
Creative Process Transformation through Generative AI Models

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Abstract

Generative artificial intelligence (AI) is reshaping creative industries, transforming how art, design, and storytelling are conceived and produced. In recent years, tools such text-to-image systems and large language models have moved from research laboratories into everyday creative workflows, making advanced capabilities accessible to professionals and matures alike. These technologies enable rapid idea generation, personalized outputs, and exploration of new aesthetic possibilities, but they also raise important questions about authenticity, authorship, and the role of human creativity. This review highlights key technological advances, such as diffusion models and personalization techniques alongside their impact on visual arts, design and writing. While AI expands creative potential and accelerates processes, challenges remain in balancing novelty with perceived authenticity and designing interfaces that support meaningful human–AI collaboration. Understanding these dynamics is essential as generative AI becomes a mainstream partner in creative practice.

Keywords: generative AI, creative process, diffusion models, human-AI collaboration, computational creativity, digital art, design automation

1.Introduction

Creative industries are experiencing a profound technological shift driven by advances in generative artificial intelligence. Over the few years, generative models have evolved from experimental research prototypes to widely adopted tools that fundamentally alter how creative professionals conceptualize, develop, and produce artistic works [1]. Text-to-image systems have democratized access to sophisticated generative capabilities, enabling creators across disciplines to explore novel aesthetic territories and accelerate production workflows [2].

This transformation raises fundamental questions regarding the nature of creativity, authorship, and the role of human agency in artistic production. While early concerns focused on whether machines could be creative, contemporary discourse has shifted toward understanding how humans and AI systems can productively collaborate, what new creative possibilities emerge from these partnerships, and how society should value and attribute AI-assisted creative works [3].

While generative AI has transformed artistic workflows and enabled new forms of human–AI co-creation, the influence of artificial intelligence extends beyond creative practice into broader organizational and technological ecosystems. AI-driven data analytics and digitalization reshape supply chain management by improving real-time visibility, predictive forecasting, and risk mitigation processes. Through the integration of machine learning, Internet of Things technologies, and automated data processing, AI functions as an infrastructure for adaptive decision-making rather than merely a creative tool [7]. These developments illustrate that contemporary artificial intelligence operates across multiple domains, linking creative innovation with operational efficiency and reinforcing its role as a cross-sector catalyst for digital transformation.

2. Technological Foundations of Generative AI in Creative Domains

2.1. Diffusion Models: Transforming Digital Art

Diffusion models have rapidly emerged as the dominant architecture for high-fidelity image generation, fundamentally reshaping artistic workflows by translating textual or semantic constraints into photorealistic or stylistically diverse images [1]. Unlike earlier Generative Adversarial Network (GAN) based approaches, diffusion models offer more stable training, better mode coverage, and superior controllability using conditional guidance mechanisms.

A comprehensive technical review of diffusion-based visual art creation was provided, documenting how these models address key challenges in creative applications including style transfer, compositional control, and semantic alignment [2]. Their analysis highlights that diffusion architecture enables artists to iteratively refine outputs through prompt engineering and parameter adjustment, supporting exploratory creative workflows that were difficult to achieve with previous generative technologies.

2.2. Human–AI Co-Creation: Practical Insights into the Technological Foundations of Generative Models

The technological foundations of generative AI in creative domains rest not only on the architecture themselves, such as DC-GANs, StyleGAN, and StyleGAN-2, but also on the sociotechnical dynamics that emerge when non-programmers interact with these systems. As

demonstrated in a case study of MA students in human–computer interaction, GANs behave as semi-autonomous creative agents whose outputs depend heavily on upstream design choices made by human collaborators. Students with minimal technical background learned to manipulate dataset composition, adjust training parameters, and select pre-trained models, demonstrating that “controllability” in generative AI often arises from curating inputs rather than altering model architecture. For example, model behaviors such as producing politicians with stereotypical “speech stance” imagery or generating symmetrical butterflies when trained on face-based models reveal how latent representations encode visual biases of the chosen training sets [4].

Moreover, the study highlights that generative models become creative tools through iterative human intervention: selecting homogeneous datasets, fine-tuning pretrained networks, experimenting with unusual domain transfers (e.g., toaster-cats or hybrid horse–kitchen-appliance images), and intentionally stopping training early to preserve desirable artifacts [4].

These examples illustrate a fundamental principle: the technological power of generative AI is inseparable from human decisions that shape data pipelines, model initialization, and training trajectories. Rather than viewing the model as a closed mathematical object, the creative process unfolds as a hybrid computational workflow where human judgment defines goals, constraints, and evaluation criteria, while the GAN operationalizes these decisions into novel visual outcomes. This co-creative loop underscores why generative AI in creative industries requires not only algorithmic advancements, but also accessible interfaces, intuitive defaults, and educational framework that empower non-experts to meaningfully steer complex generative systems.

The above-mentioned study provides valuable insights into human-AI collaboration in creative tasks. It highlights that non-programmers can grasp key concepts and train GANs to obtain interesting results using either graphical user interface (GUI) -based software or by modifying simple existing code. This research also identifies several human intervention points in the creative process, including dataset selection, choice of pre-trained models, and post-processing of results. Notably, some students interpreted the task as AI assisting human creativity rather than autonomous AI creation. The paper suggests that allowing non-programmers more control and intervention points is desirable, but the challenge lies in providing non-experts with intuitions about handling various hyperparameters [4].

2.3. Authenticity Challenges in Human–AI Artistic Co-Creation

A critical development in creative AI is the emergence of personalization techniques that adapt generative models to individual artists' styles using small curated datasets [5]. These approaches

address a fundamental tension in creative AI: while large-scale pre-trained models offer impressive general capabilities, creative professionals often require outputs that align with their unique aesthetic sensibilities and established work.

Research on personalization demonstrates that when AI models are trained or adapted using small, artist-curated datasets, artists can exercise greater control over the creative process and develop a stronger sense of ownership over the generated outcomes. By integrating personalization features into co-creative interfaces, artists are enabled to experiment with and tailor generative models to align with their individual aesthetic goals and working methods. Adopting small data approaches also expands the range of possible interactions, including direct dataset manipulation, hyperparameter tuning, and active divergence techniques. Furthermore, personalization may shape how artists perceive AI systems in co-creative contexts, fostering a sense of agency in the system and supporting more dynamic and reciprocal human–AI collaborations. Model personalization with small data holds significant promise for enhancing artists’ experiences with generative AI, and it calls for future research to further develop co-creative systems grounded in these personalization-centered principles. [5]

3. Impact on Creative Processes Across Domains

3.1 Visual Arts and Design: Novelty Versus Authenticity

Empirical studies reveal the complex effects of generative AI on visual creative practices, with significant gains in novelty accompanied by concerns about authenticity and artistic value. In experiments conducted with 560 participants examining perceptions of AI co-created artworks, finding that such works are consistently judged as more novel but less authentic than purely human-created pieces [3]. Critically, the stage of AI involvement matters: AI contributions to the ideation phase are viewed more favorably than AI-implemented execution, which generates stronger negative reactions regarding authenticity.

These findings highlight a fundamental tension in AI-assisted creativity: while generative models excel at producing unexpected combinations and expanding the space of possible designs, audiences and creators may devalue outputs perceived as lacking genuine human creative agency [3]. Importantly, Messer's research also demonstrates that disclosure of artist involvement and curation of training data can partially mitigate negative authenticity judgments, suggesting pathways for more accepted integration of AI in artistic practice.

3.2 Design Space Exploration: Beyond Generic Tools

Research comparing purpose-built generative design tools with generic text-to-image models has revealed the importance of interface design and interaction modalities for effective creative use.

By studying fashion design apprentices using both a custom design exploration tool (generative. fashion) and Stable Diffusion, it was found out that the specialized tool better supported both divergent thinking, by enabling the generation of diverse design concepts, and convergent thinking, by facilitating the iterative refinement and focusing of selected ideas [6].

The key difference lay in the affordances for design space exploration: the custom tool provided explicit controls for manipulating design parameters, managing randomness, and iteratively constraining outputs—capabilities absent in generic interfaces optimized for single-shot generation [6]. This finding underscores that the successful integration of generative AI into professional creative workflows requires more than powerful models; it demands a thoughtful interaction design that aligns with domain-specific creative processes.

3.3 Writing and Narrative Creation

While visual generation has dominated public attention, generative AI is also transforming writing and narrative creation. AI systems were developed, that apply generative techniques to scaffold story generation and support prompt refinement in creative writing workflows. These tools function primarily as ideation aids, helping writers to overcome creative blocks and explore alternative narrative directions [2].

However, literature on AI-assisted writing remains less developed than visual domains, with fewer high-impact empirical studies documenting measurable effects on creative outcomes and professional adoption patterns. This gap represents an important direction for future research, particularly as large language models continue to improve in coherence and stylistic control.

4. Conclusion

This review has demonstrated that generative artificial intelligence has significantly reshaped creative processes in the visual arts, design, and writing over the period 2020–2025. Recent advances in diffusion models, generative adversarial networks, and personalization techniques have moved generative AI from an experimental technology to a stable component of contemporary creative workflows. Creativity increasingly unfolds through hybrid arrangements in which computational generation is guided by human expertise, evaluation, and contextual understanding.

Simultaneously empirical findings reviewed in this article indicate persistent challenges related to authenticity, authorship, and creative agency. Although AI-assisted outputs are often perceived as more novel, they may be evaluated as less authentic when human involvement is insufficiently visible in the final product. This suggests that creative value is shaped not only by technical quality, but also by social expectations regarding intentionality and control. Consequently, the effective adoption of generative AI depends on transparent workflows,

appropriate interface design, and personalization mechanisms that reinforce the role of the human creator.

Overall, literature supports a co-creative interpretation of generative AI as an enabling rather than a substitutive technology. Future research should prioritize studies of creative practice, cross-domain analyses, and the examination of generative AI in broader organizational and cultural contexts.

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შემოქმედებითი პროცესის ტრანსფორმაცია გენერაციული ხელოვნური ინტელექტის მოდელების მეშვეობით

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რეზიუმე

გენერაციული ხელოვნური ინტელექტი (AI) ცვლის შემოქმედებით ინდუსტრიებს, ახდენს ხელოვნების, დიზაინისა და თხრობის ჩანაფიქრის ტრანსფორმაციას. ბოლო წლებში ისეთი ტექნოლოგიები, როგორცაა ტექსტიდან გამოსახულების გენერაციის სისტემები და დიდი ენობრივი მოდელები, კვლევითი ლაბორატორიებიდან გადავიდა ყოველდღიურ კრეატიულ სამუშაო პროცესებში, რაც მოწინავე შესაძლებლობებს ხელმისაწვდომს ხდის როგორც პროფესიონალებისთვის, ასევე მოყვარულებისთვის.

ეს ტექნოლოგიები უზრუნველყოფს იდეების სწრაფ გენერირებას, პერსონალიზებული შედეგების და ახალი ესთეტიკური შესაძლებლობების კვლევას, თუმცა ერთდროულად აჩენს მნიშვნელოვან კითხვებს ავთენტურობის, ავტორობისა და ადამიანის შემოქმედებითი როლის შესახებ.

ამ დინამიკის გააზრება განსაკუთრებით მნიშვნელოვანია იმ პირობებში, როდესაც გენერაციული ხელოვნური ინტელექტი თანდათან ხდება კრეატიული პრაქტიკის ერთ-ერთ მთავარ პარტნიორად.

საკვანძო სიტყვები: გენერაციული ხელოვნური ინტელექტი, შემოქმედებითი პროცესი, დიფუზიის მოდელები, ადამიანი-ხელოვნური ინტელექტის თანამშრომლობა, გამოთვლითი კრეატიულობა, ციფრული ხელოვნება, დიზაინის ავტომატიზაცია