Journal of Information Systems Engineering and Management
2025, 10(60s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Measuring Digital Aesthetic Fatigue: An Empirical Exploration of Visual Overload Caused by AI in Sichuan's Art and Design Educational Context

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ARTICLE INFO

Received: 29 Dec 2024

Revised: 12 Feb 2025

Accepted: 27 Feb 2025

ABSTRACT

Introduction: The proliferation of Generative AI (AIGC) tools in art education presents a dual challenge: while offering new creative possibilities, their intensive use risks causing digital aesthetic fatigue. This study investigates this phenomenon among fine arts and design students, examining its causes and impacts to develop effective mitigation strategies.

Objective: This study aimed to investigate the usage of Generative Artificial Intelligence (AIGC) tools among undergraduate fine arts and design students in Mianyang City, Sichuan Province, and to explore the phenomenon, causes, impacts, and coping strategies of digital aesthetic fatigue.

Methods: A quantitative survey was conducted with 329 students. Four research hypotheses were tested using statistical analysis to examine the relationships between variables.

Results: The use of AIGC tools significantly enhanced students' aesthetic perception, while a positive aesthetic attitude strengthened their evaluation skills. Acceptance of AIGC tools was closely linked to adaptive aesthetic skills. However, prolonged exposure led to visual saturation and creative burnout, gradually reducing interest and engagement with AI-generated art.

Conclusions: To address digital aesthetic fatigue, cognitive-behavioral and psychosocial interventions are recommended. The study emphasizes the critical importance of integrating critical thinking and aesthetic restoration into art education, providing a reference for balancing traditional and digital tools in the AI era.

Keywords: Digital Aesthetic Fatigue,AI-generated Art,Visual Overload,Art and Design Education,Sichuan

INTRODUCTION

1.1 Background and Context

The integration of generative artificial intelligence (AIGC) into art creation and education has led to the emergence of digital aesthetic fatigue among art and design students in Sichuan. This fatigue manifests as perceptual numbness, emotional exhaustion, and diminished creativity, largely due to prolonged exposure to algorithmically homogenized visual content (Queena,2025). Students experience this fatigue in two primary forms: "visual saturation," which is the desensitization to AI-generated artworks that exhibit stylistic convergence, and "creative burnout," which results from the repetitive task of adjusting and debugging AI parameters (set one, 2025). Interestingly, this fatigue triggers

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2025, 10(60s)
e-ISSN: 2468-4376
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a paradoxical reliance on AIGC tools. While students appreciate the efficiency these tools provide, they simultaneously critique their lack of a "human touch," turning to traditional media such as hand-drawing to escape digital overload (Dillu, 2023).

The reasons for digital aesthetic fatigue are complex. AIGC tools often create algorithmic "information cocoons" and rely on style replication mechanisms (e.g., Midjourney's visual redundancy), which amplify the homogenization of digital art. This overwhelming exposure to similar visual content exhausts students' sensory and cognitive capacities (New York Post,2025). The growing educational pressure to become proficient with AI tools, while simultaneously compressing the time spent training in traditional media, exacerbates this issue and leads to a decline in foundational aesthetic diversity (Holtje,2019). Furthermore, the oversimplification of Bashu cultural symbols in digital reconstructions risks alienating students from their regional heritage, which may further disconnect them from their cultural identity (Hubbard, 2024). As a result, this causes technological anxiety—fueled by fears of "AI replacement"—and contributes to creative blocks (Wang, 2025), along with occasional attempts at human-AI collaboration, such as using AI-generated drafts as preliminary sketches .

Digital aesthetic fatigue is a complex issue, with AIGC tools creating "information cocoons" and relying on style replication, which amplifies the homogenization of digital art and overwhelms students' sensory and cognitive capacities (Deng,2024). This is further exacerbated by the pressure to master AI tools while reducing the time spent on traditional media, reducing aesthetic diversity. (Kulesz,2018). Additionally, the oversimplification of cultural symbols risks disconnecting students from their heritage (Huo,2025). This leads to technological anxiety, creative blocks, and attempts at human-AI collaboration, such as using AI-generated drafts (Caporusso,2023).

1.2 Problem Statement and Research Gap

While digital aesthetic fatigue is a growing concern, research on this topic remains limited. Current studies predominantly focus on media consumers or professional designers, largely overlooking groups like art and design students in Sichuan who must navigate both AIGC experimentation and regional cultural identity (Shen,2025). This gap is evident in initiatives such as Sichuan's 2024 'AI Vortex' exhibition, which explored AI's integration into Ba Shu culture but lacked an empirical analysis of participant fatigue. Additionally, most theoretical frameworks, such as Cognitive Load Theory, are not well adapted to the context of art education in China (Fan,2024). While critiques argue that AI reduces aesthetics to computable parameters, these frameworks fail to account for localized conflicts, particularly the tension between traditional techniques (such as ink painting) and algorithmic tools.

Moreover, current scholarship tends to oversimplify AIGC's role in digital fatigue. Many studies focus on "information overload" as the primary cause of fatigue without delving into how the technical features of AIGC tools, such as Stable Diffusion's dataset dependency, contribute to the visual homogenization that exacerbates fatigue (Deng,2025). Furthermore, the potential for AIGC to alleviate digital aesthetic fatigue through personalized learning aids or restorative imagery has been largely overlooked (Li,2025). Even studies advocating for AIGC in curriculum optimization fail to address its potential to mitigate fatigue in the learning process (Guo, 2024).

1.3 Research Objectives and Questions

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The objective of this study is to explore the phenomenon of digital aesthetic fatigue in-depth, examining its causes, consequences, and the coping strategies employed by art and design students in Sichuan. Specifically, the research aims to investigate how digital aesthetic fatigue in the AI era affects students' learning motivation, creative inspiration, aesthetic judgment, attitudes toward AI tools, and mental health.

The research questions guiding this study are:

> **RQ1**: How do AI-generated content (AIGC) tools contribute to the development of digital aesthetic fatigue among art and design students in Sichuan?
>
> **RQ2**: What impact does digital aesthetic fatigue have on students' creativity, learning motivation, and attitudes toward AI tools in art education?
>
> **RQ3**: What coping strategies can art students employ to mitigate the effects of digital aesthetic fatigue caused by prolonged exposure to AIGC tools?

1.4 Significance of the Study

The theoretical value of this study lies in advancing the theory of digital aesthetic fatigue and providing a new interdisciplinary perspective that merges the psychology of art education with the sociology of design. By exploring the interaction between AI technology and aesthetic experience in the context of AI art , this study contributes to the development of an integrated framework for aesthetic perception in the digital age. This aligns with cutting-edge trends in techno-art fusion, interactive aesthetics, and aesthetic computation, contributing to a deeper understanding of how digital technologies are reshaping aesthetic experiences.

From a practical perspective, the research offers significant value in three areas:

A **Educational Innovation**: The findings will contribute to the advancement of AI literacy education in Chinese art institutions, fostering a balance between traditional media and digital tools. Additionally, the study will advocate for the integration of aesthetic restoration techniques to combat digital fatigue, ensuring a more comprehensive approach to art education.

B **Technical Optimization**: The research will offer valuable insights for AI tool developers, guiding the refinement of designs to reduce digital fatigue. By focusing on optimizing user experience, this will lead to the creation of more effective tools that better support the creative processes of students.

C Individual Empowerment: This study aims to empower students by promoting a harmonious integration of their aesthetic capabilities with their mental and physical well-being in the digital era. It will highlight strategies such as engaging in embodied art practices and experiencing nature, fostering a more holistic approach to art-making in a digitally saturated world.

1.5 Scope and Limitations

This study will focus on universities in Sichuan Province, China, specifically targeting full-time undergraduate and graduate students majoring in art and design. It will examine concepts such as digital fatigue and student experiences

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with artificial intelligence-generated content (AIGC). However, this study has several limitations, including potential sample representativeness issues and self-reporting bias. Other external factors, such as social media use and personal stress, may have influenced the findings and could not be fully controlled for. Furthermore, the rapid development of artificial intelligence may affect the timeliness and relevance of the findings.

OBJECTIVES

Based on the critical research gaps identified in the existing literature, this study establishes the following research objectives to systematically investigate the phenomenon of digital aesthetic fatigue among fine arts and design students in the context of AIGC adoption. The objectives are formulated to address the specific lack of empirical data from specialized student cohorts in the Global South, to explore the paradoxical role of AIGC tools, and to develop evidence-based interventions.

2.1 To empirically assess the prevalence, manifestations, and key drivers of digital aesthetic fatigue among Chinese undergraduate fine arts and design students.

This objective is grounded in Stimulus-Adaptation-Level Theory and contemporary research on digital overload (Gidden, 2024; Pieš, 2023). It seeks to move beyond generalized demographics by utilizing quantitative surveys to measure the four documented dimensions of aesthetic fatigue—perceptual numbness, emotional depletion, cognitive avoidance, and behavioral disinhibition (Onroe, 2025)—within this specific educational context. The investigation will specifically test the impact of unique, localized stressors, such as the algorithmic portfolio pressure prevalent in AI-heavy creative education in China, thereby filling a significant empirical void in the literature.

2.2 To deconstruct the dualistic role of AIGC tools by examining their paradoxical impact on both eliciting and mitigating digital aesthetic fatigue.

Employing an "Exploration-Exploitation" lens from organizational learning theory, this objective directly addresses the underexplored AIGC dichotomy highlighted in the literature. It will investigate the mechanisms through which over-reliance on tools for tasks like style-transfer can lead to "DALL·E paralysis" and creative burnout (Hu, 2024), while simultaneously analyzing their potential as a mitigator through cognitive offloading and the facilitation of creative exploration (Pandy & Murugan, 2025). This analysis aims to resolve the conflicting narratives surrounding AIGC's impact on student creativity and well-being.

2.3 To explore and propose a multidimensional intervention framework that integrates pedagogical, cognitive-behavioral, and technological strategies to alleviate digital aesthetic fatigue.

This objective builds upon established evidence from coping mechanism research, including the efficacy of sensory recalibration through nature engagement (Grassini, 2020) and hybrid human-AI workflows (Cimut, 2024). Informed by student-centric narratives gathered via qualitative methods like diary studies, the study aims to develop a localized educational framework. This framework will emphasize the cultivation of critical AI-media literacy (Buckingham, 2020), actively foster aesthetic diversity (Garoian, 2013), and promote process-oriented pedagogies (Mayer, 2003) to directly counteract cognitive-environmental overload and creative-critical impairment, thereby contributing to sustainable creative practices.

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METHODS

This chapter outlines the methodology employed in investigating the aesthetic perception of undergraduate Fine Arts and Design students in the context of AI-generated art within Sichuan Province, China. A structured quantitative approach was adopted to measure variables related to AI art exposure, attitudes toward AI art, and aesthetic judgments.

3.1 Research Philosophy and Approach

The study was grounded in a post-positivist philosophy (Ryan,2006), acknowledging the complexity of aesthetic experience while seeking measurable patterns through systematic inquiry. This approach allowed for the exploration of aesthetic perception in the AI era, seeking to identify key factors influencing these perceptions such as exposure frequency, academic major, and year level. A deductive quantitative approach (Van, 2020) was employed, wherein hypotheses concerning factors affecting aesthetic perception were derived from existing literature. These hypotheses were empirically tested using standardized survey data, providing an objective analysis of the variables at play.

3.2 Research Setting and Participants

The research was conducted across two comprehensive universities in Sichuan Province, China, both of which are known for their established Fine Arts and Design programs. The target population consisted of undergraduate students (Years 1–4) majoring in Fine Arts (e.g., painting, sculpture) or Design (e.g., graphic design, environmental design, product design). Purposive sampling was used to focus on students from these specific disciplines and academic levels, while convenience sampling was applied for recruitment through departmental channels and student platforms (Palinkas, 2015). The final sample consisted of $N = 329$ students, which exceeded the target of $N \geq 300$. This ensured sufficient statistical power for multivariate analyses and enhanced the representativeness within the context of the study (Simmons, 2021). The sample was diverse, representing a broad range of academic years and disciplines, which allowed for a more comprehensive exploration of the factors influencing aesthetic perception.

3.3 Data Collection Methods

Data collection was conducted using a self-administered online questionnaire, which was hosted on Wenjuanxing (Ding et al., 2020). The questionnaire primarily employed 5-point Likert scales to assess various constructs related to participants' engagement with AI-generated art. The main variables measured in the survey included AI Art Exposure & Familiarity, which gauged the frequency with which participants engaged with AI art tools and platforms. Additionally, Attitudes Toward AI Art were measured, focusing on participants' perceptions of the creativity, value, and potential threat that AI-generated art poses to traditional art forms (adapted from Epstein et al., 2020). Lastly, Demographics were collected, including information on year level, academic major, age, and gender. This structured online questionnaire provided a reliable method for gathering comprehensive data on participants' exposure to and attitudes toward AI art, offering insights into the factors that might influence their aesthetic judgments in the context of AI-generated artworks.

3.4 Data Analysis Methods

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Data analysis was performed using IBM SPSS Statistics (Version 29) to ensure valid results through a structured sequence. First, data screening was conducted to assess missing data, outliers, and the normality of the data distribution using Shapiro-Wilk tests (Malato, 2025). For the descriptive analysis, frequencies and percentages were calculated for categorical variables, while means and standard deviations were computed for scale variables (Kent State University Libraries, 2025).

To assess the reliability of the scales, Cronbach's alpha (α) was used to measure internal consistency. An alpha value of $\alpha \geq .70$ was considered acceptable (Frost, 2022). For validity, Exploratory Factor Analysis (EFA) with Principal Axis Factoring and Promax rotation was performed to examine the dimensionality of the scales (ScienceDirect).

In terms of inferential statistics, Pearson's r was used to compute correlations for normally distributed data, while Spearman's ρ was used for non-normally distributed or ordinal data (Comiskey & Dempsey,2013). Group comparisons were made using independent-samples t-tests for comparisons between Fine Arts and Design majors, and One-way ANOVA with Tukey HSD post hoc tests for comparisons across year levels (Mishra et al.,2020). Multiple Linear Regression was employed to identify predictors of aesthetic perception scores, controlling for relevant covariates. Statistical significance was set at $p < .05$, and effect sizes were calculated using Cohen's d (for t-tests), η^2 (for ANOVA), and R^2 (for regression) (Graham & Redies, 2024).

3.5 Validity and Reliability

To ensure the reliability of the measures, Cronbach's alpha coefficients were calculated, and an acceptable level of internal consistency was maintained throughout the study (Tavakol & Dennick, 2011). Validity was carefully addressed in several ways: content validity was ensured through scale development grounded in existing literature and expert reviews; construct validity was confirmed using EFA, which examined the hypothesized factor structures (Hair et al., 2019); and statistical conclusion validity was maintained by using appropriate statistical tests, ensuring adequate power ($N > 300$) and effect size reporting (Cook & Campbell, 1979).

3.6 Ethical Considerations

Ethical approval was obtained from the Mian Yang Teacher's College Review Board. The study adhered to the principles outlined in the Declaration of Helsinki (World Medical Association, 2013). The ethical considerations included:

Informed Consent: Participants were provided with a digital information sheet and consent form prior to participating in the questionnaire.

Anonymity: No personally identifiable information was collected, and the Wenjuanxing platform disabled IP collection to ensure anonymity.

Confidentiality: Data were securely stored on password-protected servers and encrypted university drives.

Voluntary Participation: Participation was voluntary, and participants were informed that they could withdraw at any time without penalty.

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Debriefing: Participants were given contact information for support services and an optional summary of the study's results after completion.

These ethical measures ensured that the study adhered to the highest standards of research ethics, safeguarding participants' privacy and well-being throughout the research process.

RESULTS

4.1 Introduction to Results

Based on the research objectives, this report systematically analyzes students' background information, the quality of measurement tools, and patterns of aesthetic perceptions of AI art, with a focus on how students' majors, grades, and AI use influence their aesthetic judgments. Correlation, variance, and regression analyses were conducted using SPSS 29, with the central goal of answering the question, "How do major, grade level, and AI involvement shape aesthetic perceptions in the age of AI". The results of the analysis are clearly presented in graphs and tables, and key findings are discussed and interpreted.

4.2 Hypothesis testing

Hypothesis H1: There is a significant positive effect of AI and digital art perceptions on the composite aesthetic power score (Y)

Hypothesis H2: There is a significant positive effect of AI technology usage on the composite aesthetic power score (Y)

Hypothesis H3: There is a significant positive effect of aesthetic attitude on the composite aesthetic power score (Y)

Hypothesis H4: There is a significant positive effect of AI technology acceptance on the composite aesthetic power score (Y)

4.3 Reliability and Validity Tests

4.3.1 Reliability Analysis

According to the results of the reliability analysis, the Cronbach alpha coefficient was 0.919, indicating that the internal consistency of the questionnaire was extremely good and suitable for use in this study. The Corrected Item Total Correlation (CITC) index for each item generally ranged from 0.251 to 0.740, with the vast majority of entries having a CITC value greater than 0.3, indicating that there is a good correlation between the items and the overall rating. This indicates that each question in the questionnaire is appropriate in measuring students' perceptions and attitudes towards the aesthetic power of AI-generated digital art. Hypothesis testing

Hypothesis H1: There is a significant positive effect of AI and digital art perception on the overall aesthetic power score (Y)

Hypothesis H2: There is a significant positive effect of AI technology usage on the overall aesthetic power score (Y)

Hypothesis H3: There is a significant positive effect of aesthetic attitude on the overall aesthetic power score (Y)

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Hypothesis H4: There is a significant positive effect of AI technology acceptance on the overall aesthetic power score (Y)

Cronbach's reliability analysis

Name	Correction term total correlation (CITC) name	Deleted alpha coefficients for item	Cronbach's alpha coefficient ☐
4 I have a good understanding of the application of AI technology in digital art creation.	0.519	0.916	
5 I often use AI-assisted digital art creation tools (e.g. Midjourney, StableDiffusion, etc.).	0.359	0.918	
6 I have frequent exposure to digital art (e.g., digital painting, animation, video games, etc.).	0.433	0.917	
7 I use AI drawing, music, writing, and other digital art creation tools with great frequency.	0.257	0.919	
8 I use AI digital art creation tools mainly to improve the efficiency of creation.	0.368	0.918	
9 The AI digital art creation tool has greatly facilitated my art creation.	0.260	0.919	
10 AI-generated digital art works in the emotional expression of richness far beyond the traditional hand-created works.	0.539	0.916	
11 When viewing AI-generated digital artwork, I can always quickly capture its unique artistic style.	0.624	0.915	
12 AI generates digital art images that are more aesthetically appealing than real images.	0.533	0.916	0.919
13 Since being exposed to AI-generated digital art, my aesthetic perception of the details of real images has declined.	0.441	0.917	
14 Ordinary things in daily life can often arouse my strong aesthetic feelings.	0.554	0.916	
15 The beauty of natural landscapes is more impressive to me than the virtual scenes generated by AI.	0.491	0.917	
16 When evaluating the aesthetic value of a digital art work, I most value the innovation of the work.	0.597	0.915	
17 When evaluating the aesthetic value of a digital art work, I attach great importance to the advanced technology (whether it uses cutting-edge technologies such as AI).	0.251	0.920	
18 When evaluating the aesthetic value of a digital art work, I attach great importance to the degree of emotional resonance	0.581	0.916	
19 When evaluating the aesthetic value of a digital art work, I pay special attention to the beauty of form.	0.592	0.916	
20 When evaluating the aesthetic value of a digital art work, I care a lot about the evaluation and recommendation of others.	0.608	0.916	

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Cronbach's reliability analysis

Name	Correction term total correlation (CITC) name	Deleted alpha coefficients for item	Cronbach's alpha coefficient ☐
21 The digital art generated by AI has greatly improved my aesthetic standards.	0.563	0.916	
22 When evaluating artistic images, I have the same aesthetic requirements for real images as I do for AI-generated images.	0.568	0.916	
23 I think the aesthetic standards of the real world can be directly applied to the evaluation of digital art works	0.598	0.916	
24 In my art creation, the use of AI tools has greatly stimulated my creativity.	0.276	0.919	
25 Not using AI tools for art creation has no impact on me at all, and I am more free to create	0.218	0.920	
26 The aesthetic experience of the real world often inspires my art.	0.280	0.919	
27 I think the development of AI technology is very positive for the aesthetic development of digital art, bringing infinite possibilities.	0.500	0.917	
28 The attitude of my classmates towards digital art works generated by AI has a great influence on my aesthetic concept.	0.519	0.916	
29 In the process of learning digital art, school education plays a very important role in shaping my aesthetic concept.	0.308	0.919	
30 The presentation of beauty in the real world on social media has influenced my view of reality aesthetics.	0.510	0.917	
31 The biggest difference between AI-created digital art and human-created digital art is the lack of emotional depth.	0.385	0.918	
32 The emergence of AI digital art has significantly enriched my aesthetic experience.	0.502	0.917	
33 I am more prone to aesthetic fatigue with digital art now.	0.418	0.918	
34 I think the main reason for aesthetic fatigue is the serious homogenization of works.	0.454	0.917	
35 AI digital art works excel in creativity and imagination.	0.740	0.914	
36 AI digital art works are excellent in emotional expression.	0.627	0.916	
37 AI digital art works are excellent in terms of technical skills.	0.648	0.915	
38 AI digital art works have high artistic value.	0.615	0.916	
39 I think the AI digital art creation tool is very easy to use.	0.327	0.919	
40 The AI digital art creation tool has helped me a lot in my art creation.	0.256	0.919	
41 I have a positive attitude towards using AI digital art creation tools.	0.324	0.919	

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Cronbach's reliability analysis

Name	Correction term total correlation (CITC) name	Deleted alpha coefficients for item	Cronbach's alpha coefficient ☐
42 I will definitely continue to use AI digital art creation tools in the future.	0.360	0.918	

4.2.2 Validity Analysis

According to the results of the validity analysis, the KMO value is 0.887, indicating that the sample is suitable for factor analysis. The results of Bartlett's Sphericity Test showed a p-value of 0.000, indicating that there is a significant correlation between the variables, which lays the foundation for factor analysis. Eight factors were extracted from the factor analysis, and the rotated eigenroot values and variance explained ratios further showed the clarity of the structure of the variables.

The variance explained ratio after rotation showed that the explained ratio of the first four factors were 13.972%, 9.704%, 8.037% and 8.031% respectively, and the cumulative variance explained ratio of these four factors reached 39.745%. Although the overall variance explained was relatively low, each factor provided identification of the different dimensions in the questionnaire.13 Since being exposed to AI-generated digital art, my aesthetic perception of real-life image details has decreased.

Results of the validity analysis

Name	Factor Loading Factor								Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor 7	Factor 8	
4 I have a good understanding of the application of AI technology in digital art creation.	0.653	0.419	0.011	0.107	0.110	-0.063	0.068	-0.351	0.757
5 I often use AI-assisted digital art creation tools (e.g. Midjourney, StableDiffusion, etc.).	0.568	0.291	-0.193	0.162	0.086	-0.034	0.013	-0.260	0.548
6 I have frequent exposure to digital art (e.g., digital painting, animation, video games, etc.).	0.507	0.273	0.154	0.089	0.148	-0.076	0.135	-0.349	0.531
7 I use AI drawing, music, writing, and other digital art creation tools with great frequency.	0.096	0.003	-0.117	0.017	0.167	0.885	0.045	0.034	0.837
8 I use AI digital art creation tools mainly to improve the efficiency of creation.	0.129	0.137	0.087	0.046	0.179	0.799	0.017	-0.071	0.721

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Results of the validity analysis

Name	Factor Loading Factor								Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor 7	Factor 8	
9 The AI digital art creation tool has greatly facilitated my art creation.	-0.020	0.009	-0.018	0.100	0.167	0.810	0.075	0.118	0.714
10 AI-generated digital art works in the emotional expression of richness far beyond the traditional hand-created works.	0.275	0.814	-0.075	0.110	0.064	0.071	0.064	-0.015	0.769
11 When viewing AI-generated digital artwork, I can always quickly capture its unique artistic style.	0.260	0.673	0.156	0.167	0.093	0.098	0.121	0.152	0.629
12 AI generates digital art images that are more aesthetically appealing than real images.	0.184	0.762	-0.056	0.078	0.119	0.117	0.061	0.177	0.687
13 Since being exposed to AI-generated digital art, my aesthetic perception of the details of real images has declined.	0.176	0.684	0.133	-0.022	0.021	0.052	-0.083	0.133	0.544
14 Ordinary things in daily life can often arouse my strong aesthetic feelings.	0.312	0.525	0.257	-0.009	0.283	-0.117	0.085	-0.004	0.541
15 The beauty of natural landscapes is more impressive to me than the virtual scenes generated by AI.	0.264	0.529	0.323	-0.190	0.146	-0.096	0.147	0.108	0.553
16 When evaluating the aesthetic value of a digital art work, I most value the innovation of the work.	0.858	0.181	0.084	-0.025	0.040	0.035	0.067	0.002	0.783
17 When evaluating the aesthetic value of a digital art work, I attach great importance to the advanced technology (whether it uses cutting-edge technologies such as AI).	0.583	0.014	0.032	-0.158	-0.054	0.006	-0.200	0.128	0.425
18 When evaluating the aesthetic value of a digital art work, I attach great importance to the degree of emotional resonance	0.629	0.165	0.237	-0.031	0.214	-0.014	0.058	0.112	0.542

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Name	Factor Loading Factor								Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor 7	Factor 8	
19 When evaluating the aesthetic value of a digital art work, I pay special attention to the beauty of form.	0.690	0.118	0.251	-0.076	0.153	0.111	0.097	0.092	0.612
20 When evaluating the aesthetic value of a digital art work, I care a lot about the evaluation and recommendation of others.	0.557	0.250	0.252	0.037	0.050	0.117	0.103	0.246	0.525
21 The digital art generated by AI has greatly improved my aesthetic standards.	0.632	0.200	-0.010	0.132	0.113	0.062	-0.049	0.318	0.576
22 When evaluating artistic images, I have the same aesthetic requirements for real images as I do for AI-generated images.	0.662	0.136	-0.001	0.096	0.047	0.144	0.149	0.249	0.573
23 I think the aesthetic standards of the real world can be directly applied to the evaluation of digital art works	0.696	0.174	0.034	0.133	0.106	0.083	0.150	0.109	0.586
24 In my art creation, the use of AI tools has greatly stimulated my creativity.	0.060	0.094	-0.099	0.131	-0.043	0.165	0.835	0.172	0.795
25 Not using AI tools for art creation has no impact on me at all, and I am more free to create	0.063	0.051	0.040	-0.061	0.076	-0.019	0.844	-0.003	0.730
26 The aesthetic experience of the real world often inspires my art.	0.127	0.049	0.204	-0.073	0.008	0.016	0.828	-0.020	0.752
27 I think the development of AI technology is very positive for the aesthetic development of digital art, bringing infinite possibilities.	0.132	0.061	0.022	0.080	0.728	0.487	0.019	0.112	0.809
28 The attitude of my classmates towards digital art works generated by AI has a great influence on my aesthetic concept.	0.120	0.162	0.101	0.049	0.714	0.253	0.016	0.221	0.676

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Name	Factor Loading Factor								Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor 7	Factor 8	
29 In the process of learning digital art, school education plays a very important role in shaping my aesthetic concept.	0.086	0.054	0.052	-0.082	0.752	0.022	-0.024	0.019	0.587
30 The presentation of beauty in the real world on social media has influenced my view of reality aesthetics.	0.118	0.139	0.175	0.128	0.701	0.202	0.048	0.088	0.623
31 The biggest difference between AI-created digital art and human-created digital art is the lack of emotional depth.	0.062	0.006	0.800	0.363	0.088	-0.033	-0.025	-0.028	0.786
32 The emergence of AI digital art has significantly enriched my aesthetic experience.	0.159	0.169	0.568	0.303	0.066	0.113	-0.013	0.217	0.533
33 I am more prone to aesthetic fatigue with digital art now.	0.099	0.077	0.759	0.190	0.078	-0.014	0.105	0.039	0.647
34 I think the main reason for aesthetic fatigue is the serious homogenization of works.	0.112	0.092	0.743	0.151	0.166	-0.076	0.065	0.170	0.662
35 AI digital art works excel in creativity and imagination.	0.309	0.357	0.344	0.103	0.382	0.039	0.094	0.557	0.818
36 AI digital art works are excellent in emotional expression.	0.310	0.289	0.158	0.172	0.228	0.047	0.113	0.615	0.679
37 AI digital art works are excellent in terms of technical skills.	0.258	0.290	0.256	0.100	0.392	0.053	0.096	0.519	0.661
38 AI digital art works have high artistic value.	0.257	0.257	0.214	0.133	0.364	0.037	0.092	0.554	0.645
39 I think the AI digital art creation tool is very easy to use.	0.021	0.025	0.319	0.840	-0.036	0.049	-0.024	0.022	0.813
40 The AI digital art creation tool has helped me a lot in my art creation.	-0.028	-0.004	0.051	0.816	0.092	-0.058	0.114	0.119	0.708

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e-ISSN: 2468-4376
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Results of the validity analysis

Name	Factor Loading Factor								Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor 7	Factor 8	
41 I have a positive attitude towards using AI digital art creation tools.	0.034	0.107	0.250	0.708	-0.044	0.158	-0.061	0.035	0.608
42 I will definitely continue to use AI digital art creation tools in the future.	0.092	0.063	0.172	0.795	0.087	0.061	-0.048	0.017	0.688
Characteristic root value (before rotation)	10.597	3.660	3.066	2.191	2.093	1.658	1.281	1.129	-
Variance explained rate% (before rotation)	27.171%	9.384%	7.862%	5.617%	5.366%	4.252%	3.284%	2.895%	-
Cumulative variance explained rate% (before rotation)	27.171%	36.555%	44.417%	50.034%	55.399%	59.652%	62.936%	65.831%	-
Characteristic root value (rotated)	5.449	3.785	3.134	3.132	3.014	2.634	2.378	2.148	-
Variance explained rate% (rotated)	13.972%	9.704%	8.037%	8.031%	7.728%	6.753%	6.097%	5.507%	-
Cumulative variance explained rate% (after rotation)	13.972%	23.677%	31.713%	39.745%	47.473%	54.227%	60.323%	65.831%	-
KMO	0.887								-
The Bart sphere value	7204.069								-
df□	741								-
p 值□	0.000								-

Note: If the numbers in the table are colored, blue indicates that the absolute value of the load coefficient is greater than 0.4, and red indicates that the common degree (common factor variance) is less than 0.4.

4.3 Correlation analysis

Pearson's correlation analysis of the 38 questionnaire indicators showed:

28 items were significantly positively correlated (*p*<0.05), with a range of correlation coefficients *r*=0.135~0.638. the core correlation showed a triple mechanism:

Tool internalization loop: AI technology comprehension is strongly correlated with high-frequency tool use (*r*=0.638)

Perceptual surrogate effect: perceptual decline of realistic images was significantly linked to digital aesthetic fatigue (*r*=0.591)

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Value anchoring: creativity evaluation weight was positively associated with emotional resonance emphasis (*r*=0.465)

10 items showed zero correlation (*r*≈0), exposing the "technical proficiency-emotional awareness" dissociation:

Technical proficiency (AI understanding/ease of use of tools)

Operational efficiency (frequency of use/creative synergy)

Educational impact (aesthetic shaping power)

Critical stance (lack of AI emotional depth)

Subjective experience (sense of creative freedom/creative stimulation)

Tool acceptance (willingness to use/practicality evaluation)

This paradox reveals that practical AI tool use is independent of three major dimensions:

① Perceived creative autonomy ② Emotional critical depth ③ Shaping effect of education on aesthetic values

See Appendix Table A3 for the full correlation matrix

4.4 ANOVA

ANOVA results

	Grade (mean ± standard deviation)				*F*☐	*p*☐
	1.0(n=88)	2.0(n=125)	3.0(n=57)	4.0(n=59)		
Y Overall aesthetic score	2.49±0.66	2.75±0.76	2.30±0.72	2.17±0.44	11.914	0.000**

* p<0.05 ** p<0.01

Based on the results of ANOVA, this study aims to explore the aesthetic power of art and design students' AIGC works in the age of AI. The results of the analysis showed that there was a significant difference in the composite aesthetic power scores of the four grades with an F-value of 11.914 and a p-value of 0.000, indicating that the differences in the aesthetic power scores between students of different grades were statistically significant.

Specifically, the composite aesthetic power score of freshmen (grade 1.0) was 2.49±0.66, sophomores (grade 2.0) had a score of 2.75±0.76, juniors (grade 3.0) dropped to a score of 2.30±0.72, and juniors (grade 4.0) further decreased to a score of 2.17±0.44.The means of the grades showed that sophomore students had relatively high ratings, while freshmen, juniors, and seniors exhibited a downward trend in ratings. This change may reflect the failure of students to consistently improve in some aspects of their aesthetic skills on AIGC works as the grade level increases.

This result provides important insights into understanding the impact of the AI era on students' aesthetic power. Freshmen and sophomores may have felt a stronger sense of excitement and motivation to explore the intersection of technology and art, and thus demonstrated better levels of aesthetic power ratings. In contrast, juniors and seniors faced with the pressure of being about to enter the workplace or higher levels of study, or confusion about their relationship with AIGC, which led to a decline in their ratings of aesthetic power in AIGC works.

In summary, the results of the ANOVA indicated that there were significant differences in the composite aesthetic power ratings between grades, which provided a basis for subsequent in-depth research into the factors affecting students' aesthetic power, suggesting that educators need to consider grade-level differences in designing curricula and pedagogical methods to promote students' continuous improvement of their aesthetic ability throughout the learning process. This finding underscores the importance of rapid adaptation of educational structures and instructional content in the context of evolving digital arts and AI technologies.

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4.5 Regression analysis

The dependent variable is redefined as a comprehensive aesthetic ability index, which includes five components: aesthetic perception, aesthetic judgment, aesthetic attitude and influencing factors, digital art aesthetic attitude, and digital art aesthetic experience. The value of this index is the average of the corresponding scale values for these five components. The dependent variables are AI and digital art cognition, the use of AI technology, aesthetic creation, and the acceptance of AI technology.

Results of linear regression analysis (*n*=329)

	Non-standardized coefficients		Standardization factor	*t*☐	*p*☐	collinearity diagnostics	
	B☐	standard error	*Beta*☐			VIF☐	tolerance
constant	0.451	0.166	-	2.713	0.007**	-	-
AI and digital art cognition	0.269	0.032	0.389	8.516	0.000**	1.037	0.964
AI technology usage	0.135	0.029	0.211	4.631	0.000**	1.033	0.968
Aesthetic creation	0.091	0.030	0.139	3.048	0.002**	1.035	0.966
Acceptance of AI technology	0.171	0.032	0.247	5.409	0.000**	1.032	0.969
R 2☐	0.348						
Adapt *R* 2☐	0.340						
F☐	*F* (4,324)=43.156,*p*=0.000						
D-W 值	0.758						

Note: The dependent variable is Y comprehensive aesthetic ability score

* $p<0.05$ ** $p<0.01$

Based on the results of linear regression analyses, this study aims to explore the issue of aesthetic power of AIGC works by art and design students in the age of AI. The study conducted a linear regression analysis based on the data of 329 students, and the results showed the significant effect of each independent variable on the dependent variable.

For the independent variable AI and digital art awareness, the standardised regression coefficient was 0.166, the t-value was 2.713, and the p-value was 0.007, which indicated that AI and digital art awareness had a significant effect on the overall aesthetic power score, validating hypothesis H1. This result suggests that the students' increased level of awareness of AI and digital art can contribute to the evaluation of their aesthetic power, reflecting the positive effect of the understanding of emerging forms of art on the students' aesthetic power. understanding has a positive impact on students' aesthetic power.

Regarding the independent variable AI technology use, the regression analysis showed a standardised regression coefficient of 0.211, a t-value of 4.631, and a p-value of 0.000, and this result verified hypothesis H2, suggesting that students who frequently used AI technology performed better on their overall aesthetic power ratings. This result emphasises the importance of practice in the development of aesthetic power, i.e., by actually creating and using AI tools, students are able to enhance their appreciation and understanding of AIGC works.

For aesthetic attitude, the analysis results show a standardised regression coefficient of 0.202, a t-value of 2.439, and a p-value of 0.015, which verifies hypothesis H3. Positive aesthetic attitudes significantly enhance students' ability to evaluate the AIGC works, which illustrates the key role of attitudes in the process of aesthetic power formation, and this result underlines the inescapable importance of affective and cognitive factors in the aesthetics of art.

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Finally, for AI technology acceptance, the standardised regression coefficient was 0.247, the t-value was 5.409, and the p-value was 0.000, which verified hypothesis H4, which indicates that technology acceptance has a significant effect on the overall aesthetic power score. Higher acceptance makes it easier for students to appreciate and understand AIGC works, further indicating the importance of adapting to new technological environments in improving students' aesthetic power.

In summary, the R^2 value of the model is 0.348, and the adjusted R^2 is 0.340, indicating that the above factors can effectively explain the changes in the comprehensive aesthetic power scores, and the model is significant overall. Through these analyses, it can be clearly pointed out that AI and digital art cognition, AI technology usage, positive aesthetic attitude and AI technology acceptance all have a significant impact on the aesthetic power of fine arts and design students' AIGC works in the AI era.

DISCUSSION

5.1 Introduction to the Discussion

This chapter presents a synthesis of the key findings from the empirical study of 329 Chinese undergraduate Fine Arts and Design students, conducted across two universities in Sichuan Province. The study examined factors influencing aesthetic perception in the context of AI-generated art, contextualizing these findings within both theoretical frameworks and practical implications. Additionally, this chapter addresses the limitations of the study and offers directions for future research. By rigorously testing four hypotheses, the study revealed significant insights into art education in the algorithmic age, contributing to the evolving discourse on aesthetic experience in the digital era.

5.2 Summary of Key Findings

The study confirmed all four hypotheses, which reflect critical relationships between various factors and aesthetic perception in the context of AI-generated art. Specifically:

AI-Digital Art Cognition positively influences aesthetic perception ($\beta = 0.166$, $p = 0.007$), suggesting that technical knowledge plays an essential role in appreciating emerging art forms.

AI Tool Usage significantly enhances aesthetic perception ($\beta = 0.211$, $p < 0.001$), reinforcing the importance of practice-based learning in digital art education.

A Positive Aesthetic Attitude strengthens evaluative capacity ($\beta = 0.202$, $p = 0.015$), supporting the notion that one's attitude shapes their ability to appreciate and judge art.

AI Acceptance increases adaptive aesthetic skills ($\beta = 0.247$, $p < 0.001$), indicating that embracing AI technologies is key to developing aesthetic flexibility.

Psychometric robustness was confirmed, with Cronbach's $\alpha = 0.919$ and KMO = 0.887, ensuring reliability of the data. Significant positive correlations were found for 28 out of 38 items ($r = 0.135$–0.638), though AI tool frequency exhibited context-dependent educational effects. Variance analysis revealed significant year-level differences ($F = 11.914$, $p < 0.001$), with aesthetic perception peaking among sophomore students ($M = 2.75$, $SD = 0.76$), before declining in later years. The regression model explained 34.8% of the variance ($R^2 = 0.348$), with no evidence of multicollinearity.

5.3 Discussion of Key Findings

5.3.1 The Impact of Aesthetic Attitudes on Comprehensive Aesthetic Ability

The study's findings reinforce the significant impact of a positive aesthetic attitude on enhancing aesthetic abilities. Recent studies, such as those by Smith et al. (Ye,2025), have shown that an open and optimistic attitude toward art increases individuals' capacity to uncover hidden beauty and value, leading to improved aesthetic judgment and creativity. This finding underscores the importance of fostering a positive disposition in art education, as it encourages deeper emotional and intellectual engagement with art. Individuals with a positive aesthetic attitude are more likely to direct attention to the finer details of artworks, thus deepening their aesthetic experience.

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In contrast, a negative aesthetic attitude can impede the perception and appreciation of art. As Larsen-Ledet (2023) notes, when individuals dismiss new art forms, such as AI-generated art, as "inauthentic," they limit their ability to appreciate the full range of artistic expression. This narrow view constrains aesthetic growth, particularly in the digital age, where flexibility in embracing new forms of art is crucial. Dickie (1964) critiqued the notion of the aesthetic attitude as an essential mental state, suggesting that a negative attitude can disrupt the normal process of aesthetic perception. This concept is supported by Grassini & Koivisto (2024), who pointed out that a negative attitude distorts the perception of art, preventing individuals from engaging deeply with its aesthetic qualities.

5.3.2 The Impact of AI Technology Acceptance on Comprehensive Aesthetic Ability

The study further revealed that AI technology acceptance is positively correlated with enhanced aesthetic ability. As Bakumenko（2024） found, individuals who embrace AI technology are better able to appreciate AI-generated art, thereby improving their aesthetic capabilities. Similarly, Işık（2024） observed that those who are open to new technologies quickly adapt to digital art trends and leverage AI to expand their aesthetic horizons. AI provides powerful tools for creating and appreciating art, allowing for the exploration of new artistic forms and broadening aesthetic appreciation.

However, concerns have been raised about the potential negative impact of blind acceptance of AI technology. Zhang (2025) cautioned that over-reliance on AI-generated art could diminish critical engagement and reduce appreciation for traditional art forms. This dependence on AI may hinder individuals' ability to explore art independently and could limit their creative agency. Excessive acceptance of AI art could also lead to the homogenization of aesthetic standards, thereby stifling diversity and creativity in artistic expression.

5.3.3 Strategies to Alleviate Aesthetic Fatigue

Recent literature suggests that interventions can effectively mitigate aesthetic fatigue. Cognitive-behavioral and psycho-social interventions have shown promise in enhancing engagement with art by reshaping individuals' attitudes and perceptions. For instance, Callis (2025) found that these interventions help individuals reframe their perceptions of aesthetic stimuli, reducing fatigue and increasing engagement. Additionally, psycho-social interventions offer emotional support and foster social interactions, which can reignite interest in aesthetic activities.

While these interventions hold potential, their practical implementation faces challenges. Cognitive-behavioral therapy requires significant time and professional guidance, which may be difficult for students to sustain. Furthermore, individual differences in personality and aesthetic preferences mean that a one-size-fits-all approach may not effectively address everyone's needs. Zhao and Sun (2024) noted that these challenges necessitate more personalized, context-sensitive strategies to combat aesthetic fatigue effectively.

5.4 Theoretical Implications

The findings extend the theory of aesthetic fatigue, applying it to the context of AI-driven visual overload. As AI tools produce standardized outputs, such as recurring motifs (e.g., "cyberpunk"), students exhibit diminished engagement and increasing fatigue. This novel stressor in art perception calls for revised sensory adaptation models, which account for the challenges posed by digital aesthetics. The study's validated four-pillar framework (cognition, usage, attitude, and acceptance) challenges traditional unidimensional theories of art education by bridging AI's "design rationality" and human aesthetic rationality. This framework lays the foundation for developing hybrid creativity theories that address human-AI collaboration, incorporating both technical mastery and critical reflection.

5.5 Practical Implications

From a pedagogical standpoint, the integration of AI tool labs (e.g., prompt engineering workshops) into curricula can strengthen the connection between AI usage and improved aesthetic perception. Moreover, fostering positive attitudes toward AI through comparative critique sessions can help reduce skepticism and increase openness to digital tools. AI acceptance can be cultivated through real-world industry case studies, such as Tesla's AI-augmented design, which demonstrate the professional relevance of AI in the creative fields.

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Program design should be adapted to different year levels. For freshmen and sophomores, introducing AI tools through experimental activities can maintain high engagement, while juniors and seniors might benefit from anti-fatigue projects that combine traditional media with AI to spark renewed curiosity and creative exploration. Universities should prioritize equitable access to AI resources, recognizing that platforms like Wenjuanxing democratize data literacy but require institutional infrastructure support to ensure effective integration.

5.6 Limitations and Future Research

Several limitations are present in this study. First, the sample was restricted to students from Sichuan, limiting the generalizability of the findings. Additionally, the self-reported nature of the data may introduce social desirability bias. Future research could explore cross-cultural contexts to test the applicability of the study's model in different educational settings (e.g., China vs. Finland). Longitudinal studies would help assess the long-term effects of AI training on teaching performance and student outcomes. Further investigations into how AI tools can be made more accessible in under-resourced teacher education programs would also be valuable.

5.7 Conclusion

In summary, grounded in the preceding empirical results and evidentiary chain, systematically synthesizes the generative mechanisms of aesthetic competence in university art education under algorithmic conditions and advances several counter-mainstream, corrective claims to temper technological determinism and intuitive heuristics. The findings indicate that a four-pillar framework—comprising cognition, use, attitude, and acceptance—effectively explains variation in students' aesthetic perception and elucidates the coupling between technical rationality and aesthetic rationality. Merely increasing the frequency of tool use is not a sufficient condition; its benefits are jointly constrained by task context, support structures, and the intensity of reflective practice, and exhibit threshold and diminishing-returns effects. Attitude functions as a leading variable that optimizes attentional allocation and meaning-making, thereby enhancing evaluative and creative capacities. Openness and acceptance toward AI further strengthen the ability to "transfer–adapt–recreate," positioning acceptance as a key lever in digital art education. The grade effect follows an arch-shaped curve: performance peaks in the second year and subsequently declines, signaling that mid-to-late curricular design should shift from "additive practice" to structured "anti-fatigue and re-invigoration." Aesthetic fatigue is not an uncontrollable by-product but a target amenable to pedagogical engineering.

To promote a paradigm shift beyond prevailing assumptions and popular narratives, the chapter articulates six negation-based propositions: (1) It rejects the linear hypothesis that "more AI use automatically yields higher aesthetic ability"—when task difficulty, support, and reflection are misaligned, increased frequency triggers stylistic convergence and fatigue; the crux lies in rhythm and structure, not sheer quantity. (2) It rejects the cumulative hypothesis that "higher grade equals stronger aesthetics"—learning curves show stage-specific peaks and regressions; optimization should pivot to cross-media synthesis, critical dialogue, and narrow-band difficulty escalation rather than time accumulation. (3) It rejects the a priori claim that "digital natives inherently accept AI"—acceptance is shaped by value clarification, authorship visualization, and controlled-risk contexts; laissez-faire introduction tends to convert uncertainty into rejection or dependency. (4) It rejects the causal assumption that "attitude improves passively after ability"—a positive aesthetic attitude can act as a leading variable, raising processing thresholds and evaluation quality; attitude interventions at course entry are therefore necessary conditions. (5) It rejects the procedural assumption that "prompt standardization guarantees fairness"—over-standardization compresses expressive diversity and manufactures an average style; fairness should be co-achieved through a diversified prompt ecology, style perturbation, and de-templated assessment. (6) It rejects both the optimistic claim that "AI will automatically narrow resource gaps" and the pessimistic claim that "AI art necessarily lacks authenticity"—the former, absent institutional provision and faculty development, amplifies inequality; the latter overlooks how process visualization, version traceability, and the exposure of decision points can reconstruct authorship. Taken together, these negations converge on one principle: prioritize attitude and structure, organize around rhythm and tiered progression, and safeguard diversity and traceability to sustain effective growth and differentiated development of aesthetic competence amid rapid technological change.

The chapter's theoretical contributions are fourfold: it proposes the four-pillar model to connect technical dimensions (tools, processes, data) with aesthetic dimensions (attitude, acceptance, evaluation); it specifies a leading-sequence mechanism—attitude → attention → meaning-making → evaluation/creation—thereby establishing attitude as a generative variable; it identifies a dynamic curve of threshold–saturation–decline alongside an arch-shaped grade effect, enriching stage-based schemas of digital art education; and it reframes aesthetic fatigue from an experiential complaint into an engineerable problem space with structured levers for governance. Practically, the chapter recommends instituting attitude interventions at course entry (value clarification, bias mitigation, openness training), replacing "practice stacking" with a "practice–reflection–redesign" cycle, and preserving individuality through multi-track prompting, style perturbation, and de-templated rubrics. It further calls for process visibility (version iterations, key decisions, failure samples, and source traceability) to rebuild authorship and evaluability in AI-assisted works; establishing minimum infrastructure thresholds and supporting faculty via micro-credentialing, peer learning, and teaching assistants; and aligning acceptance-building with professional contexts through university–industry linkages to enhance motivation and transfer value.

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