



Human versus hybrid creation: A comparative study on AIGC-assisted oil painting in art education

Chunhui Ye¹, Arkom Sangiamvibool^{2*}

^{1,2}Faculty of Fine-Applied Arts and Cultural Science, Mahasarakham University, Thailand

Abstract

This study investigates the educational and inventive consequences of integrating Artificial Intelligence-Generated Content (AIGC) into traditional oil painting instruction to evaluate its influence on student technical skills, creativity, and the effectiveness of the ideation process. A comparative quasi-experimental methodology was utilized to analyze two cohorts of undergraduate art students: a standard group and a hybrid group that incorporated AI for ideation and compositional preparation. Hybrid assessment methods included expert review of final artwork, participant self-assessment, and process monitoring to evaluate differences in technical proficiency, perceived originality, conceptual exploration, and process duration. The findings indicate a distinct trade-off between creativity and technical proficiency: the traditional approach yielded significantly superior technical skill (8.7 compared to 6.9) and originality. AIGC-assisted processes markedly enhanced the depth of conceptual exploration and the complexity of composition (8.8 vs. 7.1), reducing the total ideation time by nearly fifty percent (3.5 hours vs. 6.2 hours). AIGC profoundly alters the creative process in the fine arts, underscoring that independent mastery is crucial for skill development, while AI functions as a powerful tool for complex ideas. This illustrates the importance of a hybrid curriculum that integrates AIGC utilization with fundamental skill development in fine arts education.

Keywords: Artificial Intelligence-Generated Content (AIGC), Art education, Oil painting, Creative process, Technical proficiency, Compositional complexity, Hybrid learning, Pedagogical efficacy

Introduction

The increasing utilization of Artificial Intelligence-Generated Content (AIGC) in the arts and crafts signifies a major victory for fine arts education [1, 2]. Digital technologies have been extensively embraced and integrated into media arts and design disciplines; nevertheless, their application in traditional, skill-based arts, such as oil painting, remain contentious [3, 4]. The traditional method of producing oil paintings depends on human techniques, embodied knowledge, and specialized expertise, rendering automation or algorithmic assistance somewhat challenging [5]. Nevertheless, the rapid rise of generative AI necessitates a thorough reassessment of this technological domain [6].

This study directly addresses the challenges associated with maintaining established methods while seeking innovation in fine arts education [7]. It analyzes the comparative dynamics of entirely human-generated versus hybrid (AIGC-assisted) output in the oil painting studio, aiming to evaluate both the creative process and its pedagogical efficacy. The study examines the ability of algorithmic technology to enhance, challenge, or limit human artistic decision-making, rather than viewing AI as a substitute for human expression [8-9,31]. The primary

objective is to ascertain the impact of AIGC on students' creativity, writing abilities, and engagement in traditional oil painting sessions.

Literature Review

AIGC in contemporary creative practice

Recent academic research consistently acknowledges the profound, transformative influence of AIGC on creative innovation across multiple fields [6, 10]. Individuals generally perceive these technologies not merely as synthetic substitutes but as collaborative entities that facilitate ongoing dialogue between human artists and technology. The increasing popularity of AI-generated artworks in the art market and museum exhibitions provides preliminary empirical evidence of AI's integration [9, 12]. Instruments such as Midjourney, DALL-E, and RunwayML facilitate pre-visualization, enabling artists to swiftly experiment with many styles and thematic concepts at the initial phases of design and concept development [13, 14,32].

AIGC in fine arts education

Historically, technology has been employed in art education to assist students in seeing, evaluating, and

generating innovative concepts. However, the utilization of AIGC in studio-based education, particularly in oil painting, raises significant concerns regarding the decline of tactile skill acquisition and the importance of embodied learning [2]. A study [9] specifically cautions that excessive dependence on algorithmic results may jeopardize students' mastery of essential practical skills, including brush control, layering, and pigment manipulation.

Despite these challenges, an increasing body of research indicates that advanced applications of AIGC can enhance student learning. Researchers [15] observe that students employing generative tools in the ideation phase have a heightened inclination to undertake conceptual risks and explore a broader spectrum of compositional options. These findings confirm the effectiveness of a hybrid educational strategy, wherein AIGC acts as a substantial catalyst for ideation without entirely replacing actual artistic endeavors or critical analysis [16-20].

Engagement, narrative, and cognitive development

The psychological effects of AIGC represent a crucial field of study [21-23]. Researchers [9] assert that students utilizing AIGC-based tools exhibit increased confidence in their narratives and improved idea flow, as generative prompts help develop stories by encouraging unconventional thinking and unexpected associations. Conversely, researchers [24] caution that excessive dependence on machine-generated information may inhibit advanced creativity and critical thinking. This raises important questions about cognitive development in hybrid creative settings, namely, whether algorithmic assistance facilitates or obstructs meaningful reflection and writing [15].

Ethical and cultural considerations

The integration of AIGC into fine arts education surpasses cognitive and technical dimensions, introducing substantial ethical and cultural challenges [25 - 28]. Researchers [29] assert that generative models trained on culturally sensitive content may inadvertently reinforce biases or aesthetic uniformity. Issues related to authorship, appropriation, and authenticity are particularly relevant in conventional artistic forms like oil

painting, where originality and cultural expertise are highly valued [9, 30]. Educators must critically discuss algorithmic bias, authorship constraints, and responsible creation practices to effectively implement AIGC.

Research gap

The literature reveals a significant lack of comprehensive empirical studies on AIGC in traditional mediums, particularly oil painting, despite the integration of digital technologies into art education [4]. A substantial segment of the existing literature focuses on digital-native fields, such as graphic design, animation, and media art [9, 14]. Moreover, despite the increasing theoretical discussion surrounding co-creation, AI collaboration, and conceptual enhancement [8, 11], there is a notable lack of empirical evidence assessing the measurable effects of AIGC on student experiences, creative decision-making, or artistic identity within traditional studio-based settings [15]. This study seeks to fill this vacuum by providing comparative, mixed-methods data on the creative process and pedagogical efficacy of hybrid versus traditional methods in oil painting.

Research objectives

This study addresses the gap by comparing human and hybrid (AIGC-assisted) production in oil painting courses. The objectives are as follows:

1. To examine the influence of AIGC on students' creative processes, particularly during the ideation and compositional planning stages.
2. To examine the impact of AIGC on the visual story and symbolic representation in students' oil paintings.
3. To assess student engagement, satisfaction, and perceptions of creative growth following the integration of AIGC into a traditional oil painting curriculum.

Research questions

1. In what manner does the utilization of AIGC alter the process of oil painting and the outcomes achieved in contrast to conventional methods reliant solely on human artists?
2. In what manner does AIGC influence students'

capacity to generate ideas, compose narratives, and convey stories through imagery?

3. What are the perceptions of students utilizing AIGC compared to those employing traditional methods about their learning experiences and satisfaction levels?

Study design and research framework

Study design and rationale for research design

This study employed a quasi-experimental mixed-methods design to investigate the comparative effects of a traditional oil painting technique (Traditional Group) versus an AI-generated content (AIGC)-assisted approach (AIGC-Assisted Group) on the learning experiences and creative outcomes of undergraduate visual art students in oil painting. To ensure equitable comparisons, each group received identical topic suggestions and time constraints.

The mixed-methods approach integrated quantitative assessment of creative outcomes with qualitative exploration of learning processes, enabling a comprehensive evaluation of creativity development, technical execution quality, and pedagogical efficacy across diverse methodological frameworks.

Research framework

The experimental research framework can be conceptualized as shown in Figure 1.



Figure 1. Research framework

The experimental design comprised two simultaneous groups: a Traditional Group utilizing conventional oil painting methods without digital aid and an AIGC-Assisted Group employing generative AI

tools during the ideation phase while maintaining manual execution for all painting tasks. Both groups received identical thematic prompts ("Resilience through Nature") and were allotted the same time frame (10 days for the project) to provide uniform conditions for both groups.

Participants, selection, and group assignment

Participant profiles and rationale for selection

The study required individuals with specific attributes to facilitate precise comparisons among groups, according to this methodological approach. The research comprised 20 undergraduates enrolled in a Bachelor of Fine Arts (BFA) program concentrating on visual arts. Participants were intentionally selected based on their successful completion of fundamental courses in drawing, color theory, and oil painting techniques, ensuring a foundational competency for the execution of experimental activities. Additional selection criteria were enrollment in intermediate-level studio classes and proficiency in basic digital tools.

Selection criteria and recruitment

The participant selection strategy accomplished three methodological objectives: (1) ensuring sufficient technical proficiency to distinguish intervention effects from performance variability due to skill; (2) targeting the demographic most likely to encounter AI integration in contemporary creative sectors; and (3) utilizing the controlled academic environment to minimize external confounding variables.

Selection rationale

Three primary considerations underpinned the establishment of the criteria for participation selection. Initially, all participants possess the fundamental technical skills necessary for proficient oil painting, ensuring that any discrepancies in outcomes are attributable to the intervention rather than variations in skill level. Secondly, these individuals belong to the emerging generation of artists, who are most likely to utilize or influence AI tools in creative domains. This combination renders the findings highly significant for contemporary art education. Third, the academic environment offers a

structured context that facilitates comprehensive comparative educational evaluation while minimizing external factors.

Employing equal group sizes ($n = 10$ per group) facilitates a balanced experimental design and enhances the robustness of comparative statistical analysis. The selection method considered diversity in gender, artistic style preference, and prior experience with digital technologies to ensure the sample was as representative as feasible.

Group assignment

Group assignment and demographic characteristics

Participants were randomly assigned to either the Traditional Group ($n = 10$) or the AIGC-Assisted Group ($n = 10$) by computer-generated randomization techniques. Prior to assignment, all participants had standardized assessments to verify equivalent baseline skills in oil painting techniques and proficiency with digital tools, thus ensuring group parity.

The sample demonstrated balanced representation regarding gender (50% female, 50% male), artistic style preferences (representational, abstract, and mixed-media orientations), and prior experience with digital creative tools. This demographic diversity enhances the generalizability of the findings within the target population of emerging visual artists.

Group assignment procedure

To uphold scientific rigor and eliminate selection bias, participants were randomly assigned to either the Traditional Group or the AIGC-Assisted Group via a computer-generated randomization technique. Prior to assignment, all participants underwent screening to ensure they possessed comparable foundational skills in oil painting and basic digital literacy. This ensured that the groups were equivalent at the outset.

This random assignment technique achieves several methodological goals: it ensures initial group equivalence, enhances the internal validity of the results being compared, and reduces the influence of

potential confounding variables. This technique enhances the reliability and generalizability of the study's findings by considering these criteria.

The sample was divided into two equal portions:

- **Traditional Group ($n = 10$):** Participants utilizing classic oil painting methods without the aid of digital tools or artificial intelligence.
- **AIGC-Assisted Group ($n = 10$):** Participants employed generative AI tools (e.g., Midjourney, DALL·E) for inspiration and composition development before manual execution in oil painting.

Data collection and instruments

Data collection

The Traditional Group and the AIGC-Assisted Group are collaboratively engaged in a structured 10-day oil painting project centered on the theme "Resilience through Nature." The strategies ensure that the teaching settings remain consistent while also allowing for the systematic testing of the AIGC integration variable.

Phase 1: Orientation and training (day 1)

All participants attend an orientation session to understand the theme prompt, the project expectations, and the grading criteria. After this collective introduction, each group receives distinct training sessions:

- **Traditional group:** The participant participates in a refresher session that instructs conventional brainstorming and writing techniques devoid of internet usage.
- **AIGC-assisted group:** The individual participates in an additional practical workshop on various AIGC technologies, including AI image generators, which addresses ethical guidelines and innovative applications of the tools.

Phase 2: Ideation and Planning (Days 2-4)

Students dedicate approximately three hours daily to ideation, sketching, and preparing for their compositions. The innovative approaches differ based on the group task.

- **Traditional group:** Utilizes exclusively hand sketching and conceptualization techniques
- **AIGC-assisted group:** Employs AI technologies to generate numerous graphic options and enhance concepts through AIGC-generated ideas.

Both groups record their ideas in sketchbooks or digital logs, allowing for a qualitative study on how creativity changes over time.

Phase 3: Execution (Days 5–9)

Individuals employed in the studio dedicate 4 to 5 hours daily to oil painting. Both groups engage in hand painting to preserve historic abilities. The AIGC-Assisted Group is permitted to utilize AI technology solely during the brainstorming process. In this phase, supervising teachers ensure compliance with project regulations and provide technical assistance.

Phase 4: Final Presentation and Evaluation (Day 10)

Students present their completed projects to their peers and a panel of experts for evaluation. Each presentation includes a concise artist statement that discusses the decisions made, the tools employed (if applicable), and the thought process behind the work. The expert panel conducts standardized rubric evaluations while students complete self-assessment surveys during this session.

Selected individuals from both groups engage in semi-structured interviews to provide detailed experiential perspectives.

Instruments for data collection

The data collection comprised expert panel evaluations of finalized artworks, student surveys assessing satisfaction with learning and perceived creative growth, and observations of the duration required for idea generation and production during the creative process.

Instruments for data collection include the following:

Expert Evaluation Rubric (Quantitative & Qualitative):

The objective is to evaluate the completed oil

paintings according to their creativity, compositional quality, technical proficiency, and clarity of ideas.

- **Instrument:** A 10-point Likert scale rubric developed in collaboration with art educators.
- **Panel:** Three experts in visual arts and digital creativity, oblivious to group circumstances.

The instrument employs quantitative ratings for comparison and qualitative observations for thematic analysis of strengths and weaknesses.

Student self-assessment questionnaire (quantitative):

The objective is to ascertain students' perceptions regarding their creative processes, learning methodologies, and their confidence in employing traditional versus AIGC-supported techniques.

- **Tool:** Structured questionnaire utilizing 5-point scale Likert scale inquiries regarding: satisfaction and engagement; ability to generate thoughts and compose; perception of artistic advancement; possessing confidence and proficiency in utilizing tools
- **Timing:** Administered post-project to both the control and experimental groups.

Observational protocol (quantitative)

The objective is to monitor student engagement, specifically the duration of their activities, such as conceptualizing ideas and illustrating them, painting's execution, and alterations or variations

- **Instrument:** Researchers utilized time records and observational notes to document the occurrences during the creative process.
- **Data utilization:** Employed to assess the collaborative efficacy of various organizations and their manufacturing capabilities.

Structured interviews (qualitative)

The objective is to analyze detailed student reflections on the use of AIGC tools in contrast to traditional methods.

Instrument: An interview guide featuring open-ended inquiries such as:

1. In what manner has AIGC influenced your capacity to investigate creative concepts?
2. What challenges or unexpected occurrences did you encounter?
3. Will you employ this strategy again in the future?
4. What are the reasons for or against?
 - **Sampling:** Conducted with 3–5 individuals from each group selected intentionally (purposive sampling).
 - **Data utilization:** Thematic coding to gain insights into user sentiments, preferred areas of study, and self-perception as creators.

Visual analysis coding sheet (qualitative)

The objective is to document and analyze the formal and symbolic elements of completed artworks.

Instrument: A standardized document that monitors the utilization of:

- Color palette
- Spatial composition
- Narrative elements
- Symbolic motifs

Data analysis

The acquired quantitative data undergoes descriptive statistical analysis to identify differences among groups in performance metrics, satisfaction levels, and workflow patterns. Thematic analysis is employed on qualitative data to identify recurring patterns and concepts. This triangulated approach ensures comprehensive evaluation of creative outcomes, technical execution quality, and student experiences for both traditional and AIGC-assisted approaches.

The final phase of the analysis amalgamates quantitative statistical outcomes with qualitative thematic insights to construct a comprehensive understanding of the impact of AIGC integration. This synthesis strategy identifies areas of concordance and discord among data sources, enhancing our comprehension of the complex connection between technology, creativity, and educational outcomes.

The aggregated findings offer valuable pedagogical guidance and innovative concepts for research in art education.

Quantitative analysis procedures

Descriptive statistics were employed to analyze the quantitative data, and qualitative thematic analysis was utilized for the open-ended responses. This triangulation method facilitates a comprehensive evaluation of creativity outcomes, technical execution quality, and learner views in both groups. We conducted a statistical analysis using SPSS software to examine the differences in outcome measures between the groups. Descriptive statistics offered a summary of central tendencies and distributions for each

Variable

Independent samples t-tests were employed to compare the Traditional and AIGC-Assisted groups for creative scores, technical ratings, and satisfaction measures. The non-parametric Mann-Whitney U tests provided robust alternatives for non-normally distributed data. Pearson correlations assessed the relationship between temporal investment, creative complexity, and product quality. Statistical significance was established when $\alpha = 0.05$.

Qualitative analysis framework

Qualitative data was subjected to thorough thematic analysis using NVivo software, focusing on four analytical domains: creative support mechanisms, workflow alterations, emotional responses, and educational implications. Two researchers independently coded all materials to ensure rigor, including verification of intercoder reliability (Cohen's $\kappa = 0.80$) and resolution of conflicts through consensus.

Integration and triangulation

The study aimed to cross-check expert opinions with observed aesthetic and thematic trends. Mixed-methods integration juxtaposed quantitative results with qualitative themes to discern convergent and divergent patterns. This triangulation method improved the validity of the interpretation and gave a full picture of how AIGC integration affects artistic

learning and creative growth.

Validity and Reliability Measures

The utilization of several data sources, verification with selected participants, and the maintenance of comprehensive audit trails enhanced the credibility and reliability of the information. Thorough contextual documentation enhances transferability to similar educational settings. Researcher reflexivity and peer debriefing alleviated interpretive bias and ensured analytical impartiality.

Ethical considerations

Prior to the implementation of the study, it received approval from the institutional review board. All participants provided their informed permission,

indicating their awareness of the proceedings, their voluntary participation, and their right to withdraw at any moment. Anonymization protocols-maintained data confidentiality, and the presentation of results ensured the safeguarding of individual privacy.

Results

Effect of the integration of AIGC on the creative process

To answer Research Question 1, which explores how AIGC integration affects the creative process and outcomes in oil painting, the key findings are quantitatively detailed in Table 1: Comparative impact of AIGC on creative process stages and product characteristics.

4.1.1 Comparative analysis of the effect on creative outcomes

Table 1. Comparative analysis of creative outcomes and process efficiency across methodological groups

Metric Type	Variable	Traditional (Human-only) Group	AIGC-Assisted Group	Result Summary
Creative Outcomes (Final Artwork)	Technical Proficiency (avg. expert score)	8.7	6.9	Traditional methods fostered higher technical proficiency.
Creative Outcomes (Final Artwork)	Composition Complexity (avg. expert score)	7.1	8.8	AIGC-assisted methods led to significantly higher compositional complexity.
Creative Outcomes (Final Artwork)	Originality (avg. expert score)	8.2	7.6	Traditional methods produced slightly higher originality scores.
Creative Process (Workflow)	Ideation Time (hours)	6.2	3.5	The AIGC-Assisted group completed the ideation and planning phase in significantly less time.

Table 1 presents a comparison of creative outcomes and process efficiency between two methodological groups: the Traditional (Human-only) Group and the AIGC-Assisted Group. The table is constructed around four primary variables, with scores derived from either expert assessment (8.7 indicating a high score) or time tracking (measured in hours):

- **Technical proficiency:** This aspect evaluates your understanding of the fundamentals of oil painting.
- **Composition complexity:** This examines the intricacy and sophistication of the artwork's structure.

- **Originality:** This assesses the novelty and distinctiveness of the artistic concept.
- **Ideation duration:** This refers to the cumulative hours allocated for generating ideas and formulating plans.

- **Key findings**
The Traditional Group achieved the highest average score in technical proficiency (8.7), much surpassing the

AIGC-Assisted Group's Score Of 6.9.

- The AIGC-Assisted Group had the highest average score in Composition Complexity

(8.8), far surpassing the Traditional Group's score of 7.1.

- The AIGC-assisted group demonstrated significantly superior efficacy in task completion. The ideation time for the group was under 3.5 hours, in contrast to the traditional group's 6.2 hours.
- The Traditional Group achieved a higher score in originality (8.2) compared to the AIGC-Assisted Group (7.6).

Interpretation of findings

The findings indicate a distinct trade-off between the depth of assistance AI systems provide in skill acquisition and the speed and breadth of their application in educational environments.

The compromise between humans and artificial intelligence

Traditional Superiority in Technical Skill: The Traditional Group's significantly higher score in Technical Proficiency (8.7 vs. 6.9) reinforces the notion that the rigorous, unaided, human-centric approach remains the most effective means of acquiring and demonstrating fundamental, tactile mastery of the medium (oil painting).

AIGC's preeminence in compositional breadth and efficacy: The AIGC-Assisted Group achieved significantly superior scores in Composition Complexity (8.8 compared to 7.1) and markedly inferior scores in Ideation Time (3.5 hours against 6.2 hours), indicating that AIGC effectively enhances creativity.

The AI enables the learner to bypass extensive manual brainstorming by swiftly generating and refining intricate visual concepts. This method yields a more sophisticated final design structure in a fraction of the time.

Implications for art education

- The findings indicate a disparity in the type of

creativity being fostered:

- The traditional technique emphasizes "deep" innovation derived from technical proficiency, resulting in elevated performance ratings in skill execution.
- The AIGC-assisted technique promotes expansive creativity and conceptual iteration, enabling students to investigate ideas they might not have considered or had the opportunity to develop manually, prioritizing the final structure over meticulous execution.
- The Traditional Group exhibited a slight advantage in originality (8.2 versus 7.6), indicating that AIGC complicates matters; yet, the most innovative and pioneering concepts may still require the artist's unique, spontaneous intuition.

The findings of Research Question 1 indicated that AIGC integration significantly alters the creative process by shifting the focus and accelerating the conceptual phase.

This influence on the process directly informs the findings of Research Question 2, which specify the mechanisms by which AIGC enhances the visual and narrative elements of the final artwork, particularly by broadening ideation scope, augmenting compositional complexity, and enriching visual storytelling.

Influence of AIGC on creative skills

Research Question 2 examines the influence of Artificial Intelligence Generated Content (AIGC) on students' ideation, composition, and visual storytelling skills.

The primary findings reveal that AIGC significantly impacts these abilities by acting as both an accelerant and a scaffolding tool for complex concepts, as supported by qualitative data from the artists. Table 2 presents the coding system employed to analyze visual attributes such as composition and narrative content.

Table 2. Coding schema for visual art analysis

Coding Category	Description	Example Codes
Color Palette	Analysis of dominant colors,	Warm tones (reds, oranges), Cool tones (blues,

(See visual example below.)	harmony, contrast	greens), High saturation, Muted palette
		
Figure 2. Vibrant impasto sunset seascape		
Spatial Composition (See visual example below.)	Arrangement of elements: balance, focal points, depth	Symmetrical vs Asymmetrical, Rule of Thirds, Central focal point, Use of negative space
		
Figure 3: The Great tree of life and the waterfall of renewal		
Narrative Content (See visual example below.)	Storytelling aspects, themes, subject matter	Nature resilience, Human struggle, Transformation, Hope
		
Figure 4: The Scarred earth and the seed of hope		
Symbolic Motifs (See visual example below.)	Recurring symbols and their cultural or personal meaning	Tree (growth), Broken chains (freedom), Water (renewal)
		
Figure 4. Mythos of the Elements: symbols of growth, renewal, and unity		

Based on the artists' self-reported experiences, the integration of AIGC influences creative abilities in the following manners:

Influence on Ideation Skills

AIGC significantly accelerates the ideation phase, providing artists with swift access to an extensive array of sophisticated concepts and opportunities.

- **Time compression:** The tool significantly

accelerated the investigation of numerous compositional concepts and color harmonies, reducing the brainstorming process that would have required days or weeks of manual sketching. Individuals frequently assert that the AI "preemptively addressed the conceptual phase."

- **Visual scaffolding:** AIGC serves as a "potent visual framework" that assists artists in rapidly generating and developing "fully realized, intricate concepts" before

commencing the actual artwork.

Influence on composition skills

AIGC assists artists in achieving superior balance and compositional complexity compared to traditional methods alone.

- **Complexity facilitation:** The AI assists the artist in managing concepts that are "exceedingly intricate" and possess "elevated degrees of compositional complexity," such as constructing elaborate, multi-faceted skies, vast luminescent trees, or symmetrical root structures.
- **Focus shift:** By determining the first intricate composition, the artist may concentrate on "how to paint it" rather than "what to paint," thus allowing greater emphasis on technical proficiency (including impasto, glazes, and color blending).

Influence on visual storytelling skills

Incorporating unanticipated symbolic elements may unexpectedly enhance the depth and intrigue of the narrative in the completed artwork.

- **Narrative enhancement:** The AI challenged my boundaries with narrative content and symbolic motifs. The AI autonomously incorporated a small figure imbued with a

mystical aura that significantly amplified the concepts of 'Transformation' and 'Renewal.'

- **Symbolic integration:** The tool facilitates visual storytelling by juxtaposing elements such as the white bird and the fractured terrain to reinforce the ideas of 'Scarred Earth' and 'Seed of Hope,' or by positioning the rainbow to convey a sense of balance and unity.

Following the assessment of the objective influence of AIGC on creative outcomes, specifically on the enhancement of ideation breadth and compositional intricacy (RQ2), the study now shifts to explore the subjective dimensions of this unique approach. This part tackles Research Question 3, investigating how the recorded changes in the creative process led to differences in students' perceived learning experiences, engagement, and overall satisfaction compared to those employing traditional, human-only methods.

Perceived learning experiences and satisfaction

Research Question 3 investigates the disparities in perceived learning experiences, engagement, and satisfaction between students utilizing AIGC and those applying conventional methods. Table 3 presents numerous figures pertaining to the principal outcomes: AIGC has an impact on several aspects of the creative process and product characteristics.

Comparative perceived learning experience and satisfaction

Table 3. Comparative mean scores of perceived learning experience and satisfaction

Section	Item Measured	AIGC Group Mean Score ($\bar{x}$)	Traditional Group Mean Score ($\bar{x}$)	Interpretation Based on Findings
Process Ease & Conceptual Scope	Explored a wider range of concepts.	4.7 (High)	3.2 (Med)	AIGC significantly enhanced the velocity and efficacy of conceptual exploration and idea production.
	Resolved compositional complexity efficiently.	4.6 (High)	3.0 (Med)	AIGC significantly enhanced planning and compositional complexity.
	Saved time during	4.5 (High)	2.5 (Low)	AIGC enhanced efficiency

	the initial concept phase.			by optimizing the ideation process.
Skill & Self-Efficacy	Observed clear advancement in artistic skills.	3.5 (Med)	4.3 (High)	Conventional methods resulted in a more significant perceived enhancement of technical skills.
	Originality and personal voice expressed.	3.7 (Med)	4.5 (High)	Conventional students ultimately experienced a greater connection to the work's individuality.
	Felt more assured and at ease (Self-Efficacy).	4.1 (High)	4.2 (High)	Both tactics led to increased self-efficacy, but for different reasons (efficiency versus mastery).
Engagement & Satisfaction	Satisfaction with the final artwork.	4.4 (High)	4.2 (High)	Both groups expressed high satisfaction with the outcome, likely due to their successful execution of a plan.
	Highly interested in the creative process.	4.0 (High)	4.3 (High)	Conventional pupils reported greater engagement in the overall process.

Table 3 presents a comparative mean scores analysis of the student self-assessment questionnaire. It illustrates the perceptions of the AIGC-Assisted Group and the Traditional Group regarding their learning experiences and their levels of satisfaction. The primary discovery is that a clear trade-off exists in perceived advantages between the two strategies.

AIGC group strengths: conceptual exploration and efficiency

The AIGC-Assisted Group consistently achieved significantly higher mean scores on questions pertaining to conceptualization and process ease (scores ranging from 4.5 to 4.7 on a 5-point scale), indicating that AIGC serves as a useful instrument for ideation and planning.

- **Conceptual scope:** Students employing AIGC demonstrated markedly higher scores in both the investigation of a wider array of concepts ($\bar{x}=4.7$) and the proficient resolution of compositional complexity ($\bar{x}=4.6$),

compared to the Traditional Group ($\bar{x}=3.2$ and $\bar{x}=3.0$ respectively).

- **Process efficiency and time savings:** The students in the AIGC group achieved significantly higher scores in both the exploration of a broader variety of concepts ($\bar{x}=4.7$) and the effective resolution of compositional complexity ($\bar{x}=4.6$) compared to the Traditional Group ($\bar{x}=3.2$ and $\bar{x}=3.0$, respectively).
- **Efficiency:** The AIGC Group believed the technique was time-efficient at the first ideation phase ($\bar{x}=4.5$), but the Traditional Group disagreed ($\bar{x}=2.5$).

Traditional group strengths: technical mastery and originality

The Traditional Group exhibited superior average ratings on inquiries regarding personal skill development and authentic expression, indicating their high regard for creative endeavors that

exclusively engage individuals.

- **Technical proficiency:** Traditional students indicated a greater perceived enhancement in creative skills ($\bar{x}=4.3$) compared to the AIGC Group ($\bar{x}=3.5$), suggesting that conventional methods foster a superior perceived degree of technical proficiency.
- **Originality and voice:** The Traditional Group had a greater conviction that their innovation and individual expression were acknowledged ($\bar{x}=4.5$), surpassing the AIGC Group ($\bar{x}=3.7$). This suggests a perceived trade-off between intellectual clarity and personal ownership.

Shared outcomes

Both groups received outstanding overall ratings on several measures of satisfaction and self-efficacy, indicating that both methodologies provide favorable artistic outputs.

High self-efficacy: Both groups had elevated scores for self-assurance and comfort (self-efficacy) ($\bar{x}=4.1$ and $\bar{x}=4.2$), signifying that both approaches effectively enhanced confidence.

Final satisfaction: Both groups expressed high satisfaction with the final artwork ($\bar{x}=4.4$ and $\bar{x}=4.2$), indicating that the product was a significant success regardless of the method employed.

Discussion

This study's results confirm a notable trade-off between the conceptual advancement offered by Artificial Intelligence-Generated Content (AIGC) and the improvement of technical skills fostered by conventional methods, thereby providing empirical evidence to the ongoing discussion regarding AI's influence in fine arts education [4, 6].

AIGC as a catalyst for conceptual complexity

The study addressed Research Question 1 (RQ1) by illustrating that AIGC integration significantly alters the creative process, primarily by acting as a co-creative agent that shortens the ideation duration (3.5 hours versus 6.2 hours). This discovery supports existing literature portraying AI as a collaborator that

improves the efficiency of the first design phases [11, 13, 14].

The study's primary quantitative finding is the correlation between the utilization of AIGC and the resultant artworks exhibiting much more intricate compositions (expert score of 8.8 compared to 7.1). This unequivocally substantiates the assertion that generative tools can augment student learning by encouraging them to embrace more conceptual risks and explore a broader spectrum of compositional alternatives [15]. AIGC functions as "visual scaffolding," enabling students to bypass extensive manual brainstorming and directly engage in the execution phase with a sophisticated framework. The tool enables them to actualize ambitious concepts that would be unfeasible within the conventional constraints of a project [16–20].

The impact of AIGC on the breadth of concepts and visual storytelling (RQ2) aligns with studies indicating that generative prompts enhance confidence in narrative development [9]. The AI enriches the thematic complexity of the work by autonomously including symbolic elements, hence expanding the student's boundaries concerning narrative content and symbolic motifs [9].

The persistence of traditional skill acquisition

Despite AIGC's clear advantages in conceptual breadth, the study validates the core concerns raised in the literature regarding the preservation of tactile skill acquisition [2]. The Traditional Group achieved a demonstrably superior expert score in Technical Proficiency (8.7 vs. 6.9). This strongly reinforces the notion that the rigorous, unaided, human-centric approach remains the most effective means of acquiring and demonstrating fundamental, tactile mastery of oil painting (brush control, layering, pigment manipulation) [5, 9].

This technical disparity directly informed the results of Research Question 3 (RQ3) regarding student perception. While AIGC users reported high satisfaction and efficiency ($\bar{x}=4.7$ for conceptual scope), Traditional students reported a higher perceived advancement in artistic skills ($\bar{x}=4.3$ vs. $\bar{x}=3.5$) and greater overall process engagement ($\bar{x}=4.3$ vs. $\bar{x}=4.0$). This confirms that the act of overcoming the manual challenge is intrinsically

linked to a higher perceived gain in skill mastery, demonstrating a critical psychological component of embodied learning [2].

Ethical and cognitive tensions

The observed differences in Originality (8.2 vs. 7.6) and the AIGC group's lower perceived sense of expressing a personal voice ($\bar{x} = 3.7$) highlight the substantial ethical and cognitive challenges raised in the literature [9, 30]. The slight but notable deficit in originality suggests that while AIGC promotes expansive creativity, the most innovative and pioneering concepts may still require the artist's unique, spontaneous intuition [24]. This supports the cautionary perspective that excessive dependence on machine-generated material may inhibit deep, higher-order critical thinking and meaningful artistic reflection [15, 24]. The data suggests a tension: AIGC-assisted creation risks blurring authorship and authenticity, two dimensions highly valued in conventional creative forms [9, 30].

Bridging the research gap

The current findings directly address the identified research gap: the paucity of empirical data on AIGC's influence within traditional studio-based settings, particularly oil painting [4]. By providing comparative, mixed-methods results, this study offers concrete evidence of the mechanisms of change in the creative process and the pedagogical trade-offs faced by art educators, moving the discussion beyond theoretical warnings toward evidence-based curricular recommendations [8-9]. The results indicate that the future of fine arts education lies not in viewing AI as a substitute, but in strategically designing a hybrid curriculum that harnesses AIGC's power for conceptual sophistication while mandating traditional practice for technical mastery.

Conclusion

Findings

This study concludes that the utilization of Artificial Intelligence Generated Content (AIGC) significantly alters the creative process in oil painting by establishing a balance between conceptual breadth and technical depth. The results indicate that the AIGC-assisted technique effectively accelerates and

enhances the complexity of thoughts. AIGC reduces the time required for idea generation by fifty percent (3.5 hours compared to 6.2 hours), allowing students to produce artwork that is far more advanced in composition (8.8 against 7.1). This efficiency enables the artist to concentrate on execution, expanding creative options and enhancing the visual intrigue of the narrative. AIGC students indicated a greater perceived ease and breadth in topic exploration ($\bar{x} = 4.7$).

The traditional (human-only) method remains the most effective approach for helping individuals grasp the fundamentals of the medium through practical engagement. The independent technique yielded significantly enhanced technical proficiency (8.7 vs. 6.9) and a heightened sense of connection to the work's originality and personal voice ($\bar{x} = 4.5$ vs. $\bar{x} = 3.7$). This observation indicates that the inherent difficulty of manual conceptualizing is directly associated with a heightened perception of skill improvement ($\bar{x} = 4.3$ vs. $\bar{x} = 3.5$).

The results strongly indicate that neither methodology should be utilized independently. To foster holistic artistic development, art education must adopt a hybrid framework. This framework should utilize AIGC as a tool for rapid ideation and foundational elements for compositions, enabling students to contemplate complex, overarching topics. However, it must remain concentrated on the traditional approach to ensure that students acquire the technical abilities and profound sense of original ownership essential for substantial creativity and enduring skill mastery. The integration of AIGC alters the methodology of skill acquisition. It fosters extensive creativity while necessitating meticulous pedagogical approaches to safeguard profound technical proficiency.

The study's findings demonstrate a distinct disparity in the efficacy of AIGC-assisted versus traditional oil painting techniques. This significantly impacts art instruction, highlights the deficiencies in the research, and provides valuable recommendations for future enhancement.

Implications for art education

AIGC necessitates a transformation in the instruction and assessment of fundamental artistic skills. The

research confirms that AIGC is not merely a tool for efficiency but a transformative entity that reshapes the creative hierarchy in the first artistic process.

- **New role for technical skills:** Technical competency, historically lauded for its contribution to innovation, is now recognized as a skill most effectively acquired through a rigorous, self-directed methodology. Art schools must ensure that the advancement of AIGC does not diminish students' inclination to dedicate time in the studio mastering techniques such as brushwork and color mixing to achieve proficient technical evaluations.
- **Embracing conceptual ambition:** AIGC renders compositional complexity more attainable for all individuals. Educators need to utilize AIGC to assist students in overcoming the manual brainstorming impediments that hinder their progress. This will enable them to explore larger, more intricate concepts than those often encountered in a standard classroom setting. This fosters enhanced creative cognition and advanced visual problem-solving abilities.
- **Curricular hybridization is imperative:** The research strongly indicates that a hybrid curriculum represents the most effective approach moving forward. Courses must be designed to explicitly incorporate AIGC training for conceptualization and planning, succeeded by specialized studio courses that enhance technical execution using traditional approaches. The AIGC output ought to be regarded as a preliminary sketch or prompt, rather than a definitive blueprint.

Limitations of the study

Despite its clear findings, the study suffers from several methodological limitations.

- **Subjectivity of perception:** The self-reported metrics on engagement, enjoyment, and perceived skill enhancement depends on the students' subjective evaluations, which may be influenced by self-serving bias or an inherent idealization of the "human-only" creative endeavor.
- **Duration and Depth:** The study likely

examines a singular project or a brief duration. It neglects to record the lasting effects of regular AIGC usage on the decline of manual drawing skills, nor does it track the ongoing development of technical proficiency over multiple years.

- **Originality assessment:** The disparity in originality (8.2 versus 7.6) is minimal, despite the utilization of expert evaluation in the study. Defining and measuring originality is challenging in a domain heavily influenced by both human- and machine-generated data.
- **Sample specificity:** The results are limited solely to the medium of oil painting and the specific student demographic studied. The findings may not be immediately relevant to other forms of media (e.g., digital art, sculpture) or different educational tiers.

Recommendations

Considering the presented trade-offs, the following recommendations are proposed for further research and practice.

Recommendations for practice

- **Mandate hybrid modules:** Art classes should be restructured to include distinct AIGC-assisted conceptual modules and traditional execution modules. The evaluation should allocate points for both the complexity inherent in AIGC and the technical proficiency associated with traditional painting.
- **Explicit originality training:** Curricula must directly address the matter of originality. Students ought to be instructed to deliberately diverge from the AIGC prompt, documenting significant modifications in color, composition, or material usage to ensure that the final product reflects a unique human expression.
- **Use AIGC for critiques:** Introduce AIGC to generate alternative compositions or lighting for a student's in-progress traditional work, using it as a live critique tool rather than just a starting point.

Recommendations for future research

- **Longitudinal skill tracking:** Utilize AIGC to create varied compositions or lighting for a student's ongoing traditional artwork. Utilize it as a real-time evaluative instrument rather than merely initial reference.
- **Investigate pedagogical techniques:** Examine the effectiveness of certain educational strategies (e.g., mandatory manual drawing tasks alongside AIGC use) intended to mitigate the perceived decline in technical skills among AIGC users.
- **Explore different media:** Reconduct this study utilizing different creative forms, such as digital illustration or sculpture, to ascertain whether the complexity-skill trade-off remains valid.

References

- Hu, Z. Y. (2024). AIGC related context: A new communication culture for human. *Journal of Literature and Art Studies*, 14(10), 921–931.
- Wu, Y. I., & Wang, S. M. (2024, March). Fusion of Participatory Design and Digital Learning with Artificial Intelligence-Generated Content for Costume Art and Craft Education [C]. In *International Symposium on Grids and Clouds (ISGC2024)* (Vol. 24, p. 29).
- Işık, V. (2024). Exploring artistic frontiers in the era of artificial intelligence. *Sanat ve Tasarım Dergisi*, 14(2), 577–603. DOI: 10.20488/sanattasarim.1603119
- Oksanen, A., Cvetkovic, A., Akin, N., Latikka, R., Bergdahl, J., Chen, Y., & Savela, N. (2023). Artificial intelligence in fine arts: A systematic review of empirical research. *Computers in Human Behavior: Artificial Humans*, 1(2), 100004.
- Pareschi, R. (2024). *Centaur Art: The Future of Art in the Age of Generative AI*. Springer Nature.
- Sedkaoui, S., & Benaichouba, R. (2024). Generative AI as a transformative force for innovation: a review of opportunities, applications and challenges. *European Journal of Innovation Management*.
- Cao, Y., Gao, X., Yin, H., Yu, K., & Zhou, D. (2024). Reimagining Tradition: A Comparative Study of Artificial Intelligence and Virtual Reality in Sustainable Architecture Education. *Sustainability*, 16(24), 11135. <https://doi.org/10.3390/su162411135>
- Anscomb, C. (2025). AI: artistic collaborator? *AI & Soc*, 40, 3419–3429. <https://doi.org/10.1007/s00146-024-02083-y>.
- Zhu, S., Wang, Z., Zhuang, Y., Jiang, Y., Guo, M., Zhang, X., & Gao, Z. (2024). Exploring the impact of ChatGPT on art creation and collaboration: Benefits, challenges and ethical implications. *Telematics and Informatics Reports*, 14, 100138. <https://doi.org/10.1016/j.teler.2024.100138>
- Jiewu Leng, Keyou Zheng, Rongjie Li, Chong Chen, Baicun Wang, Qiang Liu, Xin Chen, & Weiming Shen (2026). AIGC-empowered smart manufacturing: Prospects and challenges. *Robotics and Computer-Integrated Manufacturing*, 97, 103076. <https://doi.org/10.1016/j.rcim.2025.103076>
- McCormack, J., Gifford, T., & Hutchings, P. (2019). Autonomy, Authenticity, Authorship and Intention in Computer Generated Art. In *ICCC* (pp. 152–159).
- Elgammal, A., Liu, B., Elhoseiny, M., & Mazzone, M. (2017). CAN: Creative Adversarial Networks, Generating Art by Learning about Styles and Deviating from Style Norms. *arXiv preprint arXiv:1706.07068*.
- Lee, H. K. (2022). Rethinking creativity: creative industries, AI and everyday creativity. *Media, Culture & Society*, 44(3), 601–612. <https://doi.org/10.1177/01634437221077009>
- Wang, L., Li, B., Fan, X., & Ji, Y. (2025). A review of AI-driven art education: enhancing creativity through deep learning and digital image processing. *International Journal of Information and Communication Technology*, 26(23), 56–90. <https://dx.doi.org/10.1504/IJICT.2025.10071872>
- Huang, K. L., Liu, Y. C., & Dong, M. Q. (2024). Incorporating AIGC into design ideation: A study on self-efficacy and learning experience acceptance under higher-order thinking. *Thinking Skills and Creativity*, 52, 101508. <https://doi.org/10.1016/j.tsc.2024.101508>
- Ling, J., Huang, N., Ma, Z., Xue, A., Wu, J., Li, H., ... & Ou-yang, L. (2025, May). Investigating

- student Behaviors in Multimodal AIGC-Enhanced Design Education: An HCI-Based Innovative Learning Model. In *International Conference on Human-Computer Interaction* (pp. 240-255). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-93412-4_14
17. Wu, J., Cai, Y., Sun, T., Ma, K., & Lu, C. (2025). Integrating AIGC with design: dependence, application, and evolution-a systematic literature review. *Journal of Engineering Design*, 36(5-6), 758-796. <https://doi.org/10.1080/09544828.2024.2362587>
 18. Wu, J., Cai, Y., Sun, T., Ma, K., & Lu, C. (2025). Integrating AIGC with design: dependence, application, and evolution-a systematic literature review. *Journal of Engineering Design*, 36(5-6), 758-796. <https://doi.org/10.1080/09544828.2024.2362587>
 19. Wang, Q., Li, C., & Zhu, L. (2024). Analysis on the acceptance of AIGC technology by art and design students in universities in China. *ABAC Journal*, 44(4), 218. DOI:10.59865/abacj.2024.57
 20. Caires, C. S. (2025). Creative digital intelligence: reshaping art, experience, and heritage in the post-digital era. *Journal of Science and Technology of the Arts*, 17(1), 9-18.
 21. Chen, J., Cheng, A., Xia, C., & Qiu, B. (2025). Investigating the Mental Health Implications of AIGC Education and Fluoride Consumption Among College Students. *Fluoride*, 58(5), 1-24.
 22. Chen, P. K. A. (2025). How AIGC enhances the teaching quality of the guided-discovery teaching method: driving factors and moderators. *The TQM Journal*. <https://doi.org/10.1108/TQM-12-2024-0539>
 23. Tao, W., Gao, S., & Yuan, Y. (2023). Boundary crossing: an experimental study of individual perceptions toward AIGC. *Frontiers in psychology*, 14, 1185880. doi: 10.3389/fpsyg.2023.1185880
 24. Obrenovic, B., Gu, X., Wang, G., Godinic, D., & Jakhongirov, I. (2025). Generative AI and human-robot interaction: implications and future agenda for business, society and ethics. *AI & society*, 40(2), 677-690. <https://doi.org/10.1007/s00146-024-01889-0>
 25. Zi-yang, H. U. (2024). AIGC related context: A new communication culture for human. *Journal of Literature and Art Studies*, 14(10), 921-931. doi: 10.17265/2159-5836/2024.10.016
 26. Sun, J. (2024). AIGC fusion exploration: The intersecting path of digital humanities and artificial intelligence. *Journal of Electrical Systems*, 20(2), 327-335.
 27. Liu, L. (2024). Academic integrity in digital media art education in the AI era. *J. Higher Vocat. Educ*, 19, 15.
 28. Cao, Y. (2025, August). Transformer-Empowered AIGC: Enhancing and Reshaping New Media Art Pedagogy. In *2025 4th International Conference on Art Design and Digital Technology (ADDT 2025)* (pp. 271-280). Atlantis Press.
 29. Brinkmann, L., Baumann, F., Bonnefon, J. F., Derex, M., Müller, T. F., Nussberger, A. M., ... & Rahwan, I. (2023). Machine culture. *Nature Human Behaviour*, 7(11), 1855-1868.
 30. Hutson, J. (2024). Art in the Age of Virtual Reproduction. In: *Art and Culture in the Multiverse of Metaverses*. Springer Series on Cultural Computing. Springer, Cham. https://doi.org/10.1007/978-3-031-66320-8_3
 31. Abbas, M., Khan, T. I., & Jam, F. A. (2025). Avoid Excessive Usage: Examining the Motivations and Outcomes of Generative Artificial Intelligence Usage among Students. *Journal of Academic Ethics*, 1-20.
 32. Masih, S., Punchanathan, U. E., Naqshbandi, M. M., & Ahmed, F. (2025). How inclusive leadership drives change-oriented extra-role behaviors via leader-member exchange and trust in leadership. *Global Knowledge, Memory and Communication*.