# CHALLENGES AND ETHICAL CONSIDERATIONS OF ARTIFICIAL INTELLIGENCE (AI) IN GRAPHIC DESIGN AND TECHNOLOGY IN TERTIARY INSTITUTIONS, NIGERIA.

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## ABSTRACT

*The extent to which tertiary educational system is equipped with the right technology for teaching and learning depends on the level of the academic's technological competence. The integration of these AI- powered system has revolutionized and significantly gained grip in educational institution, particularly in Nigeria. Recently, AI attention are drawn in bias and diversity in design, authenticity and plagiarism concerns, overreliance on AI tools, and data security and user privacy. Despite all the potential benefits of AI, several challenges hinder it effective adoption and applications in the graphic designs and technology in tertiary education systems in Nigeria. In addition, there may not be enough awareness and understanding of AI-technologies among designers in the tertiary institutions. This position paper explores the challenges and ethical considerations of AI in graphic design and technology in the tertiary education. Also, recommend the best practices to mitigating AI in the system. The findings revealed that AI has the powered design tools to transformed the graphic design landscape, enabling designers to work more efficiently and effectively. These tools use machine learning algorithms to analyze vast amounts of big data, including user preferences, design trends, and artistic choices. AI can assist designers in various tasks in higher institutions. Also, several challenges and problems need to be addressed to support the ethical use of AI in graphic design and technology. The integration of AI in graphic design presents both opportunities and challenges. Understanding the ethical considerations and challenges associated with AI, designers and technologists can harness its potential while promoting responsible and respectful practices. The future of AI in graphic design relies on a harmonious coexistence of human ingenuity and AI-driven design.*

**KEYWORDS: Artificial Intelligence (AI), Ethical considerations, Graphic design And Technology (274)**

## INTRODUCTION

The future of graphic design is in AI. As technology continues to advance, the use of AI in graphic design is becoming more prevalent. This integration of Artificial Intelligence (AI) in graphic design has revolutionized the creative industry, offering unprecedented efficiency and innovation. However, it also raises significant ethical concerns that designers and technologists must address. This position paper explores the challenges and ethical considerations of AI in graphic design and technology. Artificial intelligence (AI) is the study of how the human brain makes decisions, learns new things, and thinks through difficulties. The goal of artificial intelligence is to enhance computer abilities related to human understanding, including language intelligence, learning, reasoning, and problem-solving (Akpan and Clark, 2024). The evolving technologies in tertiary institutions necessitate innovative strategies to improve graphic designs, particularly the staff encompass diverse roles, all of whom contribute significantly to the realization of the institutions goals. As tertiary

education systems seek to address challenging issues, AI-technology has gained recognition as a vital smart tool to enhancing competencies in digitalization and driving better outcomes. Ethics is another essential aspect of graphical design activity. Researchers are required to adhere to ethical standards, which include obtaining informed consent from participants, ensuring confidentiality, and avoiding plagiarism. These principles are vital for maintaining the integrity of the research process and protecting the rights of participants (Zhaksylyk, Zimba, Yessirkepov, & Kocyigit, 2023). Ethical compliance not only enhances the credibility of the research but also ensures its acceptance in the broader academic and professional communities. They provide evidence-based solutions to societal problems, enhance policy formulation, and support innovation.

For instance, research in art education has informed curriculum development, while scientific research has led to breakthroughs in technology (Haleem, Javaid, Qadri, and Suman, 2022). Thus, research activities remain a cornerstone of progress across various disciplines, driving sustainable development and global advancement. Ethical concerns regarding privacy, bias in algorithmic decisions, and the potential for misuse of sensitive data require careful consideration. Researchers must develop frameworks that address these concerns while promoting transparency and accountability in AI applications (Cheong, 2024). Such strategic measures are crucial for fostering trust and ensuring that AI's involvement in research remains aligned with ethical standards and societal values. Notable AI-generated artworks by one famous AI-generated piece is "Portrait of Edmond de Belamy," which sold for $432,500 at auction. This artwork sparked debates about the value and originality of AI-generated art. It highlighted how AI is challenging traditional ideas of what constitutes art. Another example is the work of AI artist Robbie Barrat. Barrat uses AI to create surreal and abstract images that have been exhibited in galleries around the world. His work raises questions about the role of AI in the art world and the nature of creativity itself. The involvement of artificial intelligence in graphical design activities marks a transformative era for data collection. By exploring strategic steps to enhance data acquisition processes, researchers can leverage AI's potential to unlock new possibilities, address existing limitations, and contribute to the advancement of knowledge across various disciplines.

This study aims to investigate the methods and strategies that maximise AI's impact on graphic design, emphasizing the importance of ethical and innovative approaches to data collection. Artificial intelligence as rightly put by Castrounis (2016) it is the ability to perceive information and retain its knowledge to be applied towards adaptive behaviors within an environment or context. Another wider and also precise is how Miner (2017) viewed Artificial intelligence as “Any technique which enables computers to mimic human behavior”. It aims primarily to make computer performance more comprehensive and cultivate intelligent patterns of thinking linking humans to computers to make them smarter (Han, 2019). As one of the most advanced information technologies globally, Artificial intelligence technology has made many advances in some key areas of graphic designs in automated image editing, personalized design and big data-driven decisions. In Nigeria, Universities face unique challenges; including bias and diversity, authenticity and plagiarism concerns, overreliance on AI tools, data security and user privacy etc. There may not be enough awareness and understanding of AI-technologies among educational stakeholders in the tertiary institutions. Thus, reviewing this paper necessitated the purpose to explore the existing gap in AI-applicability in graphic designs and technology in the tertiary institutions in Nigeria. Hence, the AI-application would examine the role of designers in automated image editing, personalized design recommendations and data-driven decisions.

**KEY AREAS OF THE STUDY**

- **AI-assisted design:** Research has focused on developing AI-powered design tools that can assist designers in various tasks, such as layout generation, color palette selection, and font suggestion.
- **Creative AI:** Studies have explored the potential of AI to generate creative content, including images, videos, and music, raising questions about authorship, ownership, and originality.
- **Design ethics**: Researchers have investigated the ethical implications of AI in design, including issues related to bias, fairness, transparency, and accountability**.**
- **Human-AI collaboration**: Studies have examined the potential benefits and challenges of human-AI collaboration in design, highlighting the need for effective communication, trust, and understanding between humans and AI systems

**STATEMENT OF PROBLEM**

The involvement of Artificial Intelligence (AI) in research activities has transformed data collection, yet challenges persist in optimizing its effectiveness. Many researchers struggle with integrating AI tools due to a lack of technical expertise and inadequate infrastructure. Issues such as data privacy, bias in AI- algorithms, and the reliability of AI-generated data further complicate its adoption. Additionally, the cost of advanced AI technologies remains a barrier for researchers in resource-limited settings. Ensuring accuracy, ethical considerations, and seamless automation in AI-driven data collection is crucial for improving research quality. There is also a need for strategic steps to enhance AI's role in streamlining data gathering, processing, and analysis. Addressing these gaps will improve research efficiency, reliability, and innovation. This study aims to explore strategic approaches for enhancing AI-driven data collection in graphic design activities.

**PURPOSE OF THE PAPER**

This paper aimed to consider the AI challenges and ethics of graphical designs in tertiary institutions. The paper seeks to explore the roles of AI in graphic design efficiency and effectiveness in the area. Also, to recommend the best practices of integrating AI in this field.

**SIGNIFICANCE OF THE STUDY**

This study is significant because it highlights the benefits and challenges of AI in graphic design. Understanding the potential of AI in graphic design can help designers and organizations leverage its capabilities while mitigating its risks. It informs design practices by identifying the challenges and ethical considerations of AI in graphic design, designers can develop more responsible and inclusive design practices. This study contributes to the development of AI ethics, by informing the development of AI ethics frameworks and guidelines and ensuring that AI is used in a way that is transparent, fair, and respectful of human values.

**FINDINGS OF RELATED LITERATURE ON THE PAPER**

This section of the paper presents the positions of already existing views of people in related topics on the challenges and ethical considerations of AI-application in graphic designs in tertiary institutions in Nigeria. The literatures are sequentially arranged and discussed; to include some relevant theories and concept of the work. Theoretically, AI-technologies can be applied in form of diffusion of innovation in a graphical design field. Diffusion of Innovations Theory (DOI), created by Everett Rogers, a pertinent paradigm to comprehend the use of AI technologies in graphic design work. According to Rogers (2003), there are many kinds of adopters according to the Diffusion of Innovation (DOI) hypothesis. These include innovators,

early adopters, the early majority, the late majority, and laggards. This theory explains the propagation of innovative technology in organizations and society. In Nigeria, innovators and early adopters - those students and institutions with access to the required resources, infrastructure, and digital literacy - may be more likely to use AI, especially in tertiary educational institutions in Nigeria. But the diffusion process has been hindered by infrastructure issues and the digital divide, dividing early adopters from the late majority, who might not have access to dependable internet and AI-powered tools (Onye, 2021). Technology adoption rates are influenced by a number of characteristics, according to the Diffusion of Innovation (DOI) hypothesis (Rogers, 2003). These include relative benefit, compatibility, complexity, trial-ability, and observe-ability. Adoption of artificial intelligence (AI) products in Nigeria may be hindered by their perceived complexity and the limited benefits they provide in locations with inadequate connection. Whereas, as more institutions adopt AI for graphical design purposes, the relative advantage of these tools may become more evident, potentially accelerating adoption.

According to Rogers (1962), stresses how, why and at what rate new ideas and technology spread. In the theory, diffusion of innovation theory predicts that media (technology) as well as interpersonal contacts provide information and influence opinion and judgments. This has attempted to explain the variables that influence how and why users adopt a new information medium, such as the AI-technologies. The relevance of the theory to this work is that AI technological application which include big data quality and availability; prioritizes transparency and explain ability; implement debasing techniques, data-driven design. This is meant to assure the best chance for delivery results through AI application. This theory makes lecturers and instructors know that innovation is not a fashion but essential element leading to long-term survival of tertiary institution and a process of using new ideas to satisfy by converting new knowledge into products and services. Therefore, with the AI-technologies, tertiary institutions can transform graphic designs anywhere at any time at their convenience. Another theory that this reviewed paper employed was Technology Acceptance Model (TAM) developed by Reeves (2014). TAM is a well-established theoretical framework for understanding user acceptance and adoption of technology. According to TAM, technology adoption and use are influenced by two main factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users believe that a technology will enhance their performance or productivity, while perceived ease of use refers to the extent to which users perceive that a technology is easy to use and understand. In the context of the study, the use of AI in instructional delivery of business education courses can be seen as a technological innovation.

The TAM framework can help to understand the factors that influence the adoption and use of AI in this context. For example, instructors' perceptions of the usefulness of AI in enhancing student learning outcomes, and their perceptions of the ease of use of AI tools and technologies, can influence their willingness to adopt and use AI in their teaching and learning practice. Design theory researchers have applied design theory frameworks to understand the role of AI in design processes and the impact of AI on design outcomes. Ethics of AI studies have drawn on ethical theories, such as consequentialism and deontology, to evaluate the moral implications of AI in design and technology. Human-computer interaction researchers have applied human-computer interaction frameworks to understand the interactions between humans and AI systems in design contexts. Concept of Artificial Intelligence, according to Lion and Ekefre (2024), the term artificial intelligence (AI) describes computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making. Huge and Godwin (2024) defined artificial intelligence (AI) as the idea and practice of creating computer systems that can-do tasks like speech recognition, decision-making, and pattern recognition that

traditionally needed human intelligence. According to Ikechukwu (2024) explained in contrast to the inherent intelligence of biological things, that artificial intelligence (AI) is the broad definition of intelligence displayed by machines, especially computer systems. By utilizing clever algorithms integrated into a dynamic computing environment, artificial intelligence mimics human thought processes. A branch of computer science called artificial intelligence studies how computers learn, comprehend data, recognize characters in images, analyze pictures, and simulate how the eyes work. In addition, artificial intelligence refers to the research and programming of computers to carry out intelligence tasks that require human intervention (Udo-Okon and Akpan, 2024).In the same vein, Bassey and Owushi (2023) defined artificial intelligence as the collection of technologies that enable machines to sense, comprehend, act, and perform several functions matching those of humans. Major components of the artificial intelligence bucket are machine learning, big data, natural language processing, decision logic, data visualization, and data analytics.

According to Copeland (2024), cited in Ikechukwu and Echerenachukwu (2024), artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Artificial intelligence (AI) describes computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making (Ufot, 2024). Furthermore, Ikechukwu (2024) explained in contrast to the inherent intelligence of biological things, that artificial intelligence (AI) is the broad definition of intelligence displayed by machines, especially computer systems. By utilizing clever algorithms integrated into a dynamic computing environment, artificial intelligence mimics human thought processes. A branch of computer science called artificial intelligence studies how computers learn, comprehend data, recognize characters in images, analyze pictures, and simulate how the eyes work. In addition, artificial intelligence refers to the research and programming of computers to carry out intelligence tasks that require human intervention (Udo-Okon and Akpan, 2024). In the same vein, Bassey and Owushi (2023) defined artificial intelligence as the collection of technologies that enable machines to sense, comprehend, act, and perform several functions matching those of humans. Major components of the artificial intelligence bucket are machine learning, big data, natural language processing, decision logic, data visualization, and data analytics. Technological Concept of the integration of Artificial Intelligence (AI) in graphic design and technology has revolutionized the creative industry. AI-powered tools can analyze vast amounts of data, learn patterns, and generate designs, images, and content. However, this raises several challenges and ethical considerations, including bias, copyright issues, authenticity, and data privacy.

## AI GRAPHIC DESIGN GENERATORS' GUILD

The advent of AI design generators has generated a great deal of concern among community of graphic artists. As AI generator platforms for art, text, and music have emerged, the creative communities - visual artists, writers, music composers, and others - have been grappling with the impact and implications. The machine learning technology behind AI generators has raised serious questions about authorship, copyright ability, and ethics. As has often been the case when technology has disrupted traditional licensing and business models, the law provides few clear answers. The lawyers, policy makers, and enforcers behind our copyright system - the engine which drives our creative economy - are playing catch up. Some constituents emphatically opposed to any use of AI image generators; others are creators who incorporate AI platforms as a tool in developing their own, original work. The resulting schism within the community has resulted in online attacks, hyperbolic rhetoric, and the dissemination of inaccurate information from both sides, and to the detriment of all artists. This time also feels different in that the tech sector in general, notorious for ignoring the concerns of

individual creators, has evolved in recent years to seem to be more open to meeting artists part-way.

Speculation predates the emergence of AI generators. For example, within the past few years, the release of the Google licensable image badge and Instagram's clarification of the limits of using their API in image embedding are positive steps - overdue, to be sure - in the right direction. If there is ever going to be a transformation in how the tech sector chooses to treat artists' concerns with authorship and the unauthorized use of work, it will most likely be the outcome of various factors: ongoing advocacy on behalf of artists, governmental scrutiny copyright litigation, and activism from individual artists working to protect the interests of all artists in meeting the challenges posed by AI generators. AI generators are not going to simply disappear. The best path forward is to push for the best means to further the interests of designers: through policies, education, and advocacy within our community and with the players, including artists, who will shape the future of AI image generators. The hope is that this future will be one in which graphic artists are protected, uplifted, and thriving. As always, we invite our community to help us shape this future. Intellectual property laws are still catching up with AI technology. Some countries have started implementing regulations, but there's a lot of gray area, and many ethical challenges. In many cases, the rules are unclear or inconsistent.

This lack of clarity can lead to disputes over who owns the rights to AI-generated images. Graphic designers must be aware of these issues when using AI tools. Understanding the legal landscape can help you navigate potential pitfalls. Some argue that AI-generated images can still be creative and original. They mention that AI tools are just another medium for artists to use. Just as a painter uses brushes and paint, an AI artist uses algorithms and data. Or even a black box AI where the output is totally opaque to the human creator. However, others believe that AI-powered images lack the depth and meaning that come from human experience. They argue that true art requires a personal connection between the artist and the viewer. AI, they say, cannot replicate this connection. Both perspectives have merit, and the debate is ongoing. As AI technology continues to evolve, our understanding of creativity and originality may also change.

## ROLE OF ARTIFICIAL INTELLIGECE (AI) IN GRAPHIC DESIGN

AI-powered design tools have transformed the graphic design landscape, enabling designers to work more efficiently and effectively. These tools use machine learning algorithms to analyze vast amounts of data, including user preferences, design trends, and artistic choices. AI can assist designers in various tasks, such as:

- **Automated Image Editing**: AI-driven image editing tools can efficiently handle tasks like retouching and color adjustments.
- **Personalized Design Recommendations**: AI-powered platforms can suggest customized design elements, such as fonts, colors, and templates, tailored to individual project requirements and brand identities.
- **Data-Driven Design Decisions**: AI tools can analyze user data and trends to inform design decisions and tailor visual elements to audience preferences.

## CHALLENGES AND ETHICAL CONSIDERATIONS

Despite the benefits of AI in graphic design, several challenges and ethical considerations arise:

- **Data security and user privacy**: Designers must prioritize data security and anonymization, obtaining explicit consent and using encryption methods to safeguard sensitive information. Implementing robust data encryption, anonymisation, and secure access controls can mitigate privacy and security concerns (Olabiyi, Frank, Owen, and

Olaoye, 2024). Technologies like federated learning allow AI systems to analyse decentralised data without transferring it to a central server, ensuring privacy while maintaining performance. Compliance with global data protection regulations, such as the General Data Protection Regulation (GDPR) and adopting ethical AI frameworks can further safeguard user data and enhance public trust in AI systems. AI tools often use data from real people to learn and create new images. This raises significant privacy concerns. For example, if an AI generates an image that looks like a real person, did that person consent to their likeness? This is especially troubling if someone uses the image in public media or advertising without permission. Data privacy is a major concern in the age of AI. Many AI tools rely on large datasets to train their algorithms. These datasets often include personal information, such as photos and social media posts. If an AI tool uses this data without consent, it can violate privacy rights. For example, an AI-generated image that resembles a real person might be in an advertisement without their permission. This can lead to serious ethical and legal issues. To address these concerns, some experts suggest stricter data privacy laws. These laws could require companies to obtain explicit consent before using personal data for AI training. They could also mandate better transparency about data and how one uses and stores it.

- **Bias and diversity in design:** AI algorithms can perpetuate bias, leading to a lack of diversity and inclusivity in visual representation. Designers must curate diverse datasets and refine AI algorithms to foster more equitable and culturally sensitive visual representations. Data quality and bias AI systems rely heavily on high-quality and unbiased datasets for accurate data collection and analysis. However, poor-quality data—such as incomplete, irrelevant, or inconsistent datasets—can lead to flawed results. Bias in datasets, such as over-representation of certain demographics, can further skew AI models, resulting in discriminatory or inaccurate outcomes (Hanna, Pantanowitz, Jackson, Palmer, Visweswaran, Pantanowitz, Deebajah, and Rashidi, 2024) The issue around bias and representation is that AI can perpetuate biases present in the data it was trained on. If the training data includes stereotypes or biased representations, the AI will likely reproduce these issues. This can lead to problematic portrayals of marginalized groups in AI images and AI stock photos. Ensuring that training data is diverse and fair is crucial to avoid these ethical problems.
- **Environmental impact and technology concerns:** Training AI models requires huge amounts of power and energy, which raises environmental concerns. As we embrace AI technology, we need to consider its impact on our planet**.** Energy consumption of AI training environmental impact of AI technologies is a major ethical concern to be considered. The environmental impact of AI is often overlooked, but it's a significant issue. Training large AI models can consume vast amounts of energy. This energy consumption contributes to carbon emissions and other environmental problems. As AI technology becomes more widespread, its environmental impact is likely to grow. To address this, some experts suggest using more energy-efficient algorithms and hardware. Others advocate for policies that encourage sustainable AI practices. AI users should know about these issues to understand the environmental impact of AI. That way, all user can make more informed choices about when and how to use this technology.
- **Authenticity and plagiarism concerns:** AI-generated content raises questions about authorship and ownership. Designers must exercise caution when using AI-generated assets, ensuring their work respects copyright and intellectual property rights. The AI generated assets are designed to augment human creativity not replace it.
- **Overreliance on AI tools:** Designers must strike a balance between leveraging AI's capabilities and maintaining their creative instincts and critical thinking. While AIcan

streamline repetitive tasks and offer valuable insights, human creativity remains paramount in crafting unique and emotionally resonant designs.

- **Copyright Issues:** The use of AI in design raises concerns about using copyright infringement. Designers must be cautious about using copyrighted materials without permission, emphasizing the important of creating original work and respecting intellectual property right.

**ETHICAL USE OF ARTIFICIAL INTELLIGENCE (AI) IN GRAPHIC DESIGNS**

To ensure the ethical use of AI in graphic design, designers and technologists must:

- **Prioritize Transparency and Explainability**: Designers should understand how AI algorithms work and be able to explain their decision-making processes. This help in improving algorithmic transparency and interpretability to address the "black box" problem in AI, researchers and developers should focus on creating explainable AI (XAI) models that provide clear insights into their decision-making processes. Techniques like model-agnostic interpretation methods, including Local Interpretable Model-Agnostic Explanations (LIME), can help users understand AI predictions. Incorporating interpretability as a core design principle ensures accountability and fosters trust in AI systems.
- **Real-time Data Processing and Feedback**: AI systems can provide real-time feedback during the data collection process, enabling researchers to monitor the quality of the data being collected continuously. For instance, in clinical trials, AI can analyse patient data in real time to ensure that no critical errors are made in data input. Similarly, AI-driven systems in field research can alert researchers to any inconsistencies or anomalies in data, allowing them to address issues immediately (Adelakun, Antwi, Fatogun & Olaiya, 2024).
- **Implement Debiasing Techniques**: Designers can use technique like debiasing algorithms and diverse datasets to neutralize bias in AI-generated content.
- **Foster Human-AI Collaboration**: Designers should work alongside AI systems, leveraging AI's capabilities while maintaining human creativity and critical thinking.
- **Establish Clear Guidelines and Regulations**: Governments and industries must develop and enforce regulations that ensure AI systems are designed and used responsibly.

**CONCLUSION**

The integration of AI in graphic design presents both opportunities and challenges. By understanding the ethical considerations and challenges associated with AI, designers and technologists can harness its potential while promoting responsible and respectful practices. Ultimately, the future of AI in graphic design relies on a harmonious coexistence of human ingenuity and AI-driven design.

**MITIGATING THE CHALLENGES**

To address these challenges, designers and developers should:-

- Diversify input data and training so as to collect data from various sources, representing different demographics and perspectives biases.
- Implement ethical guidelines and frameworks to establish and enforce ethics while incorporating principles such as transparency, fairness and a human-centered approach.
- Foster a culture of ethical AI, by setting guidelines, consider diverse perspectives, and motivate staff to recognize ethical risks, contributing to a culture where responsible AI practices are ingrained.
- Stay informed about emerging technologies and ethical implications, by continuously updating knowledge on technological advancement and new developments in AI's applications for design, ensuring foresight and anticipatory ethical considerations.

**RECOMMENDATIONS**

Based on the challenges and ethical considerations of AI in graphic design and technology, the following recommendations are made:

- Diversify training data to ensure that AI models are trained on diverse datasets to mitigate bias and promote inclusivity.
- Implement transparency and accountability to develop AI systems that are transparent, explainable, and accountable, ensuring that users understand how AI-generated content is created and used.
- Prioritize human-centered design systems for values, creativity, and well-being, ensuring that AI augments human capabilities rather than replacing them.
- Develop AI ethics frameworks to establish and enforce AI ethics frameworks that promote responsible AI development and use, ensuring that AI is used in a way that respects human values and rights.
- Provide education and training to educate designers, developers, and users about the benefits and challenges of AI in graphic design, ensuring that they can effectively use AI-powered tools while mitigating its risks.

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