

Innovation and Practice of Information-Based Teaching Means in University Fine-Arts Education Under the Digital Background

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Abstract: The continuous evolution of digital technology has brought practical issues of systematic updating of teaching means to university fine-arts education, which integrates the dual attributes of skill teaching and aesthetic cultivation. On the basis of defining the conceptual relationship between “digital background” and “information-based teaching”, this paper analyzes the application value of information-based teaching means in resource supply, classroom interaction and industry connection. Based on the disciplinary characteristics of fine arts, it reveals prominent problems such as technological squeezing of embodied practice, structural shortcomings in teachers’ digital literacy, unbalanced supply of professional resources and substitution of original-work appreciation from three dimensions: concepts, teachers and resources. It also discusses the intertwined impacts of superficial teaching modes and simplified evaluation. Further, it puts forward innovative paths integrating concept calibration, hierarchical teacher training, collaborative resource construction, mode innovation and diversified evaluation. The study holds that only when information-based means take artistic ontology as the destination and institutional mechanisms as support can they serve the improvement of aesthetic-education quality in universities in the new era.

Keywords: Digital transformation; University fine-arts education; Information-based teaching; Teaching innovation; Aesthetic education

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1. Introduction

The in-depth penetration of digital technology into the education field is transforming the basic modes of knowledge production and dissemination. The *Education Informatization 2.0 Action Plan* identifies the in-depth integration of information technology with education and teaching as an important direction for educational reform. *Opinions on Comprehensively Strengthening and Improving School Aesthetic-Education Work in the New Era* also require the development of high-quality digital resources for aesthetic-education courses and promote inter-university resource sharing^[1]. Under the combined effects of policy guidance and

technological evolution, university fine-arts education, which attaches equal importance to skill instruction and aesthetic cultivation, has ushered in opportunities for updating teaching means while also bearing transformation-related pressures.

2. Application value of information-based teaching means in university fine-arts education under the digital background

2.1. Expand the boundaries of art-resource supply and alleviate the scarcity of high-quality aesthetic-education resources

Resource supply for traditional university fine-arts teaching is restricted by collections, funds and geographical locations. High-quality original works have long been concentrated in a small number of professional colleges and art museums in first-tier cities. Information-based means have first changed this pattern: high-definition digital collections reproduce every subtle detail of art treasures; digital art museums and cloud-based resource libraries break the physical boundaries of collections. The digitalization of resources can break through time-space restrictions and lower access thresholds. The co-construction and sharing of inter-university and cross-regional resource platforms are also regarded as an important mechanism for improving educational quality. For universities in western regions with insufficient collections, the resource gap restricting the balanced development of fine-arts education is expected to be bridged in this way.

2.2. Reconstruct interaction forms in fine-arts classrooms and increase the feasibility of teaching students in accordance with their aptitude

There are significant individual differences in fine-arts learning. Restricted by teacher-student ratios in traditional classrooms, teachers can hardly provide one-on-one guidance on every student's assignments. Information-based means offer new solutions to this problem: intelligent teaching systems can push copying templates and training sequences matching students' foundations according to learning records. Intelligent tutor systems and learning-analytics technologies have seen many application explorations in scenarios such as learning-situation diagnosis and content adaptation. Virtual-simulation technology can simulate creation procedures for disciplines such as sculpture within digital environments, and its experience can be transferred to skill-oriented fields including oil painting. Students can repeatedly practice craft procedures under zero-consumption and low-risk conditions, allowing teachers to devote more classroom time to creativity and aesthetic guidance. These means are not meant to replace teachers; instead, they free teachers from repetitive demonstrations and shift the focus of interaction to the cultivation of artistic perceptiveness.

2.3. Connect the demands of the digital-art industry and foster compound fine-arts talents

As digital cultural creativity, film-and-television special-effects, game art and other industries have become important career destinations for fine-arts graduates, employers generally expect fine-arts talents to possess solid modeling skills and aesthetic judgment as well as proficiency in creation tools such as digital painting and three-dimensional modeling^[2]. Information-based teaching enables curriculum systems to keep pace with the evolution of industrial technologies. Interdisciplinary training for digital-media-art majors also shows that the organic integration of art training and digital-technology courses can significantly enhance post-graduation adaptability. When students can both sketch from life and master digital tools, they enjoy greater freedom in

media selection. Thus, the unified realization of skill acquisition and personality cultivation required by the policy of “educating people through aesthetics” gains more solid implementation conditions.

3. Existing problems of information-based teaching in university fine-arts education under the digital background

3.1. Deviations in teaching concepts: Imbalance between technology application and aesthetic cultivation

Conceptual deviations are mainly reflected in two opposite yet interrelated cognitive tendencies. Some senior teachers regard digital technology as the opposite of hand-drawing fundamentals, believing that screen-based appreciation and digital painting will weaken students’ physical perception of brush-and-ink performance and modeling. Empirical studies show that teachers’ acceptance of information-based teaching is closely correlated with their teaching experience and technological self-efficacy ^[3]. Judging from teaching observations and teaching-research feedback, some young teachers go to the opposite extreme. They reduce informatization merely to “courseware demonstration plus video playback”, and squeeze out aesthetic discussion and creation guidance with software operations, resulting in classrooms characterized by “flashy technology yet absent art”.

These two tendencies exert particularly adverse impacts on fine-arts disciplines, for fine-arts learning is essentially embodied. Sketching requires long-term immersive observation of objects; eyes, hands and minds build tacit understanding through repeated viewing and revision. The bleeding of ink-and-wash on rice paper and the pressure of palette knives against canvases constitute irreplaceable sources of modeling experience. When teaching is simplified to image browsing and software demonstration, students lose not only skill training but also artistic perceptiveness generated through physical participation. Qian Chuxi reminds us that improper use of technological intermediaries will create barriers between students and artworks and hinder the deepening of aesthetic experience ^[4]. Therefore, conceptual deviations are directly related to the bottom-line quality of fine-arts education.

3.2. Structural shortcomings in teachers’ digital literacy and absence of capacity-improvement mechanisms

At present, university fine-arts teachers show obvious structural imbalance in digital literacy. Surveys conducted in primary-and-secondary-school contexts have shown that teachers’ digital-application level has a significant negative correlation with age. Such an age effect may be more prominent among teachers of traditional painting genres that value inheritance of hand-crafted skills. Backbone teachers for traditional painting genres are mostly middle-aged and senior teachers who specialize in paper-based and canvas-based creation. Though they possess profound artistic attainments, they generally lack systematic training in digital drawing equipment, virtual teaching platforms and intelligent evaluation tools. The anxiety of teachers regarding digital transformation has been documented in existing research, and for university fine-arts teachers, it is specifically manifested as doubts about technological intervention in creation evaluation, such as intelligent scoring and data portraits. The *Standards for Teachers’ Digital Literacy* issued by the Ministry of Education establish a teachers’ competency framework covering five dimensions: digital awareness, digital-technology knowledge and skills, digital-based application, digital social responsibility, and professional development. Measured against these standards, a considerable number of fine-arts teachers still fall short in the dimensions of “digital-based application” and “professional development”.

3.3. Structural imbalance in digital-resource construction and hidden risks of technological substitution

Studies on new educational infrastructure point out that digital educational resources commonly suffer from unreasonable supply structures, scarcity of high-quality content and monotonous forms. The phenomenon of “roads available with no vehicles” is particularly typical for fine-arts disciplines ^[5].

First, resources lack sufficient professional adaptability: most so-called “digital resources” are merely collections of textbook scans and courseware, without step-by-step analysis of painting processes or high-definition in-depth appreciation of original works. Second, imbalanced supply for sub-disciplines has been noted in digital-resource research. According to the author’s searches on mainstream resource platforms, high-quality digital images of original works and demonstration videos by famous masters for traditional majors including Chinese painting, oil painting and printmaking have long been scarce, giving rise to a new “digital divide”. Third, hidden risks of technological substitution exist. The appreciation of original works is irreplaceable, for material texture, dimensional tension and physical thickness of paint layers can only be fully perceived in front of real artworks, which cannot be reproduced by digital images. If resource construction adopts “digitalizability” as the screening criterion, and one-sidedly pursues quantity of images while ignoring digital-assisted design for original-work appreciation, it may achieve elimination under the guise of convenience.

3.4. Superficial teaching modes and simplified creation-evaluation methods

Beyond the above-mentioned dimensions, superficial teaching modes and simplified evaluation methods also stand out. In some classrooms, informatization remains confined to courseware demonstration and video playback without penetrating key links such as copying, sketching-from-life and creation. It becomes mere classroom decoration, leading to gaps between input and outcomes. Creation evaluation has long relied on single scoring by course instructors, with implicit criteria and generalized feedback. It mostly focuses on final works while neglecting conception, revision and iteration processes, and fails to reflect the real trajectory of fine-arts learning. Such problems are intertwined with conceptual, teacher-related and resource-related factors, resulting in situations where technologies are “available yet unused, used yet not in depth”. **Table 1** shows the correspondence between the four categories of problems and innovative paths.

Table 1. Correspondence between existing problems and innovative paths

Existing Problems	Disciplinary Dilemmas of Fine Arts	Corresponding Innovative Paths	Key Implementation Mechanisms
Deviations in teaching concepts	Embodied nature of fine-arts learning; severe harms caused by “replacing art with technology”	Calibrate teaching concepts	Curriculum access demonstration; control over the proportion of technology application
Structural shortcomings in teachers’ literacy	Backbone teachers face dual thresholds of art and technology	Hierarchical teacher training	Closed loop of “diagnosis — training — research-and-polishing — incentives”
Resource imbalance and substitution risks	Irreplaceable original-work appreciation; uneven supply for sub-disciplines	Collaborative resource construction	“University-Museum-Enterprise” co-construction network; double review and dynamic updating
Superficial modes and simplified evaluation	Technologies serve only as classroom decorations; art-creation evaluation cannot be fully quantified	Mode innovation and diversified evaluation	“Machine preliminary evaluation — in-depth teacher evaluation — peer mutual evaluation”; process-oriented digital archives

4. Innovative paths for information-based teaching in university fine-arts education under the digital background

4.1. Calibrate teaching concepts and establish the value hierarchy of “technology for application, art as ontology”

Concept calibration cannot be limited to slogans; it must be implemented as enforceable governance rules. First, establish an access-demonstration mechanism for digital-teaching content. For newly launched or renovated information-based fine-arts courses, syllabi shall specify aesthetic competencies and modeling attainments to be cultivated, before demonstrating the matching between technical tools and such objectives, so as to prevent lesson designs driven merely by technology from entering classrooms. Second, set structural proportions for classroom technology use. The duration of digital demonstration in core links such as sketching-from-life and creation shall be kept within reasonable limits to ensure that embodied practice is not squeezed out. For copying courses, adopt a dual-track design of “high-definition digital template study alongside paper-based copying”. Digital resources undertake functions of detail magnification and process decomposition, while paper-based copying builds hand feel and brush-and-ink experience. Third, establish an evaluation orientation of “art as ontology”. Fine-arts education shall aim at deepening aesthetic experience. The policy of “educating people through aesthetics” also requires technologies to serve people’s all-round development rather than the reverse. Any technical application that cannot illustrate its aesthetic contributions shall be removed from teaching designs.

4.2. Conduct hierarchical teacher training and build a competency closed loop of “diagnosis — training — research-and-polishing — incentives”

Teacher development shall start with precise diagnosis. In accordance with the five dimensions specified in the *Standards for Teachers’ Digital Literacy*, compile diagnostic scales tailored to fine-arts disciplines and conduct surveys to establish files for full-time teachers’ digital literacy. Carry out hierarchical and categorized training based on diagnosis results. For middle-aged and senior teachers, focus on basic applications including equipment operation, resource retrieval and online marking, and adopt workshops and paired tutoring to help them cross operational barriers. The shortcomings of middle-aged and senior teachers revealed in large-scale surveys justify differentiated training. For young teachers, focus on in-depth application of digital-creation tools and curriculum development integrating technology and art, and improve high-level competencies through university-enterprise joint training. Existing schemes for hierarchical development of teachers’ information-based competencies and digital training resources can serve as references for this system ^[6].

4.3. Collaboratively construct resources and build a “university-museum-enterprise” digital-resource supply network

Facing structural resource imbalance, a single university cannot resolve such issues, and collaborative construction represents an inevitable choice. The co-construction-and-sharing mechanism advocated by the *Education Informatization 2.0 Action Plan* provides policy grounds for inter-university collaboration. Government-university-institute-enterprise collaboration has also been proven as an effective way to expand the supply of high-quality resources.

At the inter-university level, establish regional university digital aesthetic-education resource alliances, carry out construction according to specialized divisions, and realize resource sharing under agreed protocols. Universities with profound accumulations in Chinese painting undertake brush-and-ink

skill courses; universities with strong sculpture strengths build three-dimensional modeling resources, so as to avoid repeated construction and ease supply imbalance. At the university-museum level, carry out teaching-authorization cooperation with art museums and museums for high-definition digital resources. Design original-work-appreciation courses as a three-stage procedure: “digital pre-research — on-site museum appreciation — classroom discussion”. Digital resources serve as pre-preparation and extended deepening for original-work teaching instead of substitution ^[7]. At the university-enterprise level, introduce real-project cases from digital-cultural-creativity enterprises and build dynamically updated industrial-case libraries to keep resources synchronized with industrial evolution. Regardless of resource sources, all resources shall pass double reviews by professional teachers and educational-technology specialists before being archived, and a semester-based assessment and elimination mechanism shall be implemented for renewal.

4.4. Innovate teaching modes and improve the evaluation system supported by technologies and safeguarded by institutions

The essence of mode innovation is to enable technologies to penetrate key teaching links instead of remaining as classroom decorations. Virtual-simulation sculpture teaching offers a replicable paradigm: students practice form-building and spatial-structure design for clay sculpture in virtual environments before class; they move on to physical operations in class and receive targeted guidance for exposed problems; after class, works are scanned in three dimensions and compared with virtual drafts to form visualizable progress tracks. Classroom-application research shows that this mode can reduce material consumption and operational risks and improve the precision of craft teaching ^[8]. Another direction is to build a creation-comment mechanism of “machine preliminary evaluation — in-depth teacher evaluation — peer mutual evaluation”. Intelligent systems generate preliminary feedback for quantifiable indicators such as composition proportion and color relationships. Teachers conduct in-depth comments focusing on conception expression and aesthetic style. Peer mutual evaluation is realized via online exhibition-and-comment platforms. Machine scoring only provides information, and the final adjudication of artistic judgment always rests with teachers ^[9].

5. Conclusion

For university fine-arts education, information-based teaching means are neither ornamental technical additions nor disruptive substitutes, but teaching variables requiring prudent governance. Their values lie in expanding resource supply, reconstructing classroom interaction and connecting industrial demands. Their risks are concentrated in conceptual deviations, teacher-related shortcomings and resource imbalance, and are amplified by the embodied nature of fine-arts learning and the irreplaceability of original-work appreciation. Only by adhering to the value hierarchy of “technology for application, art as ontology”, implementing hierarchical training, collaborative construction and diversified evaluation throughout the paths, and relying on institutional safeguards to maintain bottom-line principles, can information-based means truly serve the cultivation of aesthetic literacy and artistic creativity. Furthermore, the more advanced digital technologies become, the more precious embodied experiences of body, materials, and original-works in fine-arts education turn out to be. Appropriate application of information-based means precisely aims to return these irreproducible experiences to classrooms in a more earnest manner. Most cases cited in this paper are derived from published achievements and public practices, lacking long-term tracking data of self-built courses. Follow-up action research will be carried out in specific courses to test the effectiveness of the proposed paths.

Disclosure statement

The author declares no conflict of interest.

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