



# Trends and challenges of higher education in Nigeria: Fine and applied arts technological literacy

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## Abstract

Digitisation has transformed art education. This study examines the trends and challenges faced by higher education art lecturers in fine and applied arts (FAA) in Nigeria, focusing on technological literacy—specifically, the availability, accessibility, and usability of digitised teaching and learning tools. A technology-based theoretical framework, namely van Dijk's (2005) resource and appropriation theory formed the theoretical framework. This qualitative study was conducted at two higher education institutions in Lagos State, Nigeria. Data were collected from 20 student teachers and four FAA lecturers through semi-structured interviews, focus group discussions, and classroom observations and analysed by generating themes. The findings suggest that FAA lecturers are guided by their technological literacy—creating pathways for digital usage and access for teaching and learning. The study could encourage curriculum planners to develop policies that advance technological literacy that meet the needs of art education in a global society.

**Keywords:** fine and applied arts (FAA), technological literacy, higher education art education, art teacher education, challenges in art education

## Introduction

The Covid-19 pandemic disrupted all aspects of the social, economic, and technological spheres within higher education (Pelletier et al., 2021), and the widespread adoption of hybrid teaching and learning models using digitised tools illuminated the inequalities across contexts

(Dlamini & Reikai, 2022; Gumbo, 2023; Sarker et al., 2019). Most best practices were adopted in resourced contexts, and the transformation of classroom learning environments within under-resourced contexts varied with location, resourcing, staffing, qualifications, training, and organisational structures (Ranerup, 2023; Sarker et al., 2019). These variables influenced the culture of teaching and learning with digital tools alongside the roles and responsibilities of the lecturers and students in higher education institutions (Alnagrat et al., 2022; Glover et al., 2018; Gumbo, 2023). Most studies have focused on the transformation and assimilation of digitisation using information communication technology (ICT) in teaching and learning in resourced classroom learning environments (e.g. Faloye & Ajayi, 2021; Moll et al., 2022; Pelletier et al., 2021; Timotheou & Hennessy, 2021) and few on under-resourced learning environments (e.g. Jantjies, 2020; Jones & Bridges, 2016). This study will explore technological literacy in low-resourced higher education classroom learning environments, and the availability, accessibility, and usability of ICT in Nigeria.

## Background and rationale

Higher education institutions (HEIs) are going through a significant change as they adjust to the demands of pedagogies using ICT (Borrero, 2013; Glover et al., 2018; Pratt et al., 2018; Telukdarie & Munsamy, 2019). ICT encompasses a range of technological components such as computers, software, networks, and satellite linkages (Glover et al., 2018; Pelletier et al., 2021). These components enable individuals to engage in many activities in ways that were previously not possible (Alnagrat et al., 2022). Infrastructure, teacher motivations, innovations, and e-pedagogies interact dynamically to determine the extent of ICT usage (Republic of South Africa, 2004). Furthermore, disparities in connectivity and access to resources exacerbate the digital divide (Dlamini & Reikai, 2022; Gumbo, 2023; Sarker et al., 2019). Most best practices are adopted from resourced contexts (Borrero, 2013; Hansson & Holmberg, 2003; Harris, 1998) and under-resourced contexts have not been extensively studied (Cross & Adam, 2007; Molotsi et al., 2023; Ranerup, 2023; Sarker et al., 2019). Networked ICTs at HEIs should enable students to access resources at three levels (Cross and Adam, 2007). Firstly, students should be able to access information through wireless network-based resources. Secondly, they should have access to learning management systems. Lastly, they should be able to access peripheral platforms through the use of ICT software. Thus, access and availability, especially in low socioeconomic contexts, have a critical role in determining educational prospects by promoting a culture of pedagogy and knowledge acquisition, and facilitating the development of technological literacy (Chigona et al., 2014; Jantjies & Joy, 2016; Molotsi et al., 2023).

A transformative driver to promoting technological literacy is the volition of the lecturer (Collier-Reed, 2006), and an increased adoption of social media platforms, especially by fine and applied arts (FAA) lecturers, could facilitate deeper and more meaningful teaching and learning (Carayannis & Morawska-Jancelewicz, 2022).

## Problem statement

Nigeria's government has been accused of mismanaging funding, resulting in a lack of advancement in higher education (Ogunode et al., 2022; Ololube et al., 2016). The government only allocates 13% of its budget to education, contrary to UNESCO's 26% recommendation (Ogunode et al., 2022; Ololube et al., 2016; Viatonu & Muse, 2022). Technology and technological literacy are crucial in Nigeria's FAA context because these are widely used for instruction. Therefore, a pedagogical strategy centred on technological literacy is needed to enable lecturers to teach quickly and effectively, and for students to easily grasp learning materials and ideas (Luckay, 2022), especially in low-resourced HEI learning environments—the focus of the current study.

## Aims, objectives, and research questions

The overall aim of this study was to explore, describe, analyse, and compare how FAA lecturers in two HEI contexts in Lagos State, Nigeria, created pathways to ICT availability and its usage in the teaching of pre-service teachers. The research objective was to explore the technological literacy of lecturers teaching final-year arts and design education students at two higher education institutions in Lagos State, Nigeria. Thus, the main research question was:

- To what extent do arts and design lecturers' levels of technological literacy align with their ICT usage in teaching and learning?

The sub-questions were:

- a) Does access to ICT support lecturers' uptake of technological practices in the arts and design education classroom?
- b) How frequently do lecturers promote technological literacy by using ICT when teaching arts and design education?
- c) What are the teaching and learning challenges faced by arts and design education lecturers when using ICT in classroom pedagogy?

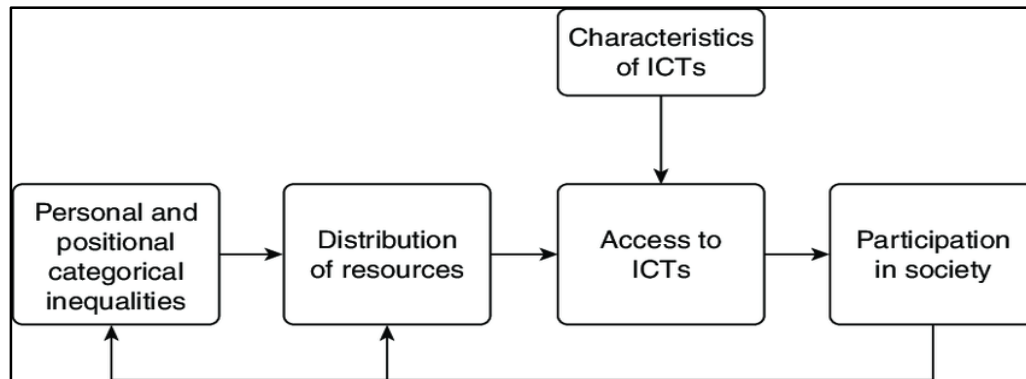
## Theoretical framework

A theoretical model to guide technological literacy for pre-service teachers in teacher education is necessary. This model should provide improved capacity for teachers given that they often face external requirements for their performance and their students' performance (Dlamini & Rekai, 2022; Kimmons & Hall, 2017; Kimmons & Johnstun, 2019). To promote technological literacy, ICT technology integration models should emphasise realistic access to technologies rather than broad concepts or unrealistic technological requirements (Borrero, 2013; Glover et al., 2018; Moll et al., 2022; Pratt et al., 2018). The closest model to combining the technological literacy of the lecturer with ICT usage is van Dijk's (2005)

resources and appropriation model (RAT). The RAT model identifies three educational uses of ICT, namely, replacement, amplification, or transformation and shows the connections between four social elements: categorical inequalities, resource distribution, access to ICT, and participation in society (van Dijk, 2005), as indicated in Figure 1 below. It is a theory useful for examining the use of digital tools amidst a lack of resources in a country like Nigeria.

**Figure 1**

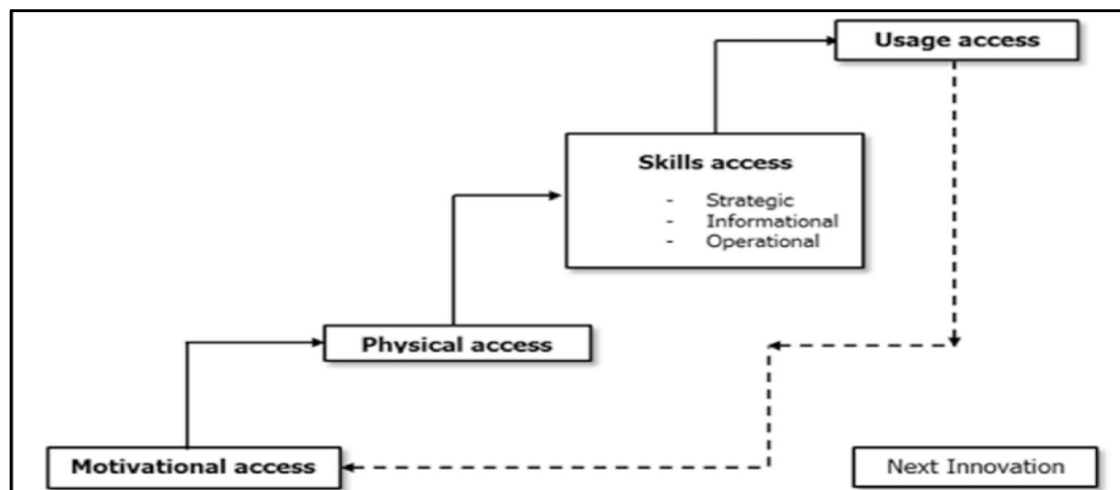
A causal model of resources and appropriation theory (van Dijk, 2005, p. 15)



Van Dijk's (2005) model suggested that societal inequalities lead to unequal distribution of resources, resulting in unequal access to ICT resources. He identified four types of independent access: motivational, physical, skills, and usage access. Usage access refers to people's use of, or interaction with, digital tools (involving hardware, software, or content) that support or oppose access (Tuslime et al., 2019), as shown in Figure 2 below.

**Figure 2**

Successful access to digital technology (van Dijk, 2005, p. 22)



And, van Dijk (2005) affirmed that usage access can be described in terms of actual use, usage time or frequency, usage diversity, broadband use, and creative use. This study explored usage access in higher education for the FAA lecturers, focusing on physical access, usage time, usage diversity, broadband use, and creative use. Physical access includes

hardware, software, and the internet, whereas usage time is related to frequency of use of digital tools. Usage diversity relates to how FAA lecturers use digital tools; broadband use can support new applications and online activities. Creative use relates to users creating digital content, such as websites, blogs, and videos, to enhance the learning experience. Understanding the specific ways and processes in which FAA lecturers use digital technology artistically is crucial for understanding creative use and the dynamic interplay of knowledge in teaching and learning FAA.

## Literature review

There is a lack of empirical data on which to base discourse on technological literacy and digitisation in higher education (Howard & Maton, 2011; Kimmons & Hall, 2017; Kimmons & Johnstun, 2019). However, unequal access to digital resources and competencies widens the education gap, impacting both lecturers and students (Dlamini & Ndzinisa, 2020; Dlamini & Rekai, 2022; Mhlongo & Dlamini, 2022). This highlights the need for technological literacy to be practiced within all HEI learning environments, especially those in Nigeria.

### Arts and design education and technology literacy

Technological literacy refers to the ability to use, manage, understand, and assess technology, particularly digital tools (Collier-Reed, 2006). It involves understanding the nature of technology, having the hands-on capacity to interact with gadgets or artefacts, and being able to think critically about technology-related issues (Luckay, 2022). The learning environment must support technological literacy development in order to foster student competencies (Latorre-Coscolluela et al., 2021). Digital tools like computers are the end product of the technological process, and being technologically literate can range from using ICT simplistically without understanding the depth of complexities to engaging with ICT in a more sophisticated way (Collier-Reed, 2006). This level of understanding allows lecturers, such as FAA lecturers in higher education, to distinguish and select appropriate digital tools for FAA teaching and learning.

Often, technological literacy is confused with computer education (Ajayi, 2018; Kola & Azeez, 2023; Okuntade, 2020), but technological literacy goes beyond that (Luckay, 2022). According to Collier-Reed (2006), technological literacy is the ability to use, manage, understand, and assess technology, and Collier-Reed (2006, p. 15) further described the concept as “how one thinks about and interacts with the artefacts of the technological process”—in the case of the current study, ICT digital tools. Furthermore, Luckay & Collier-Reed argued that technology literacy is “understanding the nature of technology, having a hands-on capacity and capacity to interact with technological gadgets or artefacts, and being able to think critically about issues relating to technology” (2012, p. 590). The level of understanding suggests that lecturers, for instance, FAA lecturers in higher education, should have the insight to distinguish and select appropriate digital tools (computer, camera, projector, cell phone, and software like internet/Wi-Fi, Google, Zoom, WhatsApp, email, and CorelDraw) for FAA teaching and learning. These choices occur within learning

environments, and studies have suggested that the learning environment must support technological literacy development to foster student competencies (Latorre-Coscolluela et al., 2021). Artists who actively engage with emerging digital technologies often have a high level of technological literacy (Luckay, 2022). These technologies have led to artistic innovations such as altering media content or the creation of new media. Examples of emerging art forms include databases, internet art, satellite art, and big data. Photography, computer technology, and the use of digital scanners and printers have all influenced contemporary art, which is more scientific than artistic (Samdanis, 2016). However, the greater part of artistic practice is technology engagement, which has played down the perceived originality of artworks. The internet and other technological devices have watered down individual styles—material manipulations and artistic renditions—limiting the originality of artworks.

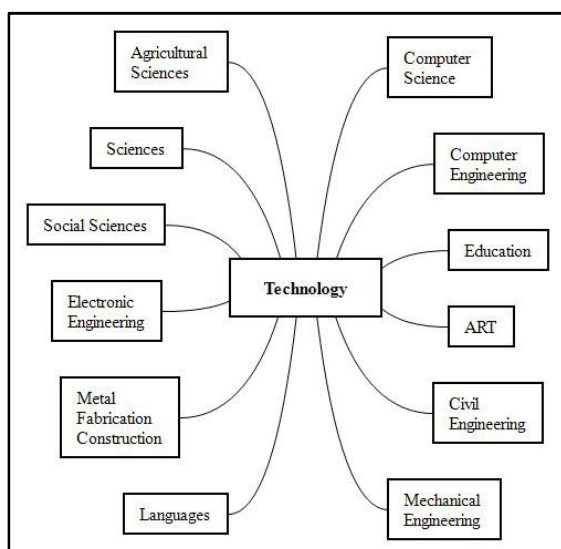
### Arts and design education in Nigeria

Nigeria's government promotes technological literacy among FAA lecturers and students to enhance teaching and learning in higher education. The country's philosophy emphasises unity, harmony, and inter-African solidarity (Daramola et al., 2015). ICT has accelerated consumption in art markets, with emerging technologies infiltrating various aspects of the art ecosystem including conceptualisation, rendition, display, marketing, consumption, and conservation (Kola & Azeez, 2023; Samdanis, 2016).

During the Covid-19 pandemic, FAA lecturers and students emphasised the importance of technological literacy and adaptability in blended teaching and online learning (Ajayi et al., 2018; Okuntade, 2020). The FAA is a practical field that can improve cognitive, affective, and psychomotor domains and lecturers should expose students to various teaching methods to promote in-depth learning (Ghory & Ghafory, 2021), yet they often struggle to integrate ICT into the teacher education curriculum due to limited resources and the complexities of teaching with ICT, as shown in Figure 3.

**Figure 3**

Hybrid technology: Interconnectivity of technology with art and other disciplines, adapted from Ajayi et al. (2018, p. 100).



## Research methodology

This qualitative study utilised a multiple case study design, multiple data sources for triangulation, and a multi-perspective to investigate the impact of ICT on technology literacy in higher education institutions (Creswell, 2006; Heale & Twycross, 2018). A sample of four FAA lecturers and 20 students at two HEIs participated in the study. Both HEIs were teacher training institutions, and will be referred to as HEI A (also referred to as HEI 1) and HEI B (also referred to as HEI 2). They share a unified and standardised curriculum and lecturers come from two pathways, namely, colleges (university educated and theory-driven) and polytechnics (practical-based) that influence their teaching approaches and learning styles. The curriculum offerings are in the subject areas of drawing, painting, sculpture, ceramic design, graphic design, metal design, and photography. Class sizes are often in the ratio of one lecturer to nine students. The age range of the lecturers varied with the age range and years of experience teaching: HEI A (between age 35 and 53 years, experience between 6 and 20 years), and HEI B (between ages of 45 and 60, experience between 10 and 30 years). The gender demographics of the participants were 85 per cent male, 15 per cent female (lecturers) and 90 per cent male, 10 per cent female (students).

The two HEIs were resourced differently with HEI A having access to separate rooms to teach theory and to do practical work, but with limited access to ICT. On the other hand, HEI B had rooms to teach theory but no studio to teach practical work because it had been demolished for renovation. Therefore, the lecturers and students performed their practical drawings of models under a tree, which impacted pedagogic strategies.

The data collection methods used in this research included in-depth semi-structured interviews with lecturers, focus group interviews with students, and classroom observations of lecturers teaching in their classrooms. Lecturers were interviewed face-to-face at both HEI A and HEI B. The lecturers were coded for anonymity (Lecturers A1, A2, B1, and B2). Four lecturers' experiences at the two HEIs, namely, at HEI A (Lecturers A1 and A2) and at HEI B (Lecturers B1 and B2) were unpacked. The lecturers were purposively selected because they taught the art and design programme to the final-year university students. They played an important role in giving insight to their pedagogical strategies in their teaching contexts. All the lecturers used ICT in their classroom practices, in varying degrees. The responses from the participants were audio-recorded and field notes were taken during the observation periods.

Student codes were used to maintain the anonymity of those interviewed. They were labelled Student 1 (S1) to Student 20 (S20). The focus group discussions (FGD) with groups of students (five per group) in both HEIs were conducted to triangulate the interview data and classroom observations. All the participants responded in the focus group interviews (10 students in two groups), coded FG 1 and FG 2. Focus groups facilitated observation of group dynamics, discussion, and clear insight into the participants' behaviours, attitudes, and language. The response rates were 100% for both the interview and focus group data, and

thus were sufficient to analyse and interpret the data, ensuring validity and reliability of the data. This article reports on three data sources, namely, the semi-structured interviews with the lecturers, focus group interviews with the students, and classroom observations of the four lecturers. Non-participant observation was used in the study to ascertain the technological literacy levels of both lecturers and students during the teaching and learning process.

The research was conducted following ethical approval from both HEIs, following all relevant protocols. The participants were aware that participation was voluntary, anonymous, beneficent, confidential, and that they could withdraw at any time. Further, the researchers ensured that informed consent was observed and signed (Creswell, 2006). According to Sharma (2018), data analysis refers to the process of bringing order, structure, and meaning to the collected data. Content analysis was used to analyse the data. Aligned with the RAT model, it enabled analysis of how ICT was regularly embedded into the classroom environment as follows: technology as a replacement, technology as an amplification, and technology as a transformation (Hughes et al., 2006).

## Findings and discussion

This research focused on lecturers' use of ICT in the arts and design classrooms of final year students at two HEIs in Lagos State, Nigeria.

The main themes of the study are as follows:

- Theme 1: Access to resources—the available ICT tools, and available arts and design lecturers using ICT.
- Theme 2: The frequency of ICT usage in the classroom by arts and design lecturers.
- Theme 3: The variety of ICT applications and tools in arts and design education classrooms.
- Theme 4: Challenges to teaching and learning with ICT experienced by arts and design lecturers.

Each theme was unpacked and described with detailed sub-themes in Table 1.

**Table 1**  
Major themes of access, frequency, diversity, and challenges of ICT

No.	Theme	Sub-theme
Theme 1	Access to resources—the available ICT tools and lecturers	Access to resources: physical resources and staff
Themes 2 & 3	The frequency of ICT usage and variety of ICT applications and tools used by arts and design lecturers	Laptop, camera, mobile applications, projector, mobile phone, LCD and digital thermometer



No.	Theme	Sub-theme
		PowerPoint Graphic designing software such as CorelDraw, Photoshop, InDesign, Illustrator Social media, Zoom, WhatsApp
Theme 4	Challenges faced by arts and design education lecturers	Using personal ICT resources Infrastructural challenges: power and electricity challenges Inadequate classroom resources Unsupportive classroom learning environment Damaged tools or parts Lack of staff ICT training

Table 1 shows Theme 1 (access to resources), Themes 2 & 3 (frequency of ICT usage and variety of ICT applications and tools used by lecturers), and Theme 4 (challenges in implementation) together with the sub-themes, which will be analysed and discussed in turn below.

### Theme 1: Access to resources—the available ICT tools and lecturers

The study revealed that lecturers prioritised physical and material access, leading to the appropriation of new ICT technology in HEI 1 and HEI 2. They preferred ICT when the environment supported access, such as computers and internet connections, and when they could use them effectively. Classroom observations revealed that lecturer's response to using ICT during teaching and learning was passively waiting for "Wi-Fi to activate" and that they were not proactive to find an alternative solution. Thus, most would only teach with ICT if infrastructure supported access. They stated the following:

Lecturer A stated: "There is no accessibility to the internet anytime and any day."

Lecturer B added:

When you're talking about digital technology this time around in this sphere of this world, we mean in African generally . . . most of the digital devices that we're supposed to use in teaching or the gadgets that we suppose to apart from the camera phone (that's cell phone) and the digital camera or what have you. We don't really have much digital devices for most of our work for the country for now . . . no teaching . . . That is just it!

The frustration of the lecturers was evident. This impacted the students' teaching and learning given that the students did not appear to experience transformative ICT pedagogies. Or, in order to experience it, FAA lecturers and students spent a significant amount of their own money on digital tools (laptops and mobile phones) and data for internet and Wi-Fi usage. The lecturers further claimed:

I have my personal tools (laptop and cell-phone). The textile unit is not digitalised and the FAA department as a whole. . . . Where there is no constant supply, we cannot use computer effectively. (Lecturer B1)

Where there is no availability of computer that means you cannot operate, that means you cannot do anything. So, there is a limitation. (Lecturer B2)

However, some were self-motivated, and ensured that the students could access ICT pedagogy by using their personal data and devices.

Many students responded as did Student 9, FG 2:

I have to take responsibility for my own learning if I do not have access, and use my own device with my own payment, at my cost.

Both the lecturers and students were aware of the superficial application of technology in their learning spaces, which van Dijk (2005) described as using digital technology as a replacement—very likely because access was controlled by infrastructural ICT access, with little or no support or directives from management or policy to guide implementation.

In HEI 2, the practical work building had been demolished, although the lecture rooms where theory was taught were retained. Practical lessons could not be done in the building because the infrastructure was completely destroyed. Lecturer B2 confirmed that consequently, students were taught their practical courses under a tree. Lecturer B2 claimed:

We now teach under the tree. Now, no studio, like you can hardly reach in a studio now. So, and what have I devised? Ummmm there is a method now, how do I teach now? That's the model, where will the model sit for the student to draw? So, you can now see that, that rather than sitting down, sitting the model . . . or drawing the model for three, four, five hours, it means that at your convenience the students should be able to that either full picture, full photography picture, or maybe Photoshop. That is copy method via technology.

Classroom observations showed that traditional methods of instruction had been the norm prior to the demolition of the building. The offices, classrooms, and studios were not digitalised, thus digital tools were seldom used in HEI 2. Indeed, as Huang and Liaw (2005) suggested, leadership management and policies should provide guidance and support for implementing ICT in transformative pedagogies. This would enhance the range of opportunities offered by digital tools and resources (Gumbo, 2023; Ng'ambi, 2013).

Lecturers' motivation and skills access, linked to technological literacy, drive usage access. Furthermore, more research is needed to understand the connection between motivation and technological literacy for both lecturers and students (Daramola et al., 2015; Luckay, 2022). These results have strong implications for the development of learning environments to support the technological literacy of lecturers, impacting van Dijk's (2005) usage access (number and diversity of applications and usage time). The focus on van Dijk's motivation access at the personal level and the connection to technological literacy for both lecturers and students also requires further research.

### Themes 2 & 3: The frequency of ICT usage and variety of ICT applications and tools used by arts and design lecturers

It was evident from the interviews and classroom observations that usage frequency and diversity in the two HEIs varied. These were explored and unpacked in the themes, usage frequency and usage variety. The diversity of ICT used in both HEIs from the students interviewed, expressed as percentages, were linked to the laptop (27%), camera (23%), mobile applications (15%), projectors (12%), mobile phone (11%), LCD (8%), and digital thermometer (4%). Notwithstanding the diversity and availability of software packages, these were limited to PowerPoint and graphic designing software such as CorelDraw, Photoshop, InDesign, and Illustrator, and social media and meeting platforms, like Zoom.

The majority of lecturers and students used their own laptops, phones, and cameras. All of the students interviewed in the focus groups at both HEIs attested to the use of various digital tools by their lecturers, saying:

Our lecturers use digital camera, computers, phones in teaching photography, use of computer for graphics, electric throwing wheel in ceramics practice and assignment, projectors for class, and apps such as CorelDraw, Photoshop, and YouTube video to teach us art. (FGD 1 and FGD 2)

The data collected for HEI 1 indicated that almost all the FAA lecturers and students claimed to use digital tools often to teach FAA, but when asked how often (numbers of times), some responded "once in a month, once in two months" and so on, or "this justifies occasional use." The lecturers of FAA would become more knowledgeable across a wider range of specialties through ongoing use of digital technology; however, most of them reported occasional use of ICT, as shown in the response below:

But the challenges I think classrooms encounter today, using these tools is that more of the tools should have been available at least to the students and to the lecturers, so I use them occasionally. (Lecturer 2)

All the FAA lecturers and students claimed there was no open access to the internet in their studios, classrooms, and offices, and that the internet was unstable. As a result of unstable access to tools and infrastructural support for using Wi-Fi, neither FAA lecturers nor the students were aware of their precise usage times. Furthermore, none of the lecturers was

observed to be using ICT technology pedagogy meaningfully during the classroom observation. Evidently, most FAA lecturers in HEI 1 and HEI 2 were not creative with using ICT in their teaching and learning, therefore one might argue that ICT integration is at the level of replacement (van Dijk, 2005) for all the lecturers studied. Thus, access, technological literacy, and user motivation level are further factors that limit utilisation.

The data gathered from the HEI 2, Lecturer 2 and FG 2 Student 1 interviews, demonstrated some variability in the usage of digital technologies. For instance, all FAA lecturers and students claimed to have used Google to look up and download information for their teaching and writing tasks. Despite the fact that some students might have intermittent access to the internet, lecturers and students defended their use of the internet by claiming that it offers more up-to-date information on FAA than their on-site physical art books.

FAA lecturers and students face limitations in using digital tools, which limits their ability to effectively teach and learn. Observations revealed that the lecturers used laptops for PowerPoint presentations, and students lack internet access in studios, classrooms, and computer labs, consequently hindering their ability to utilise resources effectively—evident in the classroom observations in both HEI contexts.

The study revealed that lecturers in both the HEI contexts had a simplistic technological literacy. This suggests that lecturers may have limited use of digital resources, leading to a lack of meaningful use in teaching and learning (Altun, 2007; Tuslime et al., 2019). The study showed that unstable internet access restricts FAA lecturers' and students' learning, while social media usage promotes excessive use that does not necessarily culminate in meaningful learning. The findings support previous studies that found the extent to which digital technology was used had exponentially influenced the technological literacy of FAA lecturers (König et al., 2022; Moll et al., 2022; Molotsi et al., 2023). Moreover, in addressing the complex demands of ICT integration in teaching and learning, it is essential for lecturers to explicate and reflect on their pedagogies and tools in planned lectures (König et al., 2022; Moll et al., 2022; Molotsi et al., 2023).

#### **Theme 4: Challenges faced by arts and design education lecturers**

Digital technology enables global classroom access but challenges include personal ICT resources, infrastructural issues, inadequate resources, unsupportive learning environments, damaged tools, and staff ICT training. Good equipment and facilities are crucial for successful implementation (Tuslime et al., 2019). Our findings suggest that the key factors, namely, insufficient facilities, learning more about the technology world, and mastering digital skills are the top challenges cited by respondents, and force lecturers to use personal digital devices for instruction.

HEI 1, Lecturer 2 lamented the personal cost of using ICT in teaching and learning, and pointed out that:

The lecturers provide the digital gadgets themselves or are forced to improvise more so, the gadgets are very expensive. It is the lecturer that will make the arrangements for the use of the gadgets and it is not easy bringing them down to class. The equipment is not made available by the institution neither is the environment made conducive to use such gadgets for teaching the students

Also, the challenge of electricity power failure seriously affected the performance of the members of staff, the students, and the entire institution system most especially in the use of digital gadgets.

HEI 2, Lecturer 2, like all other key participants explained:

Power supply is not constant, it is unpredictable and the cost of providing of alternative power supply such as generator is too exorbitant. There are many activities you can do online either as a lecturer or student this present era, but once there is no stable, regular electricity power supply, you are constrained because you cannot use your gadgets.

Respondents from the focus group discussions also identified various bottlenecks threatening the use of digital technological tools, and these bottlenecks can be viewed as primarily institutional. The bottlenecks are the government and institutional authorities not providing the digital technological tools needed in the teaching and learning of art in HEIs, which leads to their unavailability or insufficiency.

HEI 2 (Student 5) lamented that most of the computers in their art laboratory/studio were spoilt and needed to be repaired or replaced. HEI 1 (Student 3) stated that his school did not have a printing table at the time of the study and HEI 2 (Students 1 to 4) and HEI 1 (Students 1 to 5) stated that lecturers and students often had to use their personal funds to acquire the needed technological gadgets for their classes.

Nigerian HEIs struggle with academic performance, technological literacy, and communication skills in art and design education, despite the policy rhetoric supporting digital technology. Evidently, intervention is crucial to overcome obstacles and improve adoption. It can be argued that the model of van Dijk (2005) did not consider these challenges explicitly, especially for under-resourced environments, and thus we argue that the model be expanded to do so. These results corroborate the findings of others who outlined the challenges of digital access, availability (Dlamini & Rekai, 2022; Jantjies & Joy, 2016) and usage, and the impact on technological literacy (Collier-Reed, 2006).

## Conclusion and recommendations

The RAT model suggests that FAA lecturers often adopt ICT as a replacement for established instructional practices, learners' learning processes, and content goals (Bolujide, 2016; Carayannis & Morawska-Jancelewicz, 2022; Gumbo, 2023; Hughes et al., 2006). However,

this approach often leads to teachers using simple assimilation techniques like note-taking or PowerPoint slides instead of designing authentically engaging tasks for students (Dlamini & Ndzinisa, 2020; Hansson & Holmberg, 2003; Jones & Bridges, 2016; Whewell et al., 2022). This suggests that lecturers seem to lack technological literacy, making them unlikely to be competent mentors for their students.

In Africa, most lecturers lack essential technological knowledge, and need extensive professional development to apply ICT in teaching (Dlamini & Rekai, 2022; Molotsi et al., 2023; Ogunyinka et al., 2015). Therefore, there is an urgent need for professional development to promote technological literacy in FAA lecturers to allow them to fully utilise various ICTs for learning, particularly those that promote deeper learning.

However, the uneven distribution and availability of robust technological infrastructures and networks in the two HEIs have hindered effective promotion of a wide range of technologies for developing information, media, and technology skills (Buabeng-Andoh, 2012; Faloye & Ajayi, 2021; Gudmundsdottir, 2010; Hameed & Hashim, 2022; Ranerup & Henriksen, 2022). It is recommended that systemic solutions support training to build capacity to improve access and usability. Supportive policies involving leadership from managers, better infrastructure, and adequate funding could guide better implementation, and raise levels of technological literacy among students and lecturers. Importantly, students' opportunities to access digital technology in teaching and learning are influenced by the lecturer's motivation and skills, which are related to their technological literacy. Further research is needed to understand the impact of these factors on students' access to digital technologies in teaching and learning.

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