ADOPTION OF EMERGING DIGITAL TECHNOLOGIES IN TEACHING SCULPTURE IN TERTIARY INSTITUTION IN SOUTH-WEST, NIGERIA

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Abstract

This paper examined the adoption of emerging digital technologies in teaching sculpture in tertiary institution in South-West, Nigeria. Three research questions were formulated to guide the study. The study employed descriptive research using survey method. The population consisted of all Fine and Applied Arts lecturer and students in South-West, Nigeria. A total of 312 sculpture lecturers and students in South-West, Nigeria were used as study samples using a purposive sampling technique. Researcher developed questionnaire for data collection. The instrument was validated by three experts and a reliability coefficient of 0.78, 0.84 and 0.76 respectively were yielded through the use of Cronbach Alpha statistic. The data collected were analysed using mean and standard deviation to answer research question one, two and three. The study revealed among others that the influence of the use of emerging digital technologies in teaching sculpture in tertiary institution is very important and meaningful. Based on the findings it was recommended among others that sculpture lecturers in tertiary institution should expose their students to ICT based instructional strategies like Vue to promote students' autonomy to knowledge acquisition, discovery learning and student- centred instructional approach.

Keyboard: Curriculum, Emerging Digital Technologies, Sculpture, Tertiary Institution

Introduction

Lecturers in Nigeria are adopting technologies to teach visuals arts and most students are also familiar with the use of modern technologies like phones, high tech phones, computers and the use of various software packages. The students can benefit from integrating technology in their teaching learning process. Students are exposed to learn various software technologies. There by opening doors through the use of technology in schools. This process allows students exposure to various modern digital arts learning (IGI Global, 2024). Zhang et al., (2023) opined that integration of emerging digital technologies in tertiary institution has the potential to enhance teaching and learning experiences. Within this context, the proficiency of tertiary institution lecturers in adopting and effectively using technologies is a critical factor influencing a successful implementation. The landscape of tertiary education has been transformed by the rapid advancement of emerging digital technologies such as online learning platforms, virtual reality and artificial intelligence. While emerging digital technologies offer new opportunities for engagement, collaboration and personalised learning, the extent to which tertiary institution lecturers are proficient in adopting and using these technologies varies across institutions and individuals (Idhalama et al, 2023).

Sculpture has been in existence throughout the ages. Sculpture has been put to use before the advent of formal education. It is an embodiment of knowledge because it is all about culture, people, time, religion, politics, social life, environment as it affect the people. Sculpture is a three dimensional arts concerned with the group of masses and volumes. The two principal types have traditionally been" free-standing" or sculpture in the round and relief sculpture. Sculpture in the round is one with mass and space in three dimensional formats. This can also be viewed from all sides and stand independently on their own. Relief sculpture is attached to a base and such composition is only being viewed from limited positions around the work (Olurinola et al, 2013). Sculpture is one of the core subjects embedded in Fine Arts in Nigerian school curriculum.

Quora (2024) viewed sculpture as a piece of Fine Arts and memorials or other three-dimensional objects can be distinguished in several key ways, though they may also overlap in some aspects. All the three types of three-dimensional works can possess artistic qualities, Fine Art sculptures are primarily focused on expression and aesthetics, memorials are centered on commemoration and collective memory, and other three-dimensional objects often prioritize

functionality or decoration. Each serves unique roles in culture and society, contributing to the rich tapestry of human expression and experience. Most of the artistic traditions in Nigeria and Africa are sculpture and paintings. Scholars and anthropologists in the field of arts have published numerous books and journals on Nigeria and African traditional arts and culture.

Lac (2024) defined emerging digital technologies are increasingly integrated into sculpture education, impacting both the creative process and the way students learn. While 3D modeling, 3D printing, and digital sculpting are becoming more prevalent, their application in education is often at a foundational level. The use of these technologies allows for greater flexibility, experimentation, and a wider range of possibilities for artistic expression, moving beyond the limitations of traditional materials and spaces. The development of emerging digital technologies had a profound influence on art and design. This trend challenges Fine Arts universities to devise specific solutions for sculpture education programs, equipping students with dig ital technology skills and AI applications in learning and creative practices. Trends in virtual and augmented reality are growing rapidly, increasing demand for experiencing art through technology. This reflects a shift in how the public appreciates art and aesthetic values. The universities update training programs to help students master both traditional tools and emerging technologies on multimedia platforms, enabling them to engage in creative activities.

Znfolio (2022) identified the following software packages for virtual sculpture: Autodesk Maya, AutodestMudbox, Houdini, Cinema 4D, Modo, Autodesk 3Ds Max, Zbrush, Rhinoceros, Substance Designer, Blender, Daz Studio, SketchupFree, Sculptris, Houdinni, Apprentice, Vue, FreeCAD, MakeHuman, OpenSCAD, etc. The acquisition of these alone is not enough but learning how to utilise the software packages is very important. The acquisition and proper technical knowledge of the software packages will enhance productivity. Martin and Johan (2017) observe that education always assures continuity as a matter of fostering creativity and change.

Omoniyi and Oluniyi (2012) expressed that it is the duty of the lecturers to create enabling environment for teaching and learning. The teacher should develop YouTube instructional media that will be used by lecturers to assist students to learn at their own pace. YouTube programme can be used to provide baseline knowledge for all learners. The online media can serve as an alternative to lectures. Lee (2021) asserted that YouTube programme supported technology to deliver learning is the latest trend in e-learning. But virtual often cause artificial learning and

thereby limit sustainability of learning outcomes and even no transfer that is the well-known couch-potato-attitude. Inclusion of emerging digital technologies in the school curriculum will enhance the teaching and learning process.

Musa et al (2018) explained that curriculum is considered the heart of any learning institution which means that schools or tertiary institution cannot exist without a curriculum. With its importance in formal education, the curriculum has become a dynamic process due to the changes that occur in our society. Curriculum innovations involve the introduction of something new in curriculum that deviates from the standard practice, often because society has changed and so must the curriculum. To meet these changes, innovations are created. An innovation must fit in with the goals and objectives of education which usually reflect the needs, interests, values and problems of the society. An innovation must be appropriate, economical in terms of time, space and resources and be aligned with the philosophy of the society and the school and rooted in sound educational theory. Curriculum changes occur because societies have new needs and issues. These changes may be in response to curriculum evaluations or reviews, or the culture. Curriculum may also change in response to economic, social, and political issues as well as access to technology and curricular innovations (Button, 2021).

The curriculum's role in encouraging the use of digital technologies in education is to align digital tools with learning objectives, and to emphasize digital literacy. To integrate emerging technologies into the curriculum, educators must adopt a proactive and forward-thinking approach. Embedding these technologies in your teaching can enhance learning experiences and prepare students for a workforce that will increasingly revolve around new technologies. By acknowledging and, in some cases, embracing these advancements, we can help to equip students with the skills and knowledge needed to thrive and adapt in a workplace that is evolving constantly, significantly (THE, 2024). Funding plays a vital role in the adoption of digital technologies in tertiary institutions, as it provides the resources needed to acquire and deploy these technologies. Funding models may need to adapt to the unique nature of digital education technologies, which often involve a combination of upfront capital and recurring expenses.

TETFUND (2023) opined that the consciousness of the fund for digital technology in elevating educational institutions help its commitment towards promoting and supporting digital literacy and technological integration in public tertiary educational institutions in the country. He

further stated that the emerging massive, unprecedented and irreversible digital transformation taking place in the world has necessitated workforces of tertiary institutions and their graduates to acquire new skill and technologies to accelerate their social and economic development. He stated that the fund has developed various digital literacy initiatives for its beneficiary institutions. These initiatives included support for ICT related procurements requested by beneficiary institutions, digital literacy and capacity development for staff of beneficiary institutions with over 19,000 persons trained and certified as at year 2020, support for e-journals subscription for research and teaching, establishment of a Digitization Project Steering Committee, among others.

Varea (2022) asserted that adoption of emerging digital technologies in the education system has grown exponentially over the past few years. This has created new possibilities, predicaments, and challenges in contemporary society. These technologies have been most prevalent in advanced tertiary institution, but recently, they have reached the most disadvantaged schools around the globe. Many of these schools and teachers rely on emerging digital technologies to assist learners in their education. The pervasiveness and the affordances of digital technologies are transforming the teaching and learning spaces. The boundaries of learning have been extended beyond the brick and mortar through technology-supported instructional activities. The complementary strength between technology-enhanced learning and traditional approaches to teaching is becoming more visible. For example, technology-enabled smart boards are slowly replacing the traditional chalkboards and textbooks in classrooms. Central to this transition are educators, who remain the custodians of classroom pedagogical discourse.

NPHCDA (2025) defined tertiary institution as a post-secondary educational establishment that provides higher education beyond secondary school. These institutions include universities, colleges, technical schools, and vocational training centers, offering a range of programs leading to degrees, diplomas, and other qualifications. FRN (2013) expressed that the goals of tertiary education are to contribute to national development through high-level manpower training; provide accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians; provide high-quality career counselling and lifelong learning programmes that prepare students with the knowledge and skills for self-reliance and the world of work; reduce skill shortages through the production of skilled manpower relevant to the needs of the labour market; promote and encourage scholarship,

entrepreneurship and community service; forge and cement national unity; and promote national and international understanding and interaction.

Statement of the Problem

Emerging digital technologies provide many advantages and opportunities for storing, processing, and sharing information in real-time, disseminating and managing knowledge are critical for value creation. Olofsson et al (2020) worked on the use of digital technology and its conditions with a view to understanding what adequate digital competence may mean in a national policy initiative. The result showed that teachers' adequate digital competence is flexible in meaning, determined by local contextual conditions and enacted in activities and decisions that are based on the teachers' own value frameworks. However, researchers focused on the use of digital technology in a national policy initiative. But not focus on adoption of emerging digital technologies in teaching sculpture in tertiary institution in Southwest, Nigeria.

The introduction of Information and Communication Technology usage, incorporation and diffusion has introduced a new age in educational methodologies, thus has radically changed traditional method of information delivery and usage patterns in the domain as well as offering contemporary learning experience for both instructors and learners. Emerging digital technologies has the potential to hasten, enrich and deepen skills, motivate and engage students in learning; helps to relate school experiences to work places, helps to create economic viability for tomorrow's workers, contribute to radical changes in school, strengthens teaching, and provides chances for connection between the school and the world. Cervetti et al (2009) affirmed that traditionally, teaching activities are always followed in chapters accordingly in the textbook. Under this circumstance, students easily have a passive attitude of learning and hardly enjoy learning and develop independent thinking. Students may not really understand what they have learned and even more unlikely to apply this knowledge in their life experience. Nevertheless, according to previous studies, emerging digital technologies teaching can increase students' motivation and achievement. Hence, the rationale behind carrying out a study on adoption of emerging digital technologies in teaching sculpture in tertiary institution in South-West, Nigeria.

Purpose of the Study

The main purpose of the study was to examine the adoption of emerging digital technologies in teaching sculpture in tertiary institution in South-West, Nigeria. Specifically, the study intend to:

1. examine the influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions.
2. ascertain the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions.
3. determine the role of funding in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions.

Research Questions

The following research questions were answered in this study.

1. What is the influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions?
2. What is the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions?
3. What is the role of funding in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions?

Methodology

The study employed descriptive research using survey method. Three research questions were formulated to guide the study. The population consisted of all Fine and Applied Arts lecturers and students in South-West, Nigeria. Purposive sampling technique was used to select 312 sculpture lecturers and students in South-West, Nigeria were used as sample size of the study. The instrument for the study was researchers designed questionnaire titled “Adoption of emerging digital technologies for teaching sculpture in tertiary institution in South-West, Nigeria. The

questionnaire comprised four section A, B, C, and D. section A consist of information either lecturer or students. Section B of the questionnaire based on the influence of use of emerging digital technologies in teaching sculpture in tertiary institution. Section C based on the role of curriculum in encouraging the emerging digital technologies in teaching sculpture. While section D based on the role of funding in encouraging the emerging digital technologies in teaching sculpture. Section B, C, and D of the questionnaire had four likert- scale of strongly Agreed (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was used for data collection. Three experts validated the instrument and reliability coefficient of 0.78, 0.84 and 0.76 respectively were yielded through the use of Cronbach Alpha statistic. The data collected were analysed using mean and standard deviation to answer research question one, two and three.

Results

Research Question 1: What is the influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions?

Table 1: Mean score of the influence of the Use of Emerging Digital Technologies in teaching Sculpture in Tertiary Institutions

S/No	Statement	Mean	Std. D
1	Emerging digital technologies have increased creativity in sculpture students	3.33	.749
2	Digital technologies have expanded the range of artistic possibilities in sculpture.	3.08	.775
3	The use of digital technologies has encouraged experimentations and innovations in sculpture.	3.01	.860
4	The integration of digital technologies has enhanced the overall quality of sculpture work	2.94	.808
5	Emerging digital technologies have improved technical skills in sculpture students.	2.82	.905

6	The use of digital technologies has facilitated the learning of complex sculpture concepts and theories.	2.75	.902
7	The integration of digital technologies has prepared sculpture students for professional practice.	2.82	.884
8	The use of technologies have enable sculpture students to share and showcase their work.	2.99	.841
9	Digital technologies have facilitated feedback and critique in sculpture classes.	3.11	.813
10	The integration of digital technologies has enhanced the overall learning experiences in sculpture.	3.10	.842
	Grand Mean ($\bar{X}$)	**3.05**	

Criterion mean: 2.50

Table 1 showed the mean score rating of the influence of the use of emerging digital technologies in teaching sculpture in tertiary institution. All items had the mean score that above the criterion mean of 2.50. Emerging digital technologies have increased creativity in sculpture students had the highest mean score of 3.33 with standard deviation value of .749. This was followed by digital technologies have facilitated feedback and critique in sculpture classes had the mean score of 3.11 with standard deviation value of .813, while the use of digital technologies has facilitated the learning of complex sculpture concepts and theories had the lowest mean score of 2.75 with standard deviation value of .902. Conclusively, the grand mean score on the influence of use of emerging digital technologies in teaching sculpture in tertiary institutions was 3.05. Therefore, by using 2.50 as the benchmark, it could be inferred that the influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions is very important and meaningful.

Research Question 2: What is the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions?

Table 2: Mean Score of the Role of Curriculum in Encouraging the Emerging Digital Technologies in Teaching Sculpture in Tertiary Institutions

S/No	Statement	Mean	Std. D
1	Curriculum in our institution effectively integrate digital technologies into sculpture education.	2.86	.910
2	The curriculum provides adequate opportunities for students to learn digital skills relevant to sculpture education.	2.91	.863
3	Our institution provides adequate digital technologies (e.g. 3D printers, laser cutters) for sculpture teacher and students	2.75	.916
4	The digital technologies provided by our institution are easily accessible to all sculpture teachers and students.	2.75	.916
5	The faculty members in our institution are adequately trained to integrate digital technologies into sculpture education.	2.78	.921
6	Our institution provides regular training and support for faculty members to stay updated on the latest digital technologies in sculpture.	2.70	.951
7	The lack of technical support is a significant barrier to the adoption of digital technologies in sculpture education.	2.99	.911
8	The curriculum in our institution is too rigid to accommodate the integration of digital technologies in sculpture.	2.83	.892
9	The integration of digital technologies in sculpture education has improved teachers and students' engagement and motivation.	2.86	.910
10	The integration of digital technologies in sculpture education has created new challenges for faculty members, such as the need for ongoing training and support.	2.90	.882
	Grand Mean ($\overline{X}$)	**2.84**	

Criterion Mean: 2.50

Table 2 showed the mean score rating of the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institution. All items had the mean score that above the criterion mean of 2.50. The lack of technical support is a significant barrier to the adoption of digital technologies in sculpture education was ranked highest with mean score of 2.99 with standard deviation value of .911. This was followed by the curriculum provides adequate opportunities for students to learn digital skills relevant to sculpture education had the mean score of 2.91 with standard deviation value of .863, while our institution provides regular training and support for faculty members to stay updated on the latest digital technologies in sculpture had the lowest mean score of 2.70 with standard deviation value .951. However, the grand mean score for role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions by respondents was found to be 2.84. Hence, using 2.50 as the average benchmark, it can be concluded that the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions by respondents was obvious and well performed.

Research Question 3: What is the role of funding in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions?

Table 3: Mean Score of the Role of Funding in Encouraging the Emerging Digital Technologies in Teaching Sculpture in Tertiary Institutions

S/No	Statement	Mean $\bar{X}$	Std. D
1	Adequate funding is available to support the adoption of digital technologies in sculpture education in South-West Nigeria institutions.	2.69	1.075
2	The lack of funding is a significant barrier to the adoption of digital technologies in sculpture education in South-West Nigeria institutions	3.10	.823
3	The government of South-West Nigeria prioritises funding for digital technologies in sculpture education.	2.59	.934

4	Private organisation and individuals provides sufficient funding to support the adoption digital technologies in sculpture education in South-West Nigeria.	2.67	.971
5	The availability of funding has a significant impact on the adoption and integration of digital technologies in sculpture education in South-West Nigeria.	2.89	.949
6	The lack of funding has hindered the development of digital technologies in sculpture education in South-West Nigeria.	3.09	.829
7	The funding allocated for digital technologies in sculpture education in South-West Nigeria is sufficient to meet the needs of faculty members and students.	2.59	.968
8	The funding for digital technologies in sculpture education in South-West Nigeria is allocated efficiently and effectively.	2.60	.964
9	Government of Southwest Nigeria plans to increase funding for digital technologies in sculpture education in the next 2 to 5 years.	2.61	.928
10	Private organisations and individuals are likely to increase their funding for digital technologies in sculpture education in South-West Nigeria in the next 2 to 5 years.	2.78	.904
	Grand Mean $\bar{X}$	**2.76**	

Table 3 showed the mean score rating of the role of funding in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions. All items had the mean score that above the criterion mean of 2.50.The lack of funding is a significant barrier to the adoption of digital technologies in sculpture education in South-West Nigeria institutions had the highest mean score of 3.10 with standard deviation value of .823. This item was followed by the lack of funding has hindered the development of digital technologies in sculpture education in South-West Nigeria had the mean score of 3.09 with standard deviation value of .829, while the government of South-

West Nigeria prioritises funding for digital technologies in sculpture education had the lowest mean score of 2.59 with standard deviation value of .934. However, the grand mean score for role of funding in encouraging the emerging digital technologies in teaching sculpture by respondents was found to be 2.76. Hence, using 2.50 as the average benchmark, it can be concluded that the role of funding in encouraging the emerging digital technologies in sculpture education by respondents is very important and cannot be underestimated.

Discussions

The result of the findings revealed that the influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions is very important and meaningful. The finding is in line with the findings of Lac (2024) who opined that emerging digital technologies are increasingly integrated into sculpture education, impacting both the creative process and the way students learn. While 3D modeling, 3D printing, and digital sculpting are becoming more prevalent, their application in education is often at a foundational level. The use of these technologies allows for greater flexibility, experimentation, and a wider range of possibilities for artistic expression, moving beyond the limitations of traditional materials and spaces. The development of emerging digital technologies had a profound influence on art and design. This trend challenges Fine Arts universities to devise specific solutions for sculpture education programs, equipping students with dig ital technology skills and AI applications in learning and creative practices. Trends in virtual and augmented reality are growing rapidly, increasing demand for experiencing art through technology. This reflects a shift in how the public appreciates art and aesthetic values. The universities update training programs to help students master both traditional tools and emerging technologies on multimedia platforms, enabling them to engage in creative activities.

Also, the result is in agreement with the findings of Mhlongo et al (2023) who stressed that adoption of emerging digital technologies in the education system has grown exponentially over the past few years. This has created new possibilities, predicaments, and challenges in contemporary society. These technologies have been most prevalent in advanced tertiary institution, but recently, they have reached the most disadvantaged schools around the globe. Many

of these schools and teachers rely on emerging digital technologies to assist learners in their education. The pervasiveness and the affordances of digital technologies are transforming the teaching and learning spaces. The boundaries of learning have been extended beyond the brick and mortar through technology-supported instructional activities. The complementary strength between technology-enhanced learning and traditional approaches to teaching is becoming more visible. For example, technology-enabled smart boards are slowly replacing the traditional chalkboards and textbooks in classrooms. Central to this transition are educators, who remain the custodians of classroom pedagogical discourse.

The result of the study showed that the role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions by respondents was obvious and well performed. The finding support the findings of Musa et al (2018) who found out that curriculum is considered the heart of any learning institution which means that schools or tertiary institution cannot exist without a curriculum. With its importance in formal education, the curriculum has become a dynamic process due to the changes that occur in our society. Curriculum innovations involve the introduction of something new in curriculum that deviates from the standard practice, often because society has changed and so must the curriculum. To meet these changes, innovations are created. An innovation must fit in with the goals and objectives of education which usually reflect the needs, interests, values and problems of the society. An innovation must be appropriate, economical in terms of time, space and resources and be aligned with the philosophy of the society and the school and rooted in sound educational theory. Also, the findings of the study is in line with the findings of Button (2021) who stressed that curriculum changes occur because societies have new needs and issues. These changes may be in response to curriculum evaluations or reviews, or the culture. Curriculum may also change in response to economic, social, and political issues as well as access to technology and curricular innovations. The curriculum's role in encouraging the use of digital technologies in education is to align digital tools with learning objectives, and to emphasize digital literacy.

The findings of the study revealed that the role of funding in encouraging the emerging digital technologies in teaching sculpture by respondents is very important and cannot be underestimated. The findings is in agreement with the findings of THE (2024) which opined that funding plays a vital role in the adoption of digital technologies in tertiary institutions, as

it provides the resources needed to acquire and deploy these technologies. Funding models may need to adapt to the unique nature of digital education technologies, which often involve a combination of upfront capital and recurring expenses.

Conclusion

The influence of the use of emerging digital technologies in teaching sculpture in tertiary institutions is very important and meaningful. The role of curriculum in encouraging the emerging digital technologies in teaching sculpture in tertiary institutions by respondents was obvious and well performed. The role of funding in encouraging the emerging digital technologies in teaching sculpture by respondents is very important and cannot be underestimated.

Recommendations

1. Sculpture lecturers in tertiary institution should expose their students to ICT based instructional strategies like Vue to promote students' autonomy to knowledge acquisition, discovery learning and student- centred instructional approach.
2. Nigeria Certificate in Education (NCE) minimum standards curriculum should be reviewed to incorporate the use of emerging digital technologies.
3. Sculpture lecturers in tertiary institution should work hand in hand with the computer programmers or software developers to develop and come out with relevant ICT-Based instructional packages.
4. Government and Curriculum developers should embrace student-centred learning approach in teaching and learning processes so that instructional strategy like emerging digital technologies will be embraced by all the various stakeholders in the educational sector.

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