APPLICATION OF AI IN TRAINING STUDENT TEACHERS IN FINE ARTS EDUCATION

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ABSTRACT

This study examined the application of Artificial Intelligence (AI) in training student teachers in Fine Arts Education as a strategy for preparing them for effective instructional delivery in a digital age. The paper addressed the need to modernize Fine Arts teacher education in Nigeria, where traditional studio-based instruction continues to limit creativity and technological engagement. The study adopted a conceptual and analytical design based on secondary data from scholarly literature, policy reports, and theoretical discussions published between 2019 and 2025. Using a qualitative content analysis approach, the paper explored how AI tools such as digital design software, virtual art studios, and adaptive learning systems can enhance creativity, teaching competence, and innovation among Fine Arts student teachers. Findings revealed that AI promotes personalized learning, supports digital art creation, and fosters interactive instructional experiences, though its implementation in Nigeria is hindered by inadequate funding, weak digital infrastructure, and limited professional capacity. The study concluded that integrating AI into Fine Arts teacher training is essential for aligning Nigerian education with global standards. It recommended curriculum reform, capacity development for educators, improved infrastructure, and ethical guidelines for responsible AI use in creative learning.

KEYWORDS: Artificial Intelligence, Fine Arts Education, Teacher Training, Digital Pedagogy and Educational Innovation.

INTRODUCTION

The use of Artificial Intelligence (AI) in education has grown rapidly in recent years. AI refers to computer systems that can perform tasks, which usually require human intelligence, such as learning, problem solving and decision-making (Russell & Norvig, 2021). In many parts of the world, AI is being used to improve how teachers teach and how students learn. This development has also affected teacher education, where student teachers are being trained to use digital tools to support learning in their subject areas (Holmes et al., 2022). Fine Arts Education is one of the areas that can benefit from AI. It involves drawing, painting,

sculpture, graphics, ceramics and textile design and so on; all of which depend on creativity and practice. With AI tools such as digital drawing platforms, image generators, and virtual design applications, student teachers can learn new ways of creating and teaching art (Nguyen, 2023). These technologies make it possible to produce, modify, and share art quickly, helping student teachers to understand both the technical and creative sides of Fine Arts Education.

The training of student teachers in Fine Arts has, however, faced many challenges in Nigeria. Problems such as poor funding, lack of digital equipment, and old methods of teaching have made it difficult to prepare student teachers for modern classrooms. Many teacher education institutions still depend on traditional studio teaching, with little use of technology. As a result, Fine Arts teachers often graduate without the digital and creative skills needed in today's schools (Abubakar & Emmanuel, 2020). AI can help to solve some of these problems by making learning more interactive and adaptive. Udi (2024) purports that integration of AI in the delivery of education by media broadcasting has the capacity to turn around and improve the presentation of instructional resources, in such a way that will satisfy learners' needs while ensuring their greater participation and engagement with learning materials during the learning process. For example, AI-powered tools can give instant feedback, support personalized learning, and create visual examples for better understanding (Luckin, 2022). When used in Fine Arts Education, these tools can allow student teachers to explore new creative methods, improve their art-making skills, and prepare better lessons for their future students. However, using AI in teacher education also brings new responsibilities. Teachers must learn how to use these tools properly and ethically. Issues such as copyright, originality, and creative ownership need to be addressed in Fine Arts Education (Nguyen, 2023). The universities that train teachers must also update their programmes to include digital literacy, coding for art, and the responsible use of AI in education (Holmes et al., 2022).

The aim of this paper is to explain how AI can be applied in training student teachers in Fine Arts Education in Nigeria. It discusses how AI can improve teaching and learning in the subject area, the skills student teachers need to acquire, and the challenges that must be addressed. The paper provides a theoretical discussion based on existing views of other scholars adding technology and theories that aligns with Fine Arts Education, at the same time highlighting AI implications and concludes that AI supports and facilitates personalized learning, creativity and acquisition of digital skills, which is trending with global events in innovation. The paper has several recommendations among which includes the fact that Fine Arts Education should be restructured to include AI literacy, not to replace human creativity but tailored to enhance learning.

CONCEPT OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Artificial Intelligence (AI) in education means using computer systems that can think, learn, and make decisions like humans to support teaching and learning. In simple terms, AI helps teachers and students to solve problems faster and more effectively (Russell & Norvig, 2021). AI systems can identify learning patterns, give feedback, and suggest improvements for students. In schools and universities, AI is used in tools like intelligent tutoring systems, language learning apps, and virtual learning platforms that guide students step by step (Holmes et al., 2022).

AI helps teachers by reducing their workload. It can grade assignments, prepare learning materials, and track student progress automatically. This allows teachers to focus

more on creative and personal teaching tasks (Luckin, 2022). For Fine Arts Education, AI can help student teachers use digital brushes, virtual 3D models, and color algorithms to improve their artistic skills. These tools make learning art more interactive and accessible.

FINE ARTS EDUCATION AND TECHNOLOGY

Fine Arts Education includes learning about drawing, painting, sculpture, and design. It trains learners to think creatively and express their ideas visually. However, many Fine Arts programmes in Nigeria still depend on old methods that limit creativity and innovation (Abubakar & Emmanuel, 2020). The use of technology can make Fine Arts Education more engaging and effective. With AI-based tools, student teachers can learn to use virtual canvases, create digital art, and explore new forms of design using computer software (Nguyen, 2023). AI can also support collaboration among art students and teachers. Through digital platforms, they can share artworks, receive instant feedback, and participate in global art communities. This exposure helps student teachers gain confidence and understand modern art trends. As education moves toward digital transformation, the role of AI in Fine Arts Education becomes more important (Holmes et al., 2022).

THEORETICAL FOUNDATION: CONSTRUCTIVIST LEARNING THEORY

The main theory supporting this study is Constructivist Learning Theory. This theory explains that learners build their own understanding and knowledge through experiences and reflection (Piaget, 1972; Bruner, 1996). When AI is used in Fine Arts Education, it provides interactive experiences that allow student teachers to explore, create, and learn by doing. For instance, AI drawing tools can guide students as they practice, helping them learn from mistakes immediately (Luckin, 2022). Constructivism supports the idea that learners are active participants in knowledge creation. AI aligns with this by giving learners control over their creative process. In Fine Arts Education, this means student teachers can use AI to test colors, designs, and techniques independently while still receiving personalized support from the system (Nguyen, 2023). This approach helps them think critically and solve creative problems more effectively.

THEORETICAL FOUNDATION: TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK) MODEL

Another theory relevant to this study is the Technological Pedagogical Content Knowledge (TPACK) model developed by Mishra & Koehler (2006). This model explains that teachers need three types of knowledge: content knowledge (what they teach), pedagogical knowledge (how they teach), and technological knowledge (the tools they use to teach). When these three are combined, teachers can design better lessons that meet modern learning needs.

For Fine Arts Education, TPACK means student teachers must not only understand art techniques but also how to use AI tools to teach those techniques effectively (Mishra & Koehler, 2006). For example, they can use AI-powered drawing applications or 3D design software to teach sculpture, color theory, and visual design. Integrating AI into Fine Arts teacher training ensures that future teachers are well prepared for the digital classroom (Zawacki-Richter et al., 2019).

REVIEW OF RELATED LITERATURE

Artificial Intelligence (AI) has increasingly transformed teaching and learning processes in higher education. Research in recent years emphasizes that AI enables adaptive, student-centered learning environments that respond to individual learner needs. Chen et al. (2020) explained that intelligent systems collect and analyze learning data to recommend suitable instructional materials and feedback patterns, thereby enhancing understanding and learner engagement. The integration of AI in education has therefore become a key component of twenty-first-century teaching reform. Teacher education has also benefited from the introduction of AI technologies. Zhou and Wang (2021) noted that AI-supported training environments provide virtual simulations that allow student teachers to practice instructional methods, classroom management, and pedagogical reflection. These digital environments create opportunities for experiential learning where student teachers build professional confidence before real classroom exposure.

In the domain of Fine Arts Education, AI contributes to digital creativity and visual innovation. Nguyen (2023) highlighted that AI-generated art platforms have expanded artistic expression by translating conceptual ideas into visual compositions through machine learning algorithms. This development allows student teachers to deepen their understanding of composition, form, and design while developing technological competence essential for contemporary art education.

Within the Nigerian context, Fine Arts Education continues to encounter significant resource and infrastructure constraints. Abubakar and Emmanuel (2020) observed that most Fine Arts departments operate with outdated facilities and rely heavily on manual studio practices. The absence of digital laboratories and insufficient access to modern tools limit the capacity of student teachers to acquire relevant digital and creative skills required in the current educational

Landscape. The global discourse on AI and education also underscores its potential for creative collaboration. Zawacki-Richter et al. (2019) asserted that AI applications in education foster interaction among learners by enabling shared artistic production, peer evaluation, and cross-cultural communication. This form of collaboration nurtures creativity, global awareness, and innovation among Fine Arts student teachers, aligning with international educational trends.

However, the introduction of AI in Nigerian teacher education has been constrained by multiple institutional and policy challenges. Olayinka and Adebayo (2021) identified limited access to broadband internet, insufficient professional training, and the absence of structured AI policies as major obstacles. Without adequate support, the integration of AI in Fine Arts teacher training remains largely conceptual rather than practical.

The international education community continues to advocate for balanced integration of AI and creativity in learning systems. UNESCO (2024) emphasized that preparing future educators requires combining digital literacy with artistic and ethical competence. The inclusion of AI in Fine Arts teacher education directly supports this agenda by promoting creative confidence and technological adaptability among student teachers. Assessment in Fine Arts Education is another area where AI demonstrates considerable potential. Huang & Lai (2022) reported that AI-based visual analysis tools are capable of evaluating artistic works through measurable parameters such as proportion, harmony, and innovation. This objectivity in evaluation contributes to consistency, fairness, and deeper feedback within Fine Arts teacher training programmes.

METHODOLOGY

This study adopted a conceptual and analytical research design aimed at examining the application of Artificial Intelligence (AI) in the training of student teachers in Fine Arts Education. Conceptual research focuses on exploring theories, models, and scholarly discussions rather than collecting field data. This approach allows researchers to critically review existing knowledge, identify conceptual gaps, and develop theoretical insights to guide practice (Creswell & Creswell, 2018). The paper relied exclusively on secondary data drawn from academic journals, books, institutional reports, and policy documents published between 2019 and 2025. These sources were carefully selected to ensure relevance, currency, and scholarly credibility. The analysis involved synthesizing previous studies on AI in education, teacher training, and Fine Arts pedagogy to provide a holistic understanding of current trends and challenges.

A qualitative content analysis technique was used to interpret the reviewed materials. This analytical method focuses on identifying themes, relationships, and emerging patterns across the literature, allowing the researcher to derive conceptual explanations rather than statistical generalizations. This interpretive approach was appropriate for a study seeking to explain theoretical linkages between AI and Fine Arts teacher education. The conceptual framework guiding the study drew from the Constructivist Learning Theory and the Technological Pedagogical and Content Knowledge (TPACK) model. These theories helped in interpreting how AI can enhance creativity, innovation, and instructional delivery in Fine Arts teacher training. The theoretical perspectives provided the structure for analyzing how digital tools contribute to knowledge construction, pedagogical improvement, and curriculum transformation.

To ensure validity and academic rigor, the study emphasized the use of peer-reviewed literature from reputable databases, including ScienceDirect, Springer, Taylor & Francis, and Google Scholar. The synthesis of global and Nigerian studies ensured that the analysis reflected both international developments and local realities. This combination of systematic review and conceptual interpretation strengthened the credibility and contextual relevance of the findings.

DISCUSSIONS

The integration of Artificial Intelligence (AI) into Fine Arts teacher education has become a major step toward modernizing teaching and learning in higher institutions. AI-driven tools such as digital painting platforms, intelligent tutoring systems, and automated design programs have expanded the boundaries of creativity and instruction. These technologies enhance the teaching of artistic principles while supporting individualized learning paths for student teachers. Holmes et al. (2022) explained that AI helps learners engage more deeply by adapting to their abilities and providing timely feedback, which is essential for developing creativity in Fine Arts Education. The application of AI tools promotes new teaching strategies that emphasize active and experiential learning. In Fine Arts Education, AI can simulate studio experiences through virtual environments, allowing student teachers to practice artistic techniques and evaluate outcomes in real time. This approach supports constructivist learning, where learners gain knowledge through exploration and reflection. Luckin (2022) noted that such digital systems foster autonomy and self-directed learning, qualities that are vital in art-based disciplines where practice and experimentation are key.

AI also contributes to curriculum innovation in teacher education. The inclusion of AI modules encourages the integration of digital art, coding, and visual analytics into traditional Fine Arts programmes. This combination of art and technology supports the development of creative problem-solving and critical thinking skills. Nguyen (2023) emphasized that AI-driven design platforms cultivate visual literacy and computational creativity among student teachers, making them more prepared for the digital classroom. These changes signify a gradual shift from conventional studio teaching to digitally supported art pedagogy. However, the successful integration of AI in Nigerian Fine Arts Education depends on institutional readiness and policy support. Many universities still face challenges related to limited infrastructure, weak internet connectivity, and lack of professional training for educators. Olayinka and Adebayo (2021) observed that these barriers restrict the potential of AI to transform teacher education. Institutions must therefore increase investment in digital laboratories, training programmes, and policy reforms that promote innovation and sustainability.

Ethical considerations also influence how AI is used in Fine Arts Education. The automation of artistic processes raises questions about authorship, originality, and intellectual property. Student teachers must be guided to understand the balance between human creativity and AI assistance. Vinuesa et al. (2020) stated that ethical education in AI use is essential for ensuring responsible innovation and maintaining integrity in creative fields. Embedding ethics and critical thinking into teacher education curricula will help student teachers adopt AI responsibly and professionally.

IMPLICATIONS

The implications of AI adoption in Fine Arts teacher training are both academic and societal. Academically, AI enhances the quality of instruction, supports continuous assessment, and encourages innovative teaching methods. Societally, it contributes to producing a workforce of creative educators capable of addressing contemporary challenges through art and technology. UNESCO (2024) underscored that integrating AI into teacher 5education aligns with global education goals that emphasize creativity, innovation, and lifelong learning. This alignment ensures that Fine Arts Education in Nigeria remains relevant in a rapidly evolving digital world.

CONCLUSION

The study has shown that Artificial Intelligence (AI) holds significant potential for transforming the training of student teachers in Fine Arts Education. By integrating AI tools such as digital design software, virtual art studios, and adaptive learning systems, teacher education can become more creative, interactive, and effective. The conceptual analysis demonstrated that AI supports personalized learning, enhances creativity, and helps student teachers acquire the digital skills needed for contemporary classroom environments. These contributions align with global efforts to promote innovation and technology-based education.

RECOMMENDATIONS

Based on the findings, several recommendations are proposed.

- Fine Arts teacher education curricula should be restructured to include AI literacy, creative coding, and digital art pedagogy. This will prepare student teachers to integrate technology meaningfully into their teaching practices.
- There should be continuous professional development for Fine Arts educators through workshops, online courses, and certification programmes to build competence in AI use.
- Government and institutional stakeholders should increase funding for digital infrastructure and establish partnerships with technology firms to ensure access to relevant AI tools.
- Ethical and policy frameworks should be developed to guide the responsible use of AI in creative disciplines, protecting originality and intellectual property rights.
- Integrating AI into Fine Arts teacher education is no longer optional but essential. It is a necessary response to global educational trends that emphasize creativity, innovation, and digital competence.

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