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How does generative AI influence creativity and creative learning in arts education?

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Abstract:
Generative artificial intelligence (GenAI) is increasingly integrated into arts education, raising important questions about its capacity to support creativity while potentially reshaping students' creative processes and agency. This systematic review examines empirical evidence on how GenAI influences creativity and creative learning across arts-related educational contexts. The review synthesized studies published between 2022 and 2026 across visual arts, music, design, creative writing, and related creative disciplines. The findings reveal a complex pattern of effects. GenAI can enhance ideation, creative self-efficacy, engagement, and creative performance, particularly when used to support exploration and iterative creation. However, the evidence also identifies risks associated with over-reliance on AI, including homogenization of creative outputs, reduced creative diversity, dependence on algorithmic suggestions, and potential erosion of foundational artistic skills. A key finding across the literature is that the educational value of GenAI depends substantially on pedagogical mediation. Studies incorporating structured scaffolding, reflective activities, and teacher guidance generally report more favorable creative outcomes than those involving relatively unstructured AI use. The review therefore suggests that GenAI should be conceptualized not simply as a creativity-enhancing technology but as a pedagogically contingent creative partner whose effects depend on how learners interact with it and how educators structure that interaction. Further longitudinal and culturally diverse research is needed to determine whether observed improvements represent sustained development of human creativity rather than short-term enhancement of AI-assisted creative performance.

Key Word*: generative artificial intelligence; creativity; creative learning; arts education; pedagogical scaffolding; systematic review*

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I. Introduction

Generative artificial intelligence (GenAI) has rapidly entered arts education classrooms across visual arts, music, design, and creative writing, prompting a substantial body of empirical research on whether these tools amplify or erode student creativity. The technology enables students to generate novel textual, visual, audio, and multimodal outputs from natural language prompts, reducing the technical skills needed to produce high-quality work (Jiang et al., 2025). A systematic review of 19 empirical studies from 2019 to 2025 found that GenAI has the potential to improve learning achievement, creative thinking, engagement, and cultural understanding when integrated through structured pedagogical frameworks. However, these positive outcomes represent early-stage implementation trends in well-resourced contexts rather than broadly generalizable conclusions. A landmark mixed-methods study using the Alternate Uses Test found that while ChatGPT-3 can support creative thinking, it also produces negative impacts on creativity and creative confidence, advocating for a careful approach to integration (Habib et al., 2024). The evidence base spans K-12 classrooms, higher education, and teacher training programs, with studies employing quasi-experimental designs, qualitative case studies, and mixed-methods approaches across diverse cultural contexts including East Asia, Europe, the Middle East, and the Americas (Abdulmajid et al., 2026; Jiang et al., 2025; Sáez-Velasco et al., 2024). This review examines how GenAI influences ideation, skill development, creative agency, and the ethical dimensions of arts learning, drawing on the full spectrum of available evidence to answer the research question: Does generative AI enhance creativity and creative learning in arts education?

II. Methods

The search ran over 170 million research papers, drawing from Semantic Scholar, PubMed, and other scholarly databases. The multi-step deep search strategy employed six research groups targeting foundational theories, alternate terminology, critical perspectives, interdisciplinary expansion, methodological diversity, and

adjacent constructs such as creative agency and authorship. Initial searches across 28 database queries identified over 6.5 million candidate papers, which were subsequently filtered through machine-learned relevance screening. From 230 papers screened, 131 passed the relevance threshold, and after deduplication, the top 100 papers were selected by relevance ranking for inclusion in this review. The corpus spans empirical studies, systematic reviews, qualitative case studies, quasi-experimental designs, and conceptual papers published between 2022 and 2026. The search combined broad topical queries with targeted searches for critical perspectives and methodological diversity across arts education sub-disciplines.

III. Results

Enhancement of Ideation and Creative Output

Multiple experimental and quasi-experimental studies report that GenAI tools measurably improve dimensions of creative output when integrated with structured pedagogical guidance. A GAN-based educational auxiliary system produced a 35.4% improvement in creative output quality and a 42.7% increase in engagement over traditional tools among 60 undergraduate art students (He & Zhang, 2025). Integrating ChatGPT-4 into artistic learning activities across fine arts, literary writing, and fashion design promoted greater growth in creative potential as measured by the Torrance Test of Creative Thinking-Figural (Xu, 2025). A mixed-methods study of 405 university students found that generative AI support in collaborative music creation significantly enhanced creative interest ($\beta = 0.616$), creative self-efficacy ($\beta = 0.557$), and perceived creative competence ($\beta = 0.357$) (Zhuang & Li, 2026). In visual art education, fifth-grade students using AI-generated images exhibited significantly higher classroom engagement and self-efficacy compared to peers receiving conventional instruction, with no significant difference in cognitive load (Bian et al., 2025). A six-week randomized experiment with 120 visual communication design students showed that GenAI-integrated instruction was associated with higher expert-rated creative performance compared to traditional instruction (Huang et al., 2026). Students in a Malaysian primary visual arts classroom using Leonardo AI demonstrated increased creative confidence and participation, particularly among learners with low artistic self-efficacy (Lai et al., 2026). A quasi-experimental study of 120 education students found large effect sizes for creative problem-solving (Hedges' $g = 1.66$) and divergent thinking (Hedges' $g = 1.18$) after a 12-week AI-assisted intervention (Hesti Putri & Khalil Jibran, 2026). In elementary STEAM education, students found using generative AI for creative expression enjoyable and personalized, potentially improving the creative process (Lee et al., 2024).

Risks of Homogenization, Dependence, and Skill Erosion

Table 1. Key risks of generative AI on creative diversity and skill development

Risk Dimension	Evidence	Context	Citations
Collective novelty loss	AI-enabled stories more similar to each other	Online writing experiment	(Doshi & Hauser, 2024)
Semantic convergence	Lower semantic divergence in AI-assisted ideas	Design engineering crossover study	(Baltà-Salvador et al., 2026)
Skill bypass	Over-reliance may reduce independent creative abilities	University art education	(Hsuan & Wei, 2025)
Aesthetic mimicry	Excessive reliance leads to standardization	Primary art classroom	(Lai et al., 2026)
Creative confidence decline	Negative impacts on creativity and confidence	College creativity course	(Habib et al., 2024)

A central paradox emerges across the corpus: GenAI can enhance individual creative output while simultaneously narrowing the collective diversity of creative work. Doshi and Hauser (2023) found that access to generative AI ideas made stories individually more creative but collectively more similar, describing a social

dilemma where writers are individually better off but produce a narrower scope of novel content (Doshi & Hauser, 2024). A randomized crossover study in design engineering showed that while AI did not reduce fluency, flexibility, or originality, semantic divergence was significantly lower in the AI-assisted condition, with AI-assisted ideas more frequently resembling existing products (Baltà-Salvador et al., 2026). Faculty in Chinese higher education highlighted risks of creativity homogenization and the reduction of traditional skills (Tadesse et al., 2026). Concerns about over-reliance were echoed by pre-service teachers in Japan who worried that AI could diminish creativity, artistic development, and critical thinking through over-dependence (Nguyen & Kasahara, 2025). A systematic review of music education identified cognitive dependence emerging through outsourcing evaluative authority and algorithm-accommodating self-censorship (Peng et al., 2026). Casacuberta and Guersenzvaig argued that prompting risks sequestering users in novice-level engagement by disrupting the feedback loop between mind, hand, and expressive material (Casacuberta & Guersenzvaig, 2025). In a study of sports undergraduates, generative AI dependence had a significant positive direct effect on creativity, but the authors cautioned that scaffolding-based instructional approaches are essential for avoiding maladaptive overreliance (Gu, 2026).

Pedagogical Mediation and Structured Integration

The effectiveness of GenAI in arts education depends heavily on instructional design, teacher mediation, and the pedagogical framework within which tools are embedded. A quasi-experimental study with 45 students found that integrating mind mapping with ChatGPT-supported digital storytelling significantly enhanced creative thinking tendencies and critical thinking awareness compared to conventional GenAI-supported learning (Chiu & Hwang, 2026). A 12-week quasi-experiment with 75 vocational students found that independent GenAI use failed to promote actual creativity development, but when teachers provided structural support alongside GenAI, all dimensions of creativity (fluency, flexibility, elaboration, and originality) improved (Cui & Li, 2026). A mixed-methods study of 112 student reflections in a Design Thinking course found that when pedagogically scaffolded, GenAI augments rather than replaces human judgment, with students evolving from passive users to critical evaluators (Rana et al., 2025). Faculty perspectives identified both positive disruptions (improved ideation and creative processes) and negative disruptions (ethical implications and pedagogical concerns), with insufficient AI literacy among faculty significantly hindering effective adoption (Basty et al., 2025). Art educators in Singapore demonstrated that AI literacy and prompt engineering are essential pedagogies for transformative learning with AI (Heaton et al., 2024). A study of 63 undergraduate arts students found that GenAI tools functioned as cognitive amplifiers in aesthetic learning, with the experimental group demonstrating significantly greater improvement in critical thinking disposition (Cohen's $d = 0.70$) through mechanisms of perceptual-conceptual alignment, iterative visual experimentation, and AI-mediated reflective structuring (Liu et al., 2026). Design educators emphasized ethical awareness and critical judgment, framing AI as a catalyst for rethinking creative processes rather than replacing them (Fleischmann, 2026). In a Kuwaiti context, AI functioned as a friction-generating interlocutor that catalyzed critical awareness of authorship, agency, and the politics of representation (Abdulmajid et al., 2026).

IV. Discussion

The corpus reveals a field in productive tension. On one hand, a convergence of quasi-experimental, mixed-methods, and qualitative studies demonstrates that GenAI tools can enhance ideation fluency, creative self-efficacy, engagement, and expert-rated creative output quality across visual arts, music, design, and creative writing (He & Zhang, 2025; Xu, 2025; Zhuang & Li, 2026). These gains are most pronounced among students with lower baseline creative ability, suggesting a democratizing effect (Doshi & Hauser, 2024; Lai et al., 2026). On the other hand, the evidence for collective creative diversity is concerning: Doshi and Hauser's finding that AI-enabled stories are more similar to each other has been corroborated by semantic convergence in design ideation and faculty concerns about aesthetic homogenization (Baltà-Salvador et al., 2026; Doshi & Hauser, 2024; Tadesse et al., 2026). The most consistent finding across the corpus is the centrality of pedagogical mediation. Studies where GenAI was deployed without structured instructional frameworks showed null or negative effects on actual creativity (Cui & Li, 2026), while those with explicit scaffolding, reflective protocols, and teacher guidance produced significant gains (Chiu & Hwang, 2026; Cui & Li, 2026; Rana et al.,

2025). However, the evidence base has notable limitations. Most studies are short-term (4-20 weeks), concentrated in higher education and East Asian contexts, and rely heavily on self-report measures and expert ratings rather than longitudinal behavioral outcomes (Jiang et al., 2025; Peng et al., 2026). The systematic review of music education noted that early childhood settings were entirely absent from the literature (Peng et al., 2026). Cultural bias in generative models poses particular challenges for non-Western educational contexts, as demonstrated by the "Algorithmic Orientalism" observed among Kuwaiti students (Abdulmajid et al., 2026).

V. Conclusion

Generative AI is reshaping arts education by lowering technical barriers to creative production, accelerating ideation, and expanding the range of aesthetic possibilities available to students. The evidence converges on a nuanced picture: GenAI can enhance individual creative output, self-efficacy, and engagement when embedded in structured pedagogical frameworks with intentional teacher mediation, but unstructured use risks homogenizing creative output, eroding collective diversity, and fostering dependency that undermines the development of foundational artistic skills. The field is transitioning from speculative commentary to empirical investigation, yet longitudinal evidence, culturally diverse contexts, and studies of younger learners remain insufficient.

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