarism to a greater degree due to copy and paste availability, among many other findings. This assertion is in line with Rodríguez-Abitia and Bribiesca-Correa (2021) study which reported that the so-called digital natives, or the net generation, are acute users of technology, especially the younger ones. Nevertheless, they use technology for informal

purposes rather than academic ones. They are familiar and comfortable with ICTs, but they are not necessarily proficient at their use in different disciplines. They cannot be considered digitally literate only because they grew up in a digital environment (Alvarez et al., 2014).

## METHODOLOGY

### RESEARCH DESIGN

The study adopted an ex-post-facto research design. It is ex-post-facto in that the independent variable (digital assessment) has already occurred as observed by the researchers over time in relation to its influence on undergraduate students' cognitive experience and behaviour in the University. According to Singh and Upadhya (2008), the ex-post-facto research design is a method of teasing out possible antecedents of events that have happened and cannot, therefore, be controlled, engineered or be manipulated by the investigator.

### PARTICIPANTS

The population of the study comprised all male and female Part 3 undergraduate students who registered for their various degree courses during the 2020/2021 academic session in a government-owned university in Jigawa state, Nigeria. There were 1,100 students who registered for their various degree courses during the 2020/2021 academic session in the university. Further, to determine the sample size, Krejcie and Morgan (1970) sampling Table was used. Armed with the sampling frame collected from the selected Departments, there are a total of 1,100 Part 3 undergraduate students as at the time of the study. Thus, Krejcie and Morgan's Table indicates that for a population of 1,100, the sample size would be 280. Thus, the sample comprised 280 Part 3 undergraduate students in the study. The undergraduate students were selected from five Faculties in the university using simple random sampling procedure. From each of the Faculties, two Departments were selected using simple random technique. From each of the selected Departments, stratified random sampling method was employed to select a total of 28 Part 3 undergraduate students totaling 280 across the five Faculties, using sex and level of educational attainment as strata. The undergraduate students were selected from 2 Departments in each of the five Faculties making a total of 10 Departments. 14 male and 14 female undergraduate students were selected from each of the randomly selected Departments making a total of 28 Part 3 undergraduate students per Faculty. This was done to balance gender difference and to ensure gender equity. Thus, a total of 280 consisting of 140 male and 140 female Part 3 undergraduate students were included in the study. Their average age was 26.75 years. Only 260 consisting of 130 male and 130 female Part 3 undergraduate students returned the instrument administered on them. Thus, the return rate was 93%.

Noteworthy, Part 3 undergraduate students were selected because they were considered as middle-levelled students as they have completed a minimum of two years on campus out of 4- or 5-years programme in the university, considered more matured and capable of making decisive judgement on what affect them in the course of their studies than their counterparts at both Parts 1 and 2 levels in the university. Also, Parts 4 and 5 undergraduate students were not considered because they are in their final year of study in the university and so they may not take the study with all the seriousness and attention it deserves.

### RESEARCH INSTRUMENT

A highly structured self-developed instrument tagged: "Digital Learning and Assessment Questionnaire (DLAQ)", was used to elicit information about the influence of the use of digital devices on the cognitive experience and behaviour of undergraduate students. The instrument contained 30 items divided into two Parts - One and Two and rated on a four-point Likert-scale graduated from "Strongly Agree'' to "Strongly Disagree'' agreement about each item/statement. The first part of the instrument (DLAQ) was divided into two sections A and B. Section A elicited students' bio-data such as name of the institution, sex, course of study, faculty, level, e-mail address, mobile phone number, type of digital devices used most often, to mention only a few. Section B comprised of 10 items with each item designed to collectively measure each of the dimensions of digital devices used amongst undergraduate students. The second part of the instrument (DLAQ) was divided into three sections A, B and C. Part Two, Section A consists of 6 items, and measures undergraduate students' digital experiences. Part Two, Section B consists of 9 items and measures undergraduate students' perceived

efficiency of e-assessment delivery. Also, Part Two, Section C consists of 5 items, and measures undergraduate students' behaviour toward the conduct of e-assessment in Nigerian universities.

### VALIDITY AND RELIABILITY OF THE INSTRUMENT

The face and construct validity of the instrument were established through subjecting items to expert judgments of five experts. Two of these experts were Tests and Measurement experts, while the remaining three were Educational Psychology, Sociology of Education and Guidance and Counselling experts. The experts' judgments revealed that the instrument had adequate face and construct validity. To establish the Content Validity Ratio (CVR), the aggregate of experts' ratings of the 30 items in the instrument (DLAQ) as "essential" in measuring what it purports to measure was put into consideration, and the mean ($\bar{x}$) of the CVR for the 30 items was 0.89. This indicates that the experts' judgments of the instrument was high and that the instrument enjoys high validity.

Consequently, a pilot study was conducted to establish the reliability of the instrument using Split-Half reliability method. This involves the splitting of items in DLAQ into odd-numbered items (x) and even-numbered items (y) separately respectively. This procedure provides two scores for each participant and were later correlated to provide a measure of internal consistency and reliability. The reliability correlation coefficient index observed for each section of the questionnaire ranged from 0.89 (n = 30; p<0.05); 0.86 (n = 30; p<0.05); and 0.93 (n = 30; p<0.05). All these values were acceptable as appropriately high for the study of human behaviour due to its complexity. Consequently, the instrument

was accepted being stable over time, hence its usage in this study.

### PROCEDURE FOR DATA COLLECTION

The research instrument was personally administered to the respondents by the researchers with the aid of the Research Assistants recruited for the purpose of this study. The Research Assistants were full-time lecturers in their respective Departments in the public university used for the study. A total of 280 questionnaires were administered on the selected sample. Out of these, only 260 questionnaires were returned correctly filled consisting of 130 male and 130 female Part 3 undergraduate students. Thus, a return rate of 93% was achieved.

### DATA ANALYSIS

From the data collected for the study, the mean ($\bar{x}$) scores and standard deviations (SD) were first computed. Afterwards, Pearson product moment correlation statistical method was used to test hypotheses one and two, while Chi-Square ($\chi^2$) statistical procedure was used to test hypothesis three respectively. Also, percentile analysis was done using simple percentage statistical method. Hence, all postulated hypotheses were tested at 0.05 level of significance.

### RESULTS

**Hypothesis One:** This states that students' digital experiences will not significantly influence their behaviour towards the conduct of e-assessment in Nigerian universities. The results of the analysis of the data are presented in Table 1.

Table 1: Influence of Students' Digital Experiences on Their Behaviour towards the Conduct of e-Assessment in Nigerian Universities

| *Variables* | *N* | *Mean Scores* ($\bar{x}$) | *SD* | *r-$_{cal}$* | *p-value* |
|---|---|---|---|---|---|
| *Students' digital experiences* | 260 | 25.61 | 3.87 | | |
| *Students' behaviour to the conduct of e-Assessment* | 260 | 25.01 | 2.90 | 0.816 | p<0.05 |

**\*Significant; df = 258, critical r = .138**

Table 1 revealed that the calculated r-value of 0.816 was significant since it is greater than the p-

value given 258 degree of freedom at 0.05 level of significance. Consequently, the null hypothesis was

disconfirmed. This means that students' digital experiences significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities.

**Hypothesis Two:** This states that students' digital experiences will not significantly influence their perceived efficiency of e-assessment delivery in Nigerian universities. The results of the analysis of the data are presented in Table 2.

Table 2: Influence of Students' Digital Experiences on Their Perceived Efficiency
of e-Assessment Delivery in Nigerian Universities

| Variables | N | Mean Scores ($\bar{x}$) | SD | $r$-cal | p-value |
|---|---|---|---|---|---|
| Students' digital experiences | 260 | 25.61 | 3.87 | | |
| Students' Perception of Efficiency of e-Assessment Delivery | 260 | 24.42 | 3.95 | 0.650 | p<0.05 |

**\*Significant; df = 258, critical r = .138**

Table 2 indicated that the calculated r-value of 0.650 was significant since it is greater than the p-value given 258 degree of freedom at 0.05 level of significance. Consequently, the null hypothesis was disconfirmed. This means that students' digital experiences significantly influenced their perceived efficiency of e-assessment delivery in Nigerian universities.

**Hypothesis Three:** This states that students' experiences of digital space in various ways using different platforms will not significantly influence their behaviour towards the conduct of e-assessment in Nigerian university. The results of the analysis of the data are presented in Table 3.

Table 3: Influence of Undergraduate Students' Experiences of Digital Devices Using Different Platforms on Their Behaviour
Towards the Conduct of e-Assessment in Nigerian Universities

| 8 | Strongly Agree | Agree | Disagree | Strongly Disagree | Total | $\chi^2$-cal | p-value |
|---|---|---|---|---|---|---|---|
| Smart Board | a22(8.5%) 19.98 | a17(6.5%) 16.72 | 6(2.3%) 8.15 | 8(3.1%) 8.15 | 53 | | |
| Google Classroom | 15 (5.8%) 16.96 | 18 (6.9%) 14.19 | 7(2.7%) 6.92 | 5(1.9%) 6.92 | 45 | | |
| Microsoft Teams | 13(5.0%) 16.21 | 16(6.2%) 13.56 | 5(1.9%) 6.62 | a9(3.5%) 6.62 | 43 | 29.36* | p<0.05 |
| Google Meet | 19(7.3%) 16.96 | 10(3.8%) 14.19 | 11(4.2%) 6.92 | 5(1.9%) 6.92 | 45 | | |
| Zoom | a20(7.7%) 14.70 | 9 (3.5%) 12.30 | 5(1.9%) 6.0 | a5(1.9%) 6.0 | 39 | | |

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| Trace Board | 9(3.5%) | 12(4.6%) | 6 (2.3%) | a8(3.1%) | 35 | |
| | 13.19 | 11.04 | 5.39 | 5.39 | | |
| **Total** | **98** | **82** | **40** | **40** | **260** | |

*Significant; df = 15; p<0.05

a = Observed Frequencies ($f_o$) are placed above the Expected Frequencies ($f_e$), while percentile values are in parentheses.

Table 3 showed that 39 respondents constituting 15% of the total sample affirmatively agreed that using a Smart Board as one of digital devices' platforms influenced their behaviour towards the conduct of e-assessment in the universities, but 14 respondents constituting 5.4% of the total sample disagreed. This is followed by 33 respondents constituting 12.7% of the total sample confirmed that using Google Classroom as one of digital devices' platforms influenced their behaviour towards the conduct of e-assessment in the universities, while a handful of the respondents (12) constituting 4.6% of the total sample thought otherwise. Noteworthy, 29 respondents constituting 11.2% of the total sample strongly agreed that using Microsoft Teams, Google Meet, and Zoom, as digital devices' platforms influenced their behaviour towards the conduct of e-assessment in the universities; however, 14, 16, and 10 respondents constituting 5.4%, 6.1%, and 3.8% of the total sample did not agree respectively. Also, 21 respondents constituting 8.1% of the total sample affirmed that using Trace Board as one of the digital devices' platforms influenced their behaviour towards the conduct of e-assessment in the universities, but, a handful of the respondents (14) constituting 5.4% of the total sample disagreed. Further, the results of the Chi-square ($\chi^2$) analysis yielded 29.36. The calculated $\chi^2$-value of 29.36 was greater than the p-value given 15 degree of freedom at 0.05 level of significance. Consequently, the null hypothesis was disconfirmed. That is, students' experiences of digital space in various ways using different platforms significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities.

## DISCUSSION OF FINDINGS

The purpose of this study was to investigate whether undergraduate students' cognitive experiences of using digital devices influenced their behaviour towards the conduct of e-assessment in Nigerian universities. The findings obtained showed that students' digital experiences significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities. Also, students' digital experiences significantly influenced their perceived efficiency of e-assessment delivery in Nigerian universities. Further, students' experiences of digital space in various ways using different platforms significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities.

The findings are in consonance with the earlier ones, which had alluded to the existence of a significant difference in students' perception of the conduct of e-assessment in Nigerian universities (Ibrahim & Iliyasu, 2021). In fact, Ibrahim and Iliyasu (2021); and Ibrahim (2020) reported that students love digital and online engagement and would all take to online or remote education easily. In addition, the diversity of students' digital experiences needs to be recognised if higher education wants to engage successfully with new generations of students in the digital environment. This is because experience has shown that there is no one-size-fits-all approach or platform when engaging with a diverse range of students. Hence, universities' digital engagement has to be designed and scaffolded as students need to be shown how and where to get information and how to engage online, recognising that there is a diversity of experiences and digital prowess. Also, the findings corroborated the discovery of Ibrahim (2020) and Mbodila et al. (2014) in their various reports. Specifically, these scholars in their respective reports indicated that digital devices have the potential to increase students' engagement, which includes undergraduate students' creative and innovative activities. For instance, Mbodila et al. (2014) explained that digital devices significantly increase students' collaboration, knowledge sharing and creative indulgencies. Similarly, Ibrahim and Yakasai (2021) believed that digital devices employment in higher

education improves learning motivation, enhances knowledge sharing and collaborative abilities. Thus, digital devices' usage has the possibility of enhancing student contact as well as improve their participation in assessment activities. Indeed, integrating digital devices into the students' learning process provides them with an opportunity to take control of their learning activities, which in turn boost their confidence.

Likewise, the findings seem to agree with the findings of Adarkwah (2020) and Okoroafor (2020) who respectively discovered that students interact with one another, exchange information about their interests, raise discussions about few topics, and follow news about specific topics on different digital media. Students now use the digital media for most of their daily activities and information gathering as opposed to older generations who used resources like textbooks, TV or newspapers. They concluded that many undergraduate students use the digital devices in interaction with friends, connecting with their classmates for online study, discussing serious academic and national issues as well as watching movies. Again, Okoroafor (2020) discovered that many undergraduate students in Nigeria use digital devices for communication, collaboration, news sharing, knowledge sharing, research, expression of opinion, maintaining a connection, and making friends from other countries. They suggested that Social Networking Sites (SNSs) should be created for educational purposes in order create a balance between social networking and academic activities of students that will encourage creativity and innovation among students.

However, these findings contradicted Oladele et al. (2021); Ibrahim and Iliyasu (2021) who reported a significant difference in access to e-assessment among undergraduate students in the universities. Specifically, Oladele et al. (2021) reported that students had a moderate level of access to Google Classroom for University of Ilorin undergraduates' learning. They concluded that there is a need to improve Google Classroom's level of accessibility to undergraduates to maximise its gains by making efforts to alleviate the challenges militating against smooth access to ensure sustainability in higher education in sub-Saharan Africa. This means that digital media have both positive and negative impacts on the students' academic performance. With so many social networking sites displayed on

the internet, students are tempted to abandon their assignment and reading schedule in preference to chatting online with friends. This is in addition to some who are now addicted to the online rave of the moment with Facebook, WhatsApp, Twitter and so on.

A likely reason for the findings of this study obviously is that current university students grew up in the technology era and digital media is now just part of students' daily routine. Despite spending time on digital media, students are still efficient enough in their studies. Nonetheless, the digital divide has been one of economic distribution as much as anything else. There are places where internet penetration is as little as 30 percent, and students who went home to regions where penetration was insufficient had to stop studying. This has been catastrophic for large groups of students in Nigeria. Suffice to say that digital technology is helping undergraduate students to be better informed by accessing information about anything at anytime and anywhere. Digital media exist to provide communication among undergraduate students regardless of the distance, making it easy for students to share information, files, pictures, videos, create blogs, send messages and conduct real time conversations that could spur creative experiences and innovative behaviour.

**CONCLUSION AND RECOMMENDATIONS**

The findings of this study are that students' digital experiences significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities. Also, students' digital experiences significantly influenced their perceived efficiency of e-assessment delivery in Nigerian universities. Whereas, students' experiences of digital space in various ways using different platforms significantly influenced their behaviour towards the conduct of e-assessment in Nigerian universities. Thus, the following recommendations are proffered: The researchers of this study advocate for the building of a more inclusive, engaging and internationalised digital environment for all undergraduate students in Nigeria. The heterogeneity of student digital experiences raises some key considerations for Nigerian universities to rethink practices and to adopt diversified approaches to assess and examine their students. It is imperative that Nigerian universities attend closely to the cultural and lived experiences that impact how students from diverse digital backgrounds interact

and engage in the online space. Based on the insights provided in this study, we recommend that the online strategies of universities need extensive auditing to ensure that there are no further assumptions that all students will effectively find information and resources as long as they are online. Nigerian universities should be aware that the potential for new interactions will continue to be limited if these digital experiences are not carefully designed, curated and shared with undergraduate students. Beyond the classroom, the digital space is particularly important for undergraduate students' socialisation, as well as for their soft skills and identity development and well-being.

## REFERENCES

Adarkwah, M. A. (2020). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. Education and Information Technologies, 2(6), 1-21. https://doi.org/10.1007/s10639-020-10331-z.

Agu, N. N., & Joshua, M. T. (2018). Research and innovations in educational assessment. In M.T. Joshua (Eds.), Research and innovations in Nigerian education (pp.353-368).Nigerian Academy of Education (NAE) Press.

Alvarez, G., Roig, A.E., & Lopez. M. (2014). A critical view of digital natives: Analysis of formal student uses of ICT. Research Quarterly, 9(2), 1-19.

Balyer, A. (2018). Academicians' views on digital transformation in education. International Online Journal of Education and Teaching, 5(1), 809-830.

Bennett, R. E. (2012). Inexorable and inevitable: The continuing story of technology and assessment. Journal of Technology, Learning and Assessment, 1(1), 118-132. http://ejournals.bc.edu/ojs/index.php/jtla/article/view/1667/

Ibrahim, A. (2022). Education quality assurance in the new normal era: A perspective on the implementation of technology-enhanced-assessments in Nigerian universities. In O. Olukolade & A. Oni (Eds.), Book of readings (pp.121-134). Higher Education Research and Policy Network (HERPNET). www.herpnet.org.ng.

Ibrahim, A. (2021). Investigating educational significance of e-learning in Nigerian universities post -COVID-19: Implications for assuring quality e-assessment. E-Journal of Education, 9(1), 207- 218. https://worldconferences.net.

Ibrahim, A. (2018). Improving assessment and evaluation skills of public-school teachers in Jigawa State. Journal of Education and Practice, 9(11), 22-32. www.iiste.org.

Ibrahim, A., & Hudu, S. (2020). COVID-19 pandemic: The exigency of e-learning and challenges in Nigerian public and privately -owned primary and secondary schools. In A.O. Ekong, S.M. Usen, & E. N. Essien (Eds.), Developing alternative teaching: Continuity plans to move classrooms online at Covid-19 era in Nigeria (pp.217-227). Benchmark Educational Services.

Ibrahim, A., & Iliyasu, A. (2021). E-assessment, inequity and accountability in the new normal era and beyond in Nigerian universities. Journal of Digital Learning and Education, 1(3), 158-166. https://doi.org/10.52562/jdle.v1i3.277

Ibrahim, A., & Yakasai, M.I. (2021). Influence of social media networking sites on creative and innovative behaviours of undergraduate students in a Nigerian university. Kano Journal of Educational Psychology, 3(1), 116-124. www.kjnisepjournal.com

Krejcie, R.V., & Morgan, D.W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(4), 607-610.

Mbodila, M., Isong, B., & Muhandji, K. (2014). The effect of social media on student's engagement and collaboration: A case study of University of Venda using Facebook. Journal of Communication, 5(2), 115–125.

National Academy of Education (NAEd) (2021). Educational assessments in the COVID-19 era and beyond. NAEd Forum Series. naeducation.org

Oladele, J.I., Koledafe, O.S., & Daramola, D.S.(2021). Prospects for online instructional delivery using google classrooms: Implications for higher education in sub-Sahara Africa. Journal of Digital Learning and Education, 1(3), 1-17. https://doi.org/10.52562/jdle.v1i3.227

Okoroafor, B.O. (2020). E-Assessment, uses and implementation challenges in higher institutions in Nigeria. Jigawa Journal of Multidisciplinary Studies, 3(2), 1-11. https://jjms.com.ng/index.php/jjms/index

Pellegrino, J. W., & Quellmalz, E.S. (2010). Perspectives on the integration of technology and assessment. Journal of Research on Technology in Education, 43(2), 119-134.

Rodríguez-Abitia, G., & Bribiesca-Correa, G.(2021). Assessing digital transformation in universities. Future Internet, 13(52), 1-17.https://doi.org/10.3390/fi13020052

Rodríguez-Abitia, G., Martinez-Perez, S., Ramírez-Montoya, M.S., & Lopez-Caudana, E. (2020). Digital gap in universities and challenges for quality education: A diagnostic study in Mexico and Spain. Sustainability, 12(2), 1-14. doi:10.3390/su12219069.

Rowlands, I., Nicholas, D., Williams, P., Huntington, P., Fieldhouse, M., Gunter, B., Withey, R., Jamali, H.R., Dobrowolski, T., & Tenopir, C. (2008). The google generation: The information behaviour of the researcher of the future. doi:10.1108/00012530810887953.

Singh, Y. K., & Upadhya, B. (2008). Advanced educational psychology. APH Publishing Corporation. United Nations Educational, Scientific and Cultural Organization (UNESCO), (2020). COVID-19 education response: How many students are at risk of not returning to school? Advocacy Paper, 6-8. Whitelock, D., & Watt, S. (2008). Reframing e-assessment: Adopting new media and adapting old frameworks. Learning, Media and Technology, 33(3), 151-154.

Whitelock, D., Ruedel, C., & Mackenzie, D. (2006). E-assessment: Case studies of effective and innovative practice. University of Derby Press. http://www.jiscinfonet.ac.uk/InfoKits/effective-use-of VLEs/resources/roadmap fore-assessment Winkley, J. (2010). E-assessment and innovation. emergingtechnologies.becta.org.uk