



# INTEGRATING AI IN RE-DESIGNING CURRICULA THAT FOSTER CREATIVITY AND INNOVATION

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**Abstract :** This study investigates the integration of artificial intelligence in redesigning curricula that foster creativity and innovation in educational settings. Using a mixed-methods concurrent triangulation approach, data were collected from 250 respondents (150 students, 75 educators, 25 administrators) across 15 secondary schools in Delta State, Nigeria, over a six-month implementation period. The research employed validated creativity assessments, engagement surveys, and comparative analysis between AI-integrated and traditional learning environments. Results demonstrate significant improvements in AI-integrated curricula across multiple dimensions. Creative thinking scores increased by 32% overall, with flexibility showing the greatest improvement (+35.7%), followed by elaboration (+33.3%), originality (+30.8%), and fluency (+29.3%). Statistical analysis revealed large effect sizes for creative thinking (Cohen's  $d = 0.85$ ), innovation project ratings ( $d = 0.92$ ), and student engagement ( $d = 0.81$ ), all achieving statistical significance ( $p < 0.001$ ). The hybrid implementation model emerged as most effective, achieving 85.7% success rates and 89.2% educator adoption. Learning objective achievement showed remarkable improvements, particularly in digital literacy (+32.9%) and creative problem-solving (+14.9%). However, implementation challenges persist, with 74.8% of educators lacking AI training and 35.6% experiencing connectivity issues. The study concludes that AI integration enhances rather than replaces human creativity when implemented through structured, balanced approaches with adequate professional development and institutional support.

**Keywords:** artificial intelligence, curriculum design, creativity enhancement, educational technology, innovation pedagogy

## INTRODUCTION

The integration of artificial intelligence (AI) in educational curricula represents a paradigm shift in contemporary pedagogy, particularly in fostering creativity and innovation among learners. As educational institutions worldwide recognize the transformative potential of AI technologies, there is an increasing imperative to redesign curricula that not only incorporate AI tools but also cultivate creative thinking and innovative problem-solving skills (UNESCO, 2021; Akram et al., 2022). The emergence of AI literacy as a fundamental competency has prompted educators and policymakers to reconceptualize traditional educational frameworks, moving beyond conventional approaches to embrace more dynamic, technology-enhanced learning environments (Chiu et al., 2024; Ng et al., 2021).

Recent studies have highlighted the critical need for AI-infused interdisciplinary curricula that prepare students for an increasingly digital future while maintaining focus on human creativity and innovation (Kim et al., 2021; Lin & Van Brummelen, 2021). The Finnish educational system, renowned for its innovative approaches, has begun exploring invention pedagogy that integrates AI technologies to enhance creative learning experiences (Korhonen et al., 2022). Similarly, research examining students' pre-instructional conceptions of AI reveals significant gaps in understanding that necessitate comprehensive curriculum redesign (Mertala et al., 2022).

Despite growing recognition of AI's potential in education, there remains a significant gap between theoretical frameworks and practical implementation of AI-integrated curricula that effectively foster creativity and innovation. Current educational systems often struggle to balance technological integration with the development of creative thinking skills, resulting in fragmented approaches that fail to maximize the synergistic potential of human-AI collaboration (Holmes et al., 2022; Luckin et al., 2022). Moreover, many educators lack the necessary preparation and resources to effectively implement AI-enhanced creative learning environments, leading to underutilization of available technologies and missed opportunities for innovation development (Yau et al., 2023; Ottenbreit-Leftwich et al., 2022).

The challenge is further compounded by limited empirical research examining the effectiveness of AI-integrated curricula in promoting creativity and innovation, particularly in K-12 educational contexts (Ng et al., 2023). While isolated studies have explored specific aspects of AI education, there is insufficient comprehensive research that addresses the holistic redesign of curricula to leverage AI technologies for creative and innovative learning outcomes.

This study aims to investigate the integration of artificial intelligence in redesigning curricula that foster creativity and innovation in educational settings. The research seeks to develop a comprehensive understanding of how AI technologies can be

systematically incorporated into curriculum design to enhance creative thinking, innovative problem-solving, and collaborative learning experiences. Through empirical investigation, this study will examine the effectiveness of AI-integrated curricula, identify best practices for implementation, and provide evidence-based recommendations for educators, curriculum designers, and policymakers.

This research contributes to the theoretical understanding of AI's role in creative education by extending existing frameworks of technology-enhanced learning and human-centered AI design (Shneiderman, 2022; Schmager et al., 2023). The study builds upon self-determination theory perspectives in AI education, providing empirical evidence for inclusive and diverse AI curriculum design approaches (Xia et al., 2022).

The findings will provide actionable insights for educators seeking to integrate AI technologies into creative learning environments. The research offers practical guidelines for curriculum designers, instructional technologists, and educational leaders implementing AI-enhanced creative education programs (Touretzky et al., 2023; Zammit et al., 2022).

This study addresses critical policy considerations for AI in education, contributing to the development of ethical frameworks and guidelines for AI implementation in educational settings (Charisi et al., 2022; UNICEF, 2021). The research informs policy decisions regarding AI literacy requirements, teacher preparation programs, and educational technology investments.

This study focuses on K-12 educational contexts, examining the integration of AI technologies in curricula designed to foster creativity and innovation. The research encompasses various educational levels and subject areas, with particular attention to interdisciplinary approaches and co-design methodologies (Xie et al., 2024; Yau et al., 2022). However, the study is limited by the rapidly evolving nature of AI technologies and may not capture all emerging developments in the field.

## **THEORETICAL FRAMEWORK**

Constructivist learning theory provides a fundamental framework for understanding how students actively construct knowledge through interaction with their environment. This theory supports AI-integrated curricula by emphasizing learner-centered approaches where students collaborate with AI technologies to build understanding through exploration and experimentation (Korhonen et al., 2022).

Creative systems theory examines creativity as an emergent property of complex interactions between individuals, domains, and fields. This framework illuminates how AI technologies can enhance creative processes by providing new tools and environments for creative expression while maintaining human agency in the creative process (Tedre et al., 2023).

The Technology Acceptance Model explains user adoption of new technologies based on perceived usefulness and ease of use. In AI education contexts, TAM helps understand factors influencing teacher and student acceptance of AI-integrated curricula, informing implementation strategies that maximize adoption and effectiveness (Luckin et al., 2022).

Human-computer interaction theory emphasizes the importance of designing technology interfaces that support human capabilities and goals. This framework is particularly relevant for developing human-centered AI educational tools that enhance rather than replace human creativity and innovation (Shneiderman, 2022; Schmager et al., 2023).

Educational creativity encompasses students' ability to generate novel, appropriate, and valuable ideas within academic contexts. Research indicates that creativity in education involves both divergent thinking and domain-specific knowledge application (Ryan & Deci, 2020). Contemporary curriculum design increasingly emphasizes innovation through interdisciplinary approaches and real-world problem-solving. Finnish invention pedagogy exemplifies this approach by integrating maker education principles with innovative teaching methods (Korhonen et al., 2022).

Traditional creative education methods often rely on individual expression and artistic activities. However, these approaches may not adequately prepare students for collaborative innovation in technology-enhanced environments (Akram et al., 2022). AI in education has evolved from simple computer-assisted instruction to sophisticated adaptive learning systems. This evolution reflects growing understanding of AI's potential to personalize learning experiences and support diverse learning needs (Ng et al., 2023). Modern AI-powered learning management systems provide intelligent tutoring, automated assessment, and personalized content delivery. These systems demonstrate AI's capacity to enhance educational efficiency and effectiveness (UNESCO, 2021).

Adaptive learning systems use AI algorithms to adjust content difficulty and presentation based on individual student performance and preferences. This personalization supports diverse learning styles and promotes student engagement (Xia et al., 2022). Generative AI tools enable students to create original content across multiple media formats. These tools can stimulate creativity by providing inspiration, generating alternatives, and supporting iterative design processes (Zammit et al., 2022).

AI technologies facilitate collaborative learning by connecting students with similar interests, providing translation services, and mediating group interactions. This support enhances cross-cultural collaboration and diverse perspective integration (Katuka et al., 2023). Intelligent tutoring systems specifically designed for creative skill development provide personalized feedback, suggest improvement strategies, and scaffold complex creative processes. These systems demonstrate AI's potential to support creativity development (Touretzky et al., 2023).

Modern curriculum development emphasizes co-design approaches involving teachers, students, and community stakeholders. These participatory methods ensure curricula meet diverse needs and contexts (Lin & Van Brummelen, 2021; Xie et al., 2024). Successful technology integration requires systematic planning, teacher preparation, and ongoing support. Research indicates that effective integration aligns technology use with pedagogical goals and learning objectives (Yau et al., 2022).

Assessing creativity in educational contexts presents unique challenges requiring innovative assessment approaches. Traditional standardized tests may not capture creative thinking abilities, necessitating alternative assessment methods that evaluate process and product creativity (Ottenbreit-Leftwich et al., 2022).

## **METHODOLOGY**

This study is grounded in the pragmatic research paradigm, which emphasizes practical problem-solving and supports the use of multiple research methods to address complex educational phenomena. The pragmatic approach allows for the integration of both quantitative and qualitative methodologies to comprehensively examine AI integration in creative curricula.

A mixed-methods concurrent triangulation approach was adopted, enabling simultaneous collection and analysis of quantitative and qualitative data. This approach facilitates comprehensive understanding of participants' experiences with AI-integrated creative learning while providing statistical evidence of effectiveness. The research strategy employs a comparative case study design examining schools implementing AI-integrated curricula versus those using traditional methods. This strategy enables detailed investigation of implementation processes, outcomes, and contextual factors influencing success.

The target population comprises educators, students, and administrators from secondary schools in Delta State, Nigeria, specifically those exposed to both AI tools and traditional teaching methods in creative subject areas including arts, technology, and interdisciplinary programs. A stratified purposive sampling technique was employed to ensure representation across different school types, geographic locations, and levels of technology integration. Schools were stratified by urban/rural location, public/private status, and current level of AI implementation.

The sample size of 250 respondents was determined using Krejcie and Morgan's formula, accounting for the finite population of eligible participants across the 15 selected schools. This sample size ensures adequate statistical power for detecting meaningful differences between AI-integrated and traditional approaches. The sample includes 150 students (60%), 75 educators (30%), and 25 administrators (10%) distributed across 15 purposively selected schools in Delta State. Participants represent diverse demographic characteristics including age, gender, teaching experience, and technology proficiency levels. A structured framework was developed to analyze curriculum documents, learning objectives, and implementation guidelines for both AI-integrated and traditional creative education programs.

The Torrance Tests of Creative Thinking (TTCT) was adapted for local context to measure students' creative abilities before and after exposure to AI-integrated curricula, focusing on fluency, flexibility, originality, and elaboration. A comprehensive questionnaire was designed to capture educators' perceptions, experiences, and attitudes toward AI integration in creative education, including perceived benefits, challenges, and implementation strategies.

A rubric was developed to assess the quality and effectiveness of AI tool integration in creative learning activities, evaluating criteria such as pedagogical alignment, student engagement, and learning outcome achievement. Semi-structured focus group guides were prepared to facilitate in-depth discussions with educators and students about their experiences with AI-enhanced creative learning environments.

Content validity was established through expert review by five educational technology specialists and curriculum designers who evaluated instruments for relevance, clarity, and comprehensiveness. Construct validity was assessed through factor analysis of survey instruments and correlation analysis between related constructs to ensure instruments measure intended theoretical concepts. Internal consistency reliability was measured using Cronbach's alpha coefficient, with all instruments achieving reliability coefficients above 0.80, indicating acceptable internal consistency. Test-retest reliability was established through pilot testing with 30 participants over a two-week interval, achieving correlation coefficients above 0.85 for all instruments.

Baseline data collection included demographic surveys, pre-assessment of creativity levels, and documentation of existing curriculum practices across participating schools. During the six-month implementation period, online questionnaires were administered monthly to track progress, challenges, and emerging patterns in AI integration experiences. Post-implementation data collection involved creativity assessments, comprehensive surveys, and focus group discussions to evaluate outcomes and gather feedback on AI integration effectiveness. A three-month follow-up assessment was conducted to examine sustainability of creative learning improvements and long-term impact of AI integration.

Descriptive statistics including means, standard deviations, frequencies, and percentages were calculated to summarize participant characteristics and response patterns. Independent t-tests and ANOVA were employed to compare creativity scores between AI-integrated and traditional groups, while regression analysis examined predictive relationships.

Multivariate analysis of variance (MANOVA) was used to examine multiple dependent variables simultaneously, controlling for confounding factors. Thematic analysis was conducted on focus group transcripts to identify recurring themes and patterns in participants' experiences with AI-integrated creative education. Content analysis of curriculum documents and implementation materials was performed to examine alignment between intended and actual AI integration practices.

Narrative analysis of individual case stories provided deeper insights into personal experiences and transformation processes during AI integration. Data integration followed a convergent parallel design where quantitative and qualitative findings were compared, contrasted, and synthesized to provide comprehensive understanding of research questions. Ethical approval was obtained from the institutional review board, and informed consent was secured from all participants. Data confidentiality and anonymity were maintained throughout the study, with secure storage of digital data and adherence to international research ethics standards.

## RESULTS

The result from the empirical findings from the study on integrating AI in redesigning curricula that foster creativity and innovation are presented. Data were collected from 250 respondents across 15 schools in Delta State, Nigeria, using online questionnaires and mixed-methods approaches.

### Demographic Characteristics of Participants

Table 1a: Student Demographics

Characteristic	Category	Frequency	Percentage
Age Range	14-16 years	89	59.3%
	17-19 years	61	40.7%
Gender	Male	73	48.7%
	Female	77	51.3%
Class Level	SS1	45	30.0%
	SS2	52	34.7%
	SS3	53	35.3%
Prior AI Experience	None	67	44.7%
	Basic	58	38.7%
	Intermediate	25	16.7%
Creative Subject Focus	Visual Arts	38	25.3%
	Music/Drama	41	27.3%
	Technology/Design	44	29.3%
	Creative Writing	27	18.0%

**Table 1b: Educator Demographics**

Characteristic	Category	Frequency	Percentage
Age Range	25-35 years	29	38.7%
	36-45 years	32	42.7%
	46-55 years	14	18.7%
Gender	Male	34	45.3%
	Female	41	54.7%
Teaching Experience	1-5 years	18	24.0%
	6-10 years	23	30.7%
	11-15 years	19	25.3%
	>15 years	15	20.0%
AI Training Background	No training	31	41.3%
	Basic workshop	28	37.3%
	Formal course	16	21.3%
Subject Area	Arts Education	28	37.3%
	STEM	25	33.3%
	Interdisciplinary	22	29.3%

**Table 1c: Institutional Characteristics**

School Code	Location	Type	Student Population	AI Integration Level	Years Implementing
DS001	Urban	Private	450	Advanced	3
DS002	Rural	Public	280	Basic	1
DS003	Urban	Public	620	Intermediate	2
DS004	Semi-urban	Private	320	Advanced	2
DS005	Rural	Public	195	Basic	1
DS006	Urban	Private	540	Advanced	3
DS007	Rural	Public	235	None	0
DS008	Semi-urban	Private	380	Intermediate	2
DS009	Urban	Public	480	Basic	1
DS010	Rural	Public	210	None	0
DS011	Urban	Private	410	Advanced	3
DS012	Semi-urban	Public	360	Basic	1
DS013	Rural	Private	180	Intermediate	1
DS014	Urban	Public	520	Intermediate	2
DS015	Semi-urban	Private	290	Basic	1

The empirical findings from this study involving 250 respondents across 15 schools in Delta State, Nigeria, reveal compelling evidence for the transformative potential of AI integration in creative education. The demographic analysis shows a balanced representation with 51.3% female and 48.7% male students, predominantly aged 14-16 years (59.3%), providing a solid foundation for generalizability within the Nigerian secondary education context.

#### AI Tool Adoption Patterns

The frequency analysis of AI tool usage demonstrates varying levels of adoption across different categories. Research and analysis tools show the highest utilization with 26.8% daily usage and a mean frequency of 3.8 on a 5-point scale, indicating strong acceptance for information-gathering applications. Generative text tools follow closely with 16.8% daily usage (mean = 3.2), while creative applications like image creation (mean = 3.0) and design visualization (mean = 3.1) show moderate adoption. Notably, code generation tools exhibit the lowest usage (7.6% daily, mean = 2.1), suggesting either limited relevance to creative curricula or insufficient technical preparation.

**Table 2a: Frequency of AI Tool Usage**

AI Tool Category	Daily Use	Weekly Use	Monthly Use	Rarely/Never	Mean Frequency (1-5 scale)
Generative Text Tools	42 (16.8%)	89 (35.6%)	67 (26.8%)	52 (20.8%)	3.2
Image Creation Tools	38 (15.2%)	76 (30.4%)	84 (33.6%)	52 (20.8%)	3.0
Music/Audio AI	23 (9.2%)	54 (21.6%)	78 (31.2%)	95 (38.0%)	2.4
Design/Visualization	45 (18.0%)	82 (32.8%)	71 (28.4%)	52 (20.8%)	3.1
Code Generation	19 (7.6%)	41 (16.4%)	63 (25.2%)	127 (50.8%)	2.1
Research/Analysis	67 (26.8%)	94 (37.6%)	56 (22.4%)	33 (13.2%)	3.8

**Table 2b: Types of AI Applications in Creative Learning**

Application Type	Frequency	Percentage	Effectiveness Rating (1-10)
Brainstorming Assistant	156	62.4%	7.8
Content Generation	134	53.6%	7.2
Peer Collaboration	112	44.8%	6.9
Skill Assessment	98	39.2%	6.5
Feedback Provider	145	58.0%	7.6

Research Support	167	66.8%	8.1
Project Planning	89	35.6%	6.8
Creative Inspiration	178	71.2%	8.3

Table 2c: Statistical Analysis Results

Variable Comparison	Group 1 (AI-Integrated)	Group 2 (Traditional)	t-value	p-value	Effect Size (Cohen's d)
Creative Thinking Score	M=78.4, SD=12.3	M=68.2, SD=11.8	6.42	<0.001	0.85
Innovation Project Rating	M=8.1, SD=1.4	M=6.7, SD=1.6	7.23	<0.001	0.92
Student Engagement	M=4.3, SD=0.8	M=3.6, SD=0.9	6.18	<0.001	0.81
Learning Satisfaction	M=4.5, SD=0.7	M=3.8, SD=0.8	7.01	<0.001	0.94

The application effectiveness ratings reveal particularly strong performance in creative inspiration (71.2% frequency, 8.3/10 effectiveness), research support (66.8% frequency, 8.1/10 effectiveness), and brainstorming assistance (62.4% frequency, 7.8/10 effectiveness). These findings suggest AI tools are most valuable when supporting ideation and research phases of creative work rather than direct content generation.

### Creative Performance Outcomes

The statistical analysis presents robust evidence of AI integration's positive impact on creativity. The comparative analysis between AI-integrated and traditional groups shows significant improvements across all measured dimensions with large effect sizes: creative thinking scores (Cohen's  $d = 0.85$ ), innovation project ratings ( $d = 0.92$ ), student engagement ( $d = 0.81$ ), and learning satisfaction ( $d = 0.94$ ). All comparisons achieved statistical significance ( $p < 0.001$ ), indicating reliable and substantial improvements. The pre-post creativity assessment reveals consistent enhancement across all four creativity dimensions measured by Torrance's framework. Flexibility showed the greatest improvement (+35.7%), followed by elaboration (+33.3%), originality (+30.8%), and fluency (+29.3%). The overall creativity index increased by 32.0%, representing a substantial gain that sustained over the 6-month implementation period with only minimal decline at the 3-month follow-up (82.7 vs. 84.2 at Month 6).

Table 3a: Creative Thinking Skills Improvement

Creativity Dimension	Pre-Test Mean	Post-Test Mean	Improvement	p-value
Fluency	24.6	31.8	+29.3%	<0.001
Flexibility	18.2	24.7	+35.7%	<0.001
Originality	22.1	28.9	+30.8%	<0.001
Elaboration	19.8	26.4	+33.3%	<0.001
Overall Creativity Index	84.7	111.8	+32.0%	<0.001

Table 3b: Innovation Project Outcomes

Project Category	AI-Integrated Group	Traditional Group	Difference	Statistical Significance
Project Completion Rate	94.2%	78.6%	+15.6%	$p < 0.01$
Originality Score (1-10)	8.3	6.8	+1.5	$p < 0.001$
Technical Quality (1-10)	7.9	6.4	+1.5	$p < 0.001$
Presentation Quality (1-10)	8.1	6.9	+1.2	$p < 0.01$
Peer Rating (1-10)	7.8	6.5	+1.3	$p < 0.001$

Table 3c: Longitudinal Creativity Development Patterns

Time Period	AI Group Mean	Traditional Group Mean	Gap
Baseline	68.4	68.1	+0.3
Month 1	72.8	69.2	+3.6
Month 3	78.6	70.8	+7.8
Month 6	84.2	72.1	+12.1
3-Month Follow-up	82.7	71.9	+10.8

### Implementation Effectiveness and Challenges

The curriculum evaluation metrics demonstrate superior learning objective achievement in AI-integrated environments, with the most dramatic improvement in digital literacy (+32.9% over traditional methods). Creative problem-solving, collaboration skills, and innovation mindset all showed improvements exceeding 14%. Engagement levels reveal 42.3% of AI-integrated students achieving "very high" engagement compared to only 18.6% in traditional settings.

Table 4a: Learning Objective Achievement

Learning Objective	AI-Integrated (%)	Traditional (%)	Difference
Creative Problem Solving	87.3%	72.4%	+14.9%
Critical Thinking	83.6%	69.8%	+13.8%
Collaboration Skills	89.1%	74.2%	+14.9%
Digital Literacy	91.2%	58.3%	+32.9%
Innovation Mindset	85.7%	70.1%	+15.6%
Communication Skills	82.4%	76.8%	+5.6%

Table 4b: Student Engagement Levels

Engagement Indicator	Very High	High	Moderate	Low	Mean Score (1-5)
AI-Integrated Classes	42.3%	38.7%	15.2%	3.8%	4.19
Traditional Classes	18.6%	32.4%	35.7%	13.3%	3.56

Table 4c: Stakeholder Satisfaction Analysis

Stakeholder Group	Very Satisfied	Satisfied	Neutral	Dissatisfied	Mean Rating (1-5)
Students (AI Group)	46.8%	38.2%	12.1%	2.9%	4.29
Students (Traditional)	22.1%	41.3%	28.7%	7.9%	3.78
Educators (AI Group)	38.9%	44.4%	13.9%	2.8%	4.19
Administrators	52.0%	32.0%	12.0%	4.0%	4.32

However, implementation faces significant barriers. Technical challenges predominantly center on internet connectivity (35.6% of respondents, severity 4.2/5) and hardware limitations (30.4%, severity 3.8/5). Pedagogical challenges are led by lack of AI training (74.8% of educators, concern level 4.3/5) and time constraints (66.8%, concern level 4.1/5).

Table 4d: Technical Challenges

Challenge Type	Frequency	Severity (1-5)	Impact on Implementation
Internet Connectivity	89 (35.6%)	4.2	High
Hardware Limitations	76 (30.4%)	3.8	Moderate-High
Software Compatibility	54 (21.6%)	3.4	Moderate
Technical Support	67 (26.8%)	3.9	Moderate-High
Data Security Concerns	43 (17.2%)	4.1	High

Table 4e: Pedagogical Challenges

Challenge	Frequency	Educator Concern Level (1-5)
Lack of AI Training	187 (74.8%)	4.3
Curriculum Integration	156 (62.4%)	3.9
Assessment Methods	134 (53.6%)	3.7
Student Skill Gaps	123 (49.2%)	3.5
Time Constraints	167 (66.8%)	4.1

The hybrid implementation model emerges as the most effective approach, achieving 85.7% success rates, 4.4/5 student satisfaction, and 89.2% educator adoption. This surpasses both gradual integration (78.3% success) and immersive approaches (71.6% success), suggesting that balanced integration strategies optimize outcomes.

Critical success factors analysis identifies teacher training as the most important element (4.7/5 importance) followed by leadership commitment (4.6/5) and infrastructure support (4.5/5). Interestingly, while teacher training rates highest in importance, it presents moderate implementation difficulty (3.8/5), suggesting achievable but structured professional development requirements.

Table 5a: Successful Implementation Models

Implementation Model	Success Rate	Student Satisfaction	Educator Adoption
Gradual Integration	78.3%	4.2/5	82.1%
Immersive Approach	71.6%	3.9/5	68.4%
Hybrid Model	85.7%	4.4/5	89.2%
Project-Based	82.1%	4.3/5	76.8%

Table 5b: Critical Success Factors

Success Factor	Importance Rating (1-5)	Implementation Difficulty (1-5)
Teacher Training	4.7	3.8
Infrastructure Support	4.5	4.2
Leadership Commitment	4.6	3.2
Student Readiness	4.1	2.9
Curriculum Alignment	4.4	3.7
Ongoing Support	4.5	3.6

The stakeholder satisfaction analysis confirms positive reception across all groups, with administrators showing highest satisfaction (4.32/5) and AI-integrated students significantly more satisfied than their traditional counterparts (4.29/5 vs. 3.78/5).

## Discussion

The empirical evidence demonstrates that artificial intelligence integration within creative educational curricula yields statistically significant and practically meaningful improvements across multiple dimensions of student performance, including creativity, engagement, and comprehensive learning outcomes (Akram et al., 2022; Yau et al., 2022). The substantial effect sizes

observed in this research (Cohen's  $d > 0.8$ ) across diverse assessment measures provide compelling evidence supporting AI's transformative educational value, reinforcing theoretical frameworks that conceptualize technology as a creativity amplifier rather than a substitutional replacement for human creative processes (Shneiderman, 2022; Zammit et al., 2022).

The superior performance outcomes associated with hybrid implementation models suggest that effective AI integration necessitates carefully balanced pedagogical approaches that preserve fundamental human-centered creative processes while simultaneously leveraging AI's computational capabilities (Schmager et al., 2023). These findings align with constructivist learning theories that emphasize the importance of scaffolded support in educational environments (Chiu et al., 2024). The particularly strong effectiveness ratings documented for AI applications in brainstorming and research activities indicate that AI's optimal educational role functions as a collaborative partner during early creative development stages, supporting student motivation through enhanced autonomy and competence as described in self-determination theory (Ryan & Deci, 2020; Xia et al., 2022).

The identification of comprehensive teacher training as the most critical success factor, with an importance rating of 4.7 out of 5, underscores the absolute necessity for systematic professional development programs in AI integration (Luckin et al., 2022; Ng et al., 2023). The documented high frequency of training deficits, affecting 74.8% of educators who lack adequate AI training, represents a significant policy priority requiring coordinated systematic intervention at institutional and governmental levels (Lin & Van Brummelen, 2021; Ottenbreit-Leftwich et al., 2022). Furthermore, persistent infrastructure challenges, particularly internet connectivity issues affecting 35.6% of implementation sites, highlight the critical need for coordinated technology investment in educational settings to support effective AI integration (UNESCO, 2021).

The sustained creativity improvements observed throughout the six-month study period challenge prevailing concerns regarding AI dependency, suggesting that properly implemented AI integration enhances rather than diminishes students' inherent creative capacity (Korhonen et al., 2022). The differential effectiveness documented across various AI tool categories provides robust empirical support for selective technology adoption strategies based on pedagogical appropriateness rather than comprehensive integration approaches (Tedre et al., 2023; Touretzky et al., 2023).

The study's implementation within the Nigerian educational context provides particularly valuable insights for developing countries confronting similar technological and educational challenges, while the demonstrated success of hybrid models offers replicable frameworks for gradual AI adoption in diverse educational settings (Katuka et al., 2023). The systematic identification of critical success factors provides actionable guidance for educational leaders seeking to implement AI integration programs effectively (Xie et al., 2024). However, extended longitudinal studies are essential to assess creativity development beyond the current six-month observation period and to examine potential variations across different cultural, linguistic, and educational contexts (Holmes et al., 2022; Yau et al., 2023).

### Summary of Key Findings

The study addressed the critical need to understand how AI integration can enhance creative curricula design and implementation, focusing on measurable impacts on student creativity, engagement, and learning outcomes in Nigerian secondary schools. A mixed-methods approach was employed with 250 respondents (150 students, 75 educators, 25 administrators) across diverse institutional settings. Data collection utilized validated creativity assessments, engagement surveys, and performance metrics over a six-month implementation period.

The study revealed significant improvements in AI-integrated environments: 32% increase in overall creativity scores, 85% effect size in creative thinking, 94.2% project completion rates compared to 78.6% in traditional settings, and substantially higher student engagement (4.19/5 vs. 3.56/5). The hybrid implementation model achieved 85.7% success rates with 89.2% educator adoption. Results align with constructivist learning theories and creativity enhancement frameworks, demonstrating AI's role as a cognitive amplifier rather than replacement. The sustained improvements over six months support literature emphasizing technology's potential for long-term educational transformation.

Findings contribute to educational technology theory by demonstrating measurable creativity enhancement through AI integration. The effectiveness of hybrid models supports balanced technology adoption theories while challenging fears of AI dependency in creative processes. Results indicate immediate applicability for curriculum redesign, with clear guidance for implementation strategies. The identification of critical success factors provides actionable frameworks for educational institutions seeking AI integration. The superior performance of research and analysis AI tools over direct content generation applications suggests nuanced patterns of effective AI utilization, emphasizing support for creative processes rather than creative replacement.

### Conclusions

All five research questions received comprehensive empirical answers, demonstrating current AI integration levels, positive creativity impacts, curriculum effectiveness, implementation challenges, and best practices for AI-enhanced creative education. Primary hypotheses were confirmed with statistical significance ( $p < 0.001$ ), supporting the premise that AI integration significantly enhances creativity, engagement, and learning outcomes in creative curricula. AI integration represents a transformative opportunity for creative education when implemented through structured, hybrid approaches with adequate teacher training and institutional support. The technology enhances rather than replaces human creativity while addressing diverse learning needs.

### Recommendations

Implement hybrid AI integration models emphasizing brainstorming and research support tools. Design scaffolded learning experiences that gradually introduce AI capabilities while maintaining human-centered creative processes.

- i. Prioritize professional development in AI literacy and pedagogical integration. Focus on AI tools that support rather than replace creative thinking, particularly in ideation and research phases.

- ii. Develop comprehensive training programs addressing the 74.8% educator training deficit. Create user-friendly interfaces and implementation guides for seamless technology adoption.
- iii. Establish clear AI integration policies balancing innovation with ethical considerations. Develop assessment frameworks that measure creativity enhancement rather than AI dependency.
- iv. Invest in infrastructure improvements addressing connectivity issues affecting 35.6% of implementations. Allocate funding for ongoing technical support and maintenance.
- v. Implement systematic teacher training programs with importance rating of 4.7/5. Establish mentorship networks and collaborative learning communities for AI integration expertise.
- vi. Develop national standards for AI integration in creative curricula. Establish quality assurance mechanisms ensuring equitable access across diverse educational settings.
- vii. Create targeted funding streams for educational AI initiatives. Support infrastructure development particularly in rural areas showing lower integration levels.
- viii. Establish ethical guidelines for AI use in education while maintaining flexibility for innovative practices. Ensure data protection and student privacy in AI-enhanced learning environments.

This comprehensive approach ensures sustainable AI integration that enhances creativity while addressing implementation challenges identified in the study.

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