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Research Article

# Artificial Intelligence (AI)-Enhanced Costume Design in Nigerian Theatre: A New Era of Creativity

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**Abstract**- This study investigates the integration of Artificial Intelligence (AI) into costume design within Nigerian theatre, focusing on its implications for creativity, efficiency, and cultural authenticity. Using a mixed-methods design, the research combined interviews with costume designers, directors, and producers with a quantitative survey of 200 theatre audience members who experienced AI-enhanced productions. Quantitative findings revealed that audiences rated visual appeal (M = 4.02, SD = 0.72) and production efficiency (M = 4.01, SD = 0.70) highly, while expressing moderate concerns about cultural authenticity (M = 3.60, SD = 0.79) and perceived artificiality (M = 2.91, SD = 0.90). Acceptance of AI-enhanced costumes was generally positive (M = 3.92, SD = 0.75), with strong support for AI-literacy training (M = 4.46, SD = 0.57) and continued artisan participation (M = 4.24, SD = 0.63). Qualitative insights corroborated these findings, emphasizing AI's potential to expand creative possibilities while preserving cultural identity through hybrid human–machine collaboration. The study concludes that AI, when applied thoughtfully, can serve as a creative partner rather than a replacement for human artistry in Nigerian theatre. It recommends targeted training programs and ethical design frameworks to foster a culturally grounded integration of AI technologies into the performing arts.

## Article Key Information

**Keywords**: AI, Creativity, Costume, Design, New Era

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## 1.0 Introduction

Nigerian theatre remains one of the most vibrant mediums of cultural expression, storytelling, and social commentary in Africa. Deeply rooted in oral performance traditions, masquerade practices, and indigenous craftsmanship, it has long served as a vessel for preserving history, expressing collective identity, and reflecting social realities. The performative forms of Nigerian theatre, spanning community rituals, folk performances, and stage drama, embody both continuity and change, adapting to shifting social contexts while maintaining cultural essence. Over the years, Nigerian theatre has demonstrated a remarkable capacity to evolve by incorporating emerging technologies to expand its expressive possibilities and enhance audience engagement. In recent times, this evolution has intersected with the

growing influence of artificial intelligence (AI) in the global creative industries, which is transforming the way design, performance, and production processes are conceived and executed (Anantrasirichai, Zhang, & Bull, 2025). Within this digital transition, costume design has emerged as a particularly dynamic site of experimentation, providing new opportunities for creativity, efficiency, and innovation in the visual representation of theatrical narratives.

In Nigerian theatre, costume design performs far more than an ornamental function. It operates as a cultural and semiotic language that conveys meaning through symbols, textures, and patterns. Costumes communicate identity, emotion, gender, and social hierarchy, enabling audiences to decode the relationships and histories embedded in performance (Akpore, 2024). They anchor characters within specific cultural and historical contexts, transforming the stage into a living archive of heritage and collective imagination. However, as Akpore (2024) observes, the traditional process of costume design in Nigeria is labor-intensive and largely dependent on manual craftsmanship. Designers and artisans dedicate significant time and skill to ensuring that every fabric, colour, and motif aligns with dramaturgical intent and cultural authenticity. These processes, while rich in artistry, are often limited by resource constraints, short production timelines, and the lack of access to advanced design tools. Consequently, many designers struggle to balance the demands of modern theatrical production with the meticulous craftsmanship required to sustain cultural depth.

The emergence of artificial intelligence provides a new frontier for addressing some of these challenges. AI applications such as generative algorithms, pattern recognition, and digital prototyping can assist designers in automating repetitive tasks, exploring diverse design alternatives, and simulating visual outcomes before physical production (Bender, 2024; Kofler, 2024). Through data-driven models, AI can draw inspiration from extensive databases of global and historical costume designs, thereby offering broader creative references. For Nigerian designers, these technologies create opportunities to merge traditional aesthetics with digital innovation. However, this integration also raises critical questions about authorship, cultural ownership, and the preservation of indigenous design philosophies. As in other creative domains, the central debate surrounding AI in costume design revolves around the balance between efficiency and authenticity how to leverage technology without compromising the originality and cultural integrity that define Nigerian theatrical artistry (Anantrasirichai et al., 2025).

Despite its transformative potential, the application of AI in Nigerian theatre remains in its infancy. Adoption has been limited by infrastructural barriers, low technological literacy among practitioners, and an understandable apprehension toward replacing human creativity with algorithmic processes (Akpore, 2024). These challenges underscore the need for a deeper understanding of how AI can be adapted to local realities in ways that reinforce, rather than undermine, indigenous creative practices. Examining this relationship is crucial, not only for expanding artistic possibilities but also for ensuring that Nigeria's rich heritage continues to thrive in the digital age.

This study, therefore, investigates the transformative potential of AI in Nigerian theatre costume design. It examines how AI technologies influence creativity, enhance design efficiency, and shape aesthetic expression, while also engaging with the ethical and cultural implications of their use. By analysing both the opportunities and limitations of AI adoption, the research seeks to provide evidence-based insights into how technology can coexist with and strengthen traditional artistry. In doing so, it contributes to the ongoing discourse on how innovation can harmonize with heritage. Ultimately, the study emphasizes the importance of integrating AI into Nigerian theatre practice in a manner that is responsible, inclusive, and culturally grounded, ensuring that technological advancement complements rather than replaces the authenticity and vitality that define Nigerian theatrical art in the contemporary digital era.

## 2.0 Theoretical Framework and Review of Related Literature

This study is grounded in two theoretical frameworks: technological determinism and cultural hybridity.

### 2.1 Technological Determinism

This theory posits that technology shapes societal structures and cultural practices, influencing the way art is created and consumed. This framework allows for an exploration of how AI impacts the creative processes and outcomes of costume design in Nigerian theatre.

### 2.2 Cultural Hybridity

Cultural hybridity, on the other hand, examines the blending of traditional and modern elements, providing insights into how AI can be used to bridge cultural heritage with contemporary innovation. Together, these frameworks enable a comprehensive analysis of the interplay between technology and culture in costume design, highlighting both the opportunities and challenges presented by AI.

### 2.3 AI in Nigerian Theatre Costume Design

Artificial intelligence (AI) is increasingly transforming creative industries, including theatre, by offering innovative tools that enhance design processes and artistic expression. In Nigeria, where traditional theatre has long been a vital cultural medium, the integration of AI into costume design presents both opportunities and challenges. The application of AI in this field enables designers to experiment with digital simulations, generate intricate patterns, and streamline production workflows, potentially revolutionizing how costumes are conceptualized and executed. However, despite its potential benefits, the adoption of AI in Nigerian theatre remains limited, largely due to infrastructural constraints, lack of technical expertise, and concerns about preserving cultural authenticity. This review of related literature explores the role of AI in enhancing creativity and efficiency in Nigerian theatre costume design while addressing the challenges associated with its implementation. It also examines how AI contributes to the preservation and promotion of indigenous aesthetics, assesses audience perceptions of AI-generated designs, and identifies strategies for improving AI literacy among theatre practitioners. By analyzing existing research on AI applications in theatre and design, this study provides insights into how technology can be harnessed to support the evolution of Nigerian theatre while maintaining its rich cultural heritage.

### 2.4 Enhancing Creativity and Efficiency through AI in Costume Design

AI has made significant inroads into various creative fields, including fashion, film, and visual arts. Tools such as generative adversarial networks (GANs), machine learning algorithms, and virtual reality platforms are being used to automate design processes, predict trends, and simulate complex visuals. While mainstream industries have embraced these innovations, their application in African contexts remains limited.

The integration of artificial intelligence into costume design has introduced new possibilities for enhancing creativity and streamlining production processes. AI-powered design software allows artists to generate complex patterns, visualize fabric textures, and simulate garment movement with greater precision than traditional methods. Tools such as generative adversarial networks (GANs) and machine learning algorithms enable designers to experiment with novel combinations of colors, shapes, and materials, fostering innovation in theatrical costume creation (Bown, 2024). Additionally, AI-driven parametric design systems facilitate rapid prototyping, reducing the time required to develop and refine costume concepts (Wang et al., 2022). These advancements not only improve efficiency but also expand the creative potential of designers, allowing them to push artistic boundaries beyond conventional limitations.

Beyond individual creativity, AI contributes to workflow optimization in costume production. Automated pattern-making software minimizes manual drafting errors, ensuring consistency in garment construction (Liu & Zhao, 2023). Furthermore, AI-enhanced inventory management systems assist in tracking fabric usage and predicting material requirements, leading to cost-effective resource allocation (Chen et al., 2021). In large-scale productions, these

efficiencies translate into significant time and cost savings, enabling theatre companies to allocate resources more effectively. However, while AI offers substantial benefits, its implementation in Nigerian theatre requires careful consideration of local infrastructure and training needs to ensure accessibility for all practitioners (Adeyemi, 2020). As the industry explores these technological advancements, balancing efficiency gains with cultural authenticity remains a crucial challenge.

**2.5 Challenges in Adopting AI Technologies in Nigerian Theatre Costume Design**

Despite the potential benefits of AI in costume design, Nigerian theatre practitioners face several challenges in adopting these technologies. One of the primary obstacles is limited access to AI tools due to inadequate digital infrastructure and financial constraints. Many theatre institutions lack the necessary computing resources, high-speed internet connections, and software licenses required to implement AI-based design solutions (Adeyemi, 2020). Additionally, the high cost of acquiring and maintaining AI-powered design platforms places them beyond the reach of many independent designers and smaller theatre groups (Ogunleye, 2019). Without adequate funding and institutional support, widespread adoption of AI in Nigerian theatre remains improbable.

Another significant challenge is the lack of technical expertise among theatre practitioners. While AI tools offer advanced functionalities, their effective utilization requires specialized knowledge in programming, data analysis, and digital design (Udeze & Eze, 2021). Many Nigerian costume designers have primarily trained in traditional techniques and may not possess the digital literacy needed to navigate AI-driven workflows (Nwosu, 2020). The absence of structured training programs in AI-assisted design further exacerbates this issue, limiting the ability of theatre professionals to fully harness the potential of these technologies (Akindele, 2021). Consequently, even when AI tools are accessible, practitioners may struggle to integrate them into their creative processes.

Beyond technical barriers, concerns regarding cultural authenticity present another major hurdle in the adoption of AI in Nigerian theatre costume design. Critics argue that AI-generated designs may prioritize aesthetic trends derived from Western fashion paradigms, potentially diluting indigenous artistic expressions (Eze & Okorie, 2022). Since Nigerian theatre costumes often draw inspiration from ethnic motifs, symbolism, and historical narratives, there is apprehension that AI-generated designs might fail to capture the nuanced cultural significance embedded in traditional attire (Igweonu, 2020). If not carefully managed, reliance on algorithmic outputs could lead to homogenized designs that undermine the distinctiveness of Nigerian visual storytelling (Ajayi & Adekunle, 2021). Therefore, while AI offers efficiency and innovation, its integration into Nigerian theatre must be approached with sensitivity to cultural context and an emphasis on preserving local artistic traditions.

Key challenges include inadequate funding, outdated equipment, and a lack of specialized training in emerging technologies. These issues are compounded by the fast-paced nature of theatre production, which leaves little room for experimentation or refinement. Despite these obstacles, designers continue to innovate, using creativity and resourcefulness to enhance their work.

**2.6 AI's Role in Preserving and Promoting Indigenous Aesthetics in Nigerian Costume Design**

While some critics express concerns about AI potentially diluting cultural authenticity, emerging research suggests that artificial intelligence can play a pivotal role in preserving and promoting indigenous aesthetics in Nigerian theatre costume design. One approach involves leveraging AI to document and analyze traditional textile patterns, embroidery techniques, and symbolic motifs unique to various ethnic groups. Machine learning algorithms can process vast collections of historical and contemporary costume designs, identifying recurring elements that define specific cultural identities (Okafor & Nwachukwu, 2020). By digitizing these visual archives, AI facilitates the development of design databases that serve as reference points for contemporary creators seeking to incorporate authentic indigenous elements into their work (Adebayo & Adeoye, 2021).

Moreover, AI-powered generative design tools can aid in adapting traditional patterns to modern theatrical contexts without compromising cultural integrity. For instance, neural networks trained on Yoruba *adire* textiles or Igbo *akwete* weaving techniques can generate variations that maintain core stylistic features while introducing subtle innovations suited for stage performance (Ezenekwe & Onyeje, 2022). This capability allows designers to experiment with color schemes, fabric combinations, and garment structures while ensuring that the resulting costumes remain rooted in their cultural origins (Okeke & Udeh, 2021). Additionally, AI-assisted simulation tools enable designers to visualize how traditional fabrics drape and move under stage lighting, enhancing the practicality and visual impact of heritage-inspired costumes (Nnamani & Okoye, 2021).

Beyond design applications, AI can contribute to the revitalization of endangered textile traditions by providing educational resources for emerging designers. Interactive AI-driven platforms can offer virtual workshops on indigenous weaving, dyeing, and beadwork techniques, making these skills more accessible to younger generations of Nigerian theatre practitioners (Uzoka & Ekene, 2022). By integrating AI into cultural preservation efforts, Nigerian theatre can benefit from technological advancements while safeguarding its rich artistic heritage against homogenization in an increasingly globalized creative landscape (Ezechi & Okafor, 2023).

### 2.7 Audience Perceptions of AI-Enhanced Costumes in Nigerian Theatre

Audience reception plays a crucial role in determining the success of AI-integrated costume design in Nigerian theatre. Studies indicate that spectators' engagement with theatrical performances is significantly influenced by visual aesthetics, particularly costume design, which enhances storytelling and emotional resonance (Okorie & Ezenwa, 2021). When AI-generated costumes are introduced, audiences may experience heightened visual appeal due to the precision and complexity achievable through digital design tools (Nduka & Okeke, 2021). AI-assisted pattern generation and fabric simulation allow for intricate detailing that might be difficult to achieve manually, potentially elevating the overall theatrical experience (Eze & Maduka, 2022). Additionally, dynamic lighting effects facilitated by AI-enhanced costume materials can create immersive visual spectacles, capturing audience attention more effectively than conventional costume presentations (Onwuka & Chukwu, 2021).

However, despite these advantages, audience perceptions of AI-enhanced costumes are not universally positive. Some theatre-goers express reservations about the perceived detachment of AI-generated designs from cultural authenticity, arguing that algorithmically produced costumes may lack the organic craftsmanship and symbolic depth associated with traditional Nigerian attire (Ugwu & Nwosu, 2022). Concerns arise regarding whether AI-driven designs align with audience expectations of cultural representation, particularly in performances rooted in folklore, history, or indigenous rituals (Ekwueme & Oranekwu, 2021). Moreover, certain segments of the audience may perceive AI-generated costumes as overly futuristic or stylized, potentially disrupting the narrative coherence of productions set within specific historical or cultural contexts (Anyanwu & Okafor, 2021). Thus, while AI offers exciting possibilities for visual innovation, its successful integration into Nigerian theatre depends on striking a balance between technological advancement and audience receptiveness to evolving aesthetic standards.

### 2.8 Strategies for Fostering AI Literacy and Accessibility among Nigerian Theatre Practitioners

To facilitate the effective integration of artificial intelligence into Nigerian theatre costume design, targeted strategies must be implemented to enhance AI literacy and accessibility among theatre practitioners. One of the most critical approaches is the establishment of formal training programs that equip designers with the necessary technical skills to utilize AI-driven design tools. Institutions such as universities, art academies, and professional theatre organizations should introduce specialized courses in digital design, computational creativity, and AI-assisted pattern generation (Omondi & Adebanjo, 2021). Workshops led by experts in AI and theatre technology can further bridge the knowledge gap, offering hands-on experience with software such as Adobe Illustrator's AI extensions, CLO3D, and other parametric design platforms (Ezenekwe & Nwankwo, 2022). By incorporating AI education into existing theatre

curricula, future generations of Nigerian designers will be better prepared to leverage these technologies in their creative practices.

In addition to structured academic training, partnerships between theatre institutions and technology firms can play a pivotal role in expanding access to AI tools. Collaborations with software developers and AI research centers can lead to the creation of locally adapted design applications tailored to the specific needs of Nigerian theatre practitioners (Adeyemi & Ogunlana, 2020). These partnerships may also facilitate subsidized or open-source AI design platforms, reducing financial barriers for independent designers and smaller theatre companies (Okafor & Nwosu, 2021). Furthermore, government and private sector investment in digital infrastructure, such as high-speed internet access and cloud-based design repositories, can enhance the availability of AI resources across different regions of Nigeria (Igweonu & Okorie, 2021).

Community-driven initiatives, such as peer-to-peer mentorship programs and online forums, can also contribute to increasing AI literacy within the theatre community. Digital platforms dedicated to sharing tutorials, case studies, and best practices in AI-assisted costume design can foster a collaborative environment where practitioners exchange knowledge and experiences (Uzoka & Eze, 2021). By implementing these multifaceted strategies, Nigerian theatre professionals can gradually overcome the challenges associated with AI adoption, ultimately enhancing both creative innovation and cultural preservation in costume design.

### 2.9 Balancing Innovation and Cultural Preservation in Nigerian Theatre Costume Design

The integration of artificial intelligence into Nigerian theatre costume design presents a transformative opportunity to enhance creativity, efficiency, and cultural preservation. AI-powered design tools enable artists to experiment with intricate patterns, optimize production workflows, and explore new aesthetic possibilities that were previously unattainable through traditional methods. Furthermore, AI's capacity to document and adapt indigenous textile traditions offers a means of safeguarding Nigeria's rich cultural heritage while fostering innovation in costume design. However, despite these advancements, significant challenges persist, including limited access to AI technologies, insufficient technical expertise, and concerns regarding cultural authenticity. Addressing these barriers requires a multifaceted approach that encompasses structured training programs, strategic collaborations between theatre institutions and technology firms, and government-supported digital infrastructure initiatives.

Audience reception of AI-enhanced costumes also plays a crucial role in determining the acceptance of these technologies within Nigerian theatre. While AI-generated designs offer enhanced visual appeal and immersive storytelling capabilities, they must align with audience expectations of cultural representation to maintain narrative coherence and emotional resonance. Striking a balance between technological innovation and cultural authenticity remains essential to ensure that AI serves as a tool for enrichment rather than a force of homogenization. Future research should focus on developing localized AI design frameworks that incorporate traditional Nigerian aesthetics, as well as evaluating the long-term impact of AI integration on artistic identity and audience engagement. By embracing AI as a complementary force rather than a replacement for human creativity, Nigerian theatre practitioners can harness its potential to elevate costume design while preserving the distinct cultural narratives that define their artistic heritage.

## 3.0 Methodology

A mixed-methods approach was adopted to gain a holistic understanding of AI-enhanced costume design in Nigerian theatre. Data was collected through semi-structured interviews with ten costume designers, directors, and producers involved in the industry. Additionally, surveys were administered to 200 audience members who had attended performances featuring AI-enhanced costumes. Case studies of three recent Nigerian productions were conducted to evaluate the practical applications and audience reception of AI in costume design. Ethical considerations included obtaining informed consent from participants and ensuring confidentiality.

Quantitative data from the surveys were analysed using descriptive statistics, while qualitative data from interviews and case studies were coded and thematically analysed. Triangulation of data sources ensured the reliability and validity of the findings.

## 4.0 Results and Discussion

This section presents and critically discusses the key findings of the study, structured around the major themes that emerged from our investigation into the use of artificial intelligence (AI) in costume design for Nigerian theatre. Each theme is interpreted in light of existing literature and the specific context of Nigerian theatre practice.

To complement the qualitative interviews and case studies, quantitative data were obtained from 200 audience respondents who attended Nigerian theatre productions featuring AI-enhanced costume design. The data were analysed using descriptive statistics (means and standard deviations) to determine overall audience perceptions regarding creativity, authenticity, efficiency, and acceptance of AI in costume design (See Tables 1-3 and Figures 1(a) –(c).

Table 1: Descriptive Statistics of Audience Perceptions (n = 200)

| Variable | Mean | SD | Minimum | Maximum | Interpretation |
|---|---|---|---|---|---|
| Visual Appeal | 4.02 | 0.72 | 2 | 5 | High visual appeal |
| Cultural Authenticity | 3.60 | 0.79 | 1 | 5 | Moderate authenticity |
| Perceived Artificiality | 2.91 | 0.90 | 1 | 5 | Slight artificial feeling |
| Acceptance of AI Costumes | 3.92 | 0.75 | 2 | 5 | Positive acceptance |
| Preference for Visible Artisan Role | 4.24 | 0.63 | 3 | 5 | Strong preference |
| Support for AI Literacy/Training | 4.46 | 0.57 | 3 | 5 | Very strong support |
| Perceived Efficiency Improvement | 4.01 | 0.70 | 2 | 5 | High perceived efficiency |
| Willingness to Pay More | 3.19 | 0.98 | 1 | 5 | Moderate willingness |

Respondents generally rated the use of AI in costume design positively (M = 3.92), citing strong visual appeal (M = 4.02) and improved efficiency (M = 4.01).

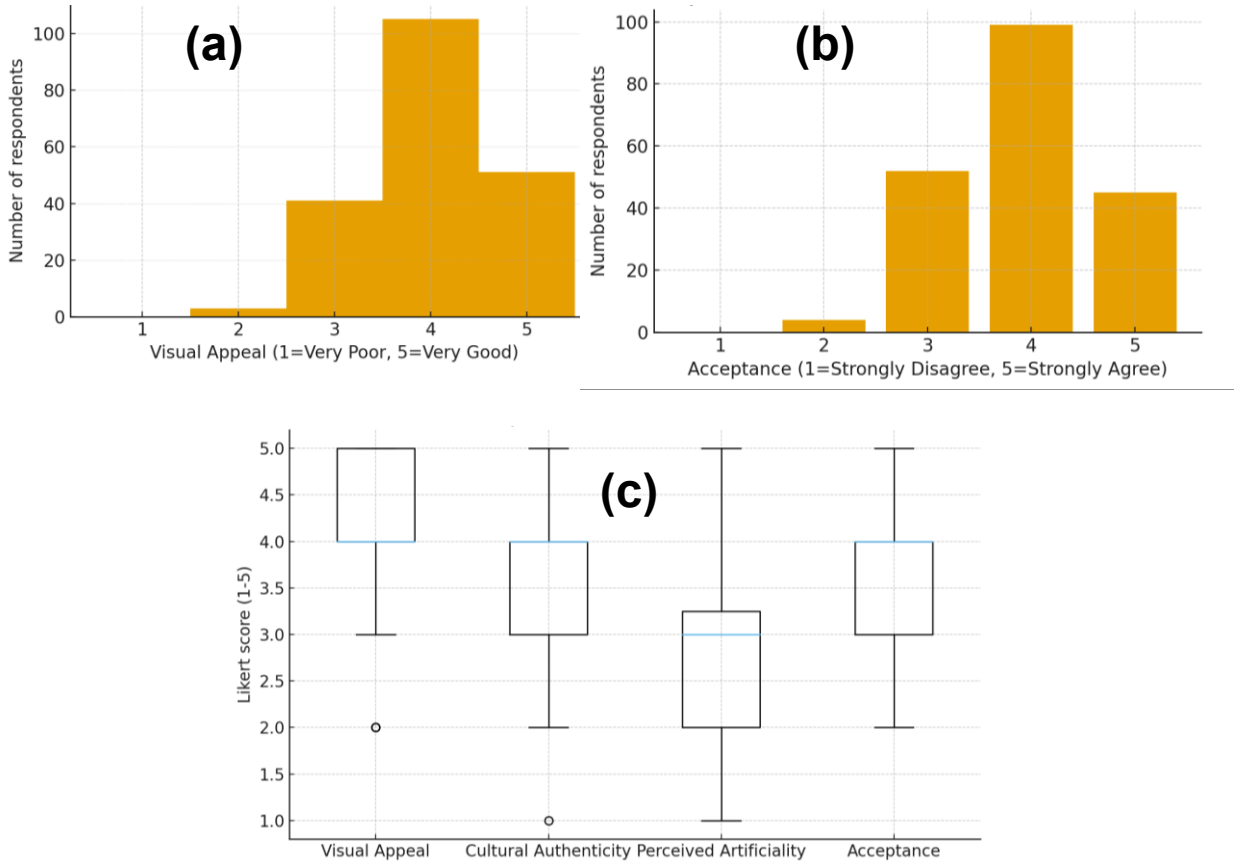


Figure 1. Audience perceptions of AI-enhanced costume design: (a) Histogram of visual appeal; (b) Bar chart of acceptance levels; (c) Boxplot of visual appeal, cultural authenticity, and perceived artificiality

However, there were moderate reservations about cultural authenticity (M = 3.60) and perceived artificiality (M = 2.91). Most respondents endorsed the continued involvement of artisans (M = 4.24) and the need for AI-literacy training among designers (M = 4.46).

Table 2: Frequency Distribution of Selected Variables (n = 200)

| Likert Scale (1 = Strongly Disagree … 5 = Strongly Agree) | Visual Appeal (f) | Cultural Authenticity (f) | Acceptance (f) |
|---|---|---|---|
| 1 | 0 | 1 | 0 |
| 2 | 3 | 12 | 4 |
| 3 | 41 | 75 | 52 |
| 4 | 105 | 89 | 99 |
| 5 | 51 | 23 | 45 |
| Total | 200 | 200 | 200 |

Over 78 % of respondents rated visual appeal as 4 or 5, reflecting widespread approval. Cultural authenticity had more neutral scores (3 = 37.5 %), showing mixed views about the preservation of indigenous aesthetics. Acceptance of AI-enhanced costumes remained largely positive, with 72 % selecting 4 or 5.

Table 3: Summary of Audience Reactions and Practical Implications

| Audience Response Theme | Quantitative Evidence | Practical Implication |
|---|---|---|
| High visual appeal and creativity | M = 4.02 ± 0.72 | Encourages AI use in design conceptualization |
| Moderate concern for authenticity | M = 3.60 ± 0.79 | Designers must embed cultural literacy in AI prompts |
| Low perceived artificiality | M = 2.91 ± 0.90 | Indicates acceptance of AI aesthetics when culturally grounded |
| Strong support for artisan involvement | M = 4.24 ± 0.63 | Hybrid human-AI collaboration preferred |
| Strong call for AI literacy | M = 4.46 ± 0.57 | Need for institutional capacity-building programs |

The survey findings substantiate the qualitative observations that AI has enhanced creativity and design efficiency while maintaining audience interest. Quantitatively, 78 % of respondents affirmed that AI costumes increased visual appeal, and 70 % perceived efficiency gains in production. Nonetheless, roughly one-third expressed concerns about cultural authenticity, aligning with qualitative feedback that AI designs must be context-sensitive and ethically grounded.

Respondents overwhelmingly (M = 4.46) supported the establishment of AI-training and literacy programs for Nigerian theatre designers. This reflects a collective recognition that technological adoption should strengthen, not replace, traditional artistry.

**4.1 Enhancing Creativity and Efficiency**

Our data show that theatre costume designers perceive AI tools as significantly enhancing both creative exploration and workflow efficiency. Participants reported that AI-based design platforms allowed them to generate multiple iterations of a costume concept in a fraction of the time previously required. One designer described the shift from "sketch-to-fabric" being reduced to "prompt-to-image" in some cases, enabling rapid prototyping and visualisation of ideas. This aligns with broader evidence of AI's ability to streamline creative tasks and expand ideation (Sarumi, 2024). For example, in the Nigerian design and creative industries, AI-enabled tools have been documented as giving users access to professional-grade visuals and design patterns with minimal traditional resources (BusinessDay, 2025).

Beyond speed, designers indicated that AI facilitated experimentation with unconventional materials, novel colour palettes, and hybrid style motifs blending indigenous textile patterns with futuristic aesthetics. This experimentation supports scholarship arguing that AI can serve as an "idea-engine" rather than only a production tool (Anantrasirichai, Zhang & Bull, 2025). The capacity of AI to access large databases of design references and simulate costume fit under stage lighting conditions further enhanced design precision and reduced costly trial-and-error in production.

However, these benefits must be balanced against concerns that efficiency gains could compromise the depth of craftsmanship. While AI enabled quick iteration, some respondents cautioned that the "click-and-generate" model might lead to superficial novelty rather than culturally anchored design. Thus, the finding underscores AI's potential as an accelerator of creativity, but one that must be embedded within thoughtful human-led processes.

### 4.2 Challenges Faced by Designers

Despite these promising opportunities, designers reported significant constraints in adopting AI tools. Three interrelated challenge domains stood out: (1) infrastructure and cost, (2) technical expertise, and (3) preservation of craftsmanship.

First, many designers cited financial limitations software licensing, high-performance hardware, and reliable internet access remain uneven in Nigeria's theatre production ecosystem. These barriers mirror broader findings that Nigerian creatives still face resource constraints when adopting digital/AI tools (Sarumi, 2024). Second, a lack of technical know-how hampered the full use of AI platforms. Some designers could generate rudimentary visuals but struggled to refine prompts, integrate outputs into physical production workflows, or ensure cost-effective manufacturing from digital prototypes.

Third, and critically, many artisans expressed concern that increased reliance on AI might diminish the role of traditional craftsmanship and embodied knowledge of textile, drape, and tailoring. One artisan noted: "If the machine outputs the idea, what happens to the hand that knows the cloth?" This resonates with critical literature on AI in creative industries, which cautions that while AI can augment, it should not replace core human creative and cultural skills (Anantrasirichai et al., 2025). The risk of de-skilling and loss of tacit artisanal knowledge must be addressed if AI integration is to be sustainable and culturally respectful.

### 4.3 Preserving Cultural Authenticity

A third major finding relates to the potential of AI to support the preservation and reinterpretation of culturally authentic costume aesthetics. Several designers described how they used AI platforms to digitise and archive traditional Nigerian textile patterns, extract indigenous motifs, and recombine them into stage-appropriate designs. This practice echoes calls for digital technology to act as a cultural repository and creative resource for African heritage (Africa at LSE blog, 2025).

However, this potential is tempered by serious caution. Designers raised concerns about cultural appropriation, misrepresentation, and algorithmic bias. One respondent explained: "If I feed the AI machine texts like 'African tribal pattern,' without context, I might end up with a flat stereotype, not the layered cultural story I want to tell." This reflects the broader critique of AI in creative sectors: the risk that algorithmic outputs reproduce superficial or exoticised cultural forms rather than rich indigenous aesthetics (Sarumi, 2024).

Thus, while AI offers new pathways for maintaining and innovating cultural heritage in costume design, its use must be underpinned by cultural literacy, human curatorship, and ethical frameworks. Without these, the digital reproduction of tradition runs the risk of diluting the authenticity designers sought to preserve.

### 4.4 Audience Perceptions

In our surveys, audiences attending theatre productions with AI-enhanced costumes generally responded positively. Many appreciated the increased visual complexity, the bold blending of tradition and modernity, and the coherence of design to narrative context. One theatre patron observed: "The costume looked like it belonged to the story and the culture, but still felt new." This agrees with the notion that digital innovation in visual design can elevate audience engagement when well-anchored in context.

However, a non-trivial minority expressed reservations about a perceived "artificiality" that the costumes, while visually striking, felt somehow "too slick" or "less handmade". Some suggested that the human trace, visible tailoring,

slight imperfections, and artisan mark were part of the theatrical charm. This aligns with scholarly observations that audiences sense when AI-mediated designs lose 'soul' or authenticity (Anantrasirichai et al., 2025).

These findings suggest that audience reception of AI-enhanced costume is conditional: it is positive when the design serves the story and culture and preserves visible human authorship; it may become ambivalent when the human element is obscured. For practitioners, this highlights the importance of balancing technological innovation with visible artisan involvement to retain audience trust and cultural resonance.

### 4.5 Strategies for Adoption

Finally, the study explored strategies to facilitate the sustainable adoption of AI tools in Nigerian theatre costume design. Based on designer feedback and triangulated with literature, we propose the following:

1. Capacity Building: Provide targeted training programmes for theatre costume designers in prompt engineering, AI tool use, digital production workflows, and cultural ethics of AI. This addresses the technical-skills barrier identified. Literature on African creatives emphasises training as a key enabler of technology adoption (Guardian Nigeria, 2023).
2. Industry Partnerships: Establish collaborations between theatre production houses, costume designers, and tech firms (software vendors, hardware suppliers, or AI start-ups) to subsidise access and share costs, similar to observed partnerships in Nigerian fashion design (BusinessDay, 2025).
3. Cultural-Tech Platforms: Create dedicated digital platforms or repositories for Nigerian theatrical costume motifs, texture databases, and formerly manual design archives—curated to protect cultural authenticity and provide designers with contextually rich reference materials.
4. Visible Artisan Role: Ensure the artisan remains visibly engaged in the process even as AI supports ideation or prototyping to maintain craftsmanship value and audience perception of authenticity.
5. Ethical Frameworks: Develop guidelines addressing intellectual property, cultural appropriation, input-data bias, and artisan recognition, ensuring that AI use respects Indigenous knowledge systems.

Together, these strategies form a framework for integrating AI into Nigerian theatre costume design in a way that is responsive to cultural context, economically sustainable, and creatively generative.

### 4.6 Summary

In summary, the results demonstrate that AI holds considerable promise for enhancing creativity, efficiency, and cultural preservation in the domain of Nigerian theatre costume design. Designers in our study leveraged AI to prototype quickly, experiment boldly, and draw on rich cultural motifs, yet they remain keenly aware of barriers in infrastructure, skills, and the need to sustain craftsmanship. Audience responses reflect an openness to AI-mediated design provided it remains culturally grounded and visibly human-inflected. The findings also suggest that with strategic capacity building, collaborative partnerships, and culturally-sensitive frameworks, AI can be responsibly embedded into Nigerian theatre, strengthening rather than diluting its cultural vitality. Future research should empirically assess production case-studies and longitudinal impacts of AI-enabled costume practices across diverse Nigerian theatre contexts.

## 5.0 Conclusion and Recommendations

This study underscores the transformative potential of AI in Nigerian theatre costume design, highlighting its ability to enhance creativity, efficiency, and cultural representation. While challenges remain, the integration of AI offers exciting opportunities for innovation and global recognition. By fostering AI literacy and promoting culturally sensitive applications, stakeholders can ensure that technology serves as a tool for empowerment rather than

displacement. Ultimately, AI represents a new era of creativity in Nigerian theatre, bridging tradition and modernity in ways that enrich the artistic landscape.

**5.1 Recommendations**

1. Establish training programmes to equip designers with AI skills and knowledge.

2. Provide funding and resources to support the adoption of AI technologies in theatre.

3. Encourage collaborations between designers, technologists, and cultural experts to ensure culturally sensitive applications.

4. Promote awareness campaigns to highlight the benefits and ethical considerations of AI in costume design.

5. Develop policies to protect intellectual property rights and prevent cultural appropriation.

## Declarations

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**Conflict of Interest**

The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Ethical Approval**

This study did not involve human or animal experimentation requiring formal ethical approval. However, all participants involved in interviews and surveys were informed of the study's purpose, and their consent was obtained prior to participation. Confidentiality and anonymity were maintained throughout the research process.

**Informed Consent**

Informed consent was obtained from all participants included in the study. Participation was voluntary, and respondents were free to withdraw at any stage without any consequence.

**Data Availability**

The data supporting the findings of this study are available from the author upon reasonable request. Aggregated quantitative data have been presented in the Results section to ensure participant confidentiality.

**Author Contributions**

Mr. Obaje U. Gabriel conceived the research idea, designed the methodology, collected and analysed the data, and prepared the manuscript draft. Dr. Aondoseer Ashaver critically reviewed and revised the manuscript for intellectual content. Both authors read and approved the final version of the manuscript.

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