

Digital and Intelligent Transformation of Art and Design Teachers' Teaching Quality: Influencing Factors, AI Empowerment Strategies, and Evaluation System Reconstruction

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Abstract: To further improve the teaching quality of art and design and enhance the effectiveness and quality of talent cultivation, this paper conducts research from the perspective of teachers' digital and intelligent transformation. Firstly, the study explores the influencing factors from the perspectives of enabling factors, challenging factors, and institutional constraints. Secondly, it proposes effective countermeasures for AI empowering art and design teaching from the teacher dimension, school dimension, and governance dimension to assist the digital and intelligent transformation of teaching. Finally, it puts forward the reconstruction strategies of the evaluation system, including the transformation of the evaluation concept, the innovation of evaluation dimensions and tools, and the evaluation implementation mechanism, so as to promote the improvement of the teaching quality of art and design teachers and the digital and intelligent transformation of teaching.

Keywords: Art and design; Teaching quality; Digital and intelligent transformation

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1. Research background and significance

With the widespread popularization of digital technology, the digital transformation of education has become an irresistible trend. In April 2025, the Ministry of Education and nine other departments issued Opinions on Accelerating the Advancement of Educational Digitalization, which clearly proposes to deeply integrate digital technology into the teaching of various disciplines. As an important teaching content for cultivating innovative talents, art teaching should actively adapt to the direction of digital education reform at the education stage. Moreover, in the digital era, AI technology has also shown an explosive growth trend. Generative AI, virtual simulation technology, and other technologies have a subversive impact on promoting creative design, work

presentation, teaching interaction, and other links, which can not only promote the innovation of art and design education tools but also bring new ideas to art and design education. In addition, against the background of educational digital transformation and AI technology empowerment, improving the quality of art and design education has become a key demand in talent cultivation, and social development has an increasing demand for design talents with digital thinking and mastery of intelligent tools. However, in this field, some art and design teachers have problems such as lagging digital literacy, insufficient understanding of new technologies, and backward application ability of digital teaching tools, so they cannot deeply integrate digital technology into art and design teaching. This also hinders the innovation of art and design teaching to a certain extent, making it difficult to meet the social development's demand for compound design talents. Therefore, it is necessary to explore how to deeply combine digital technology to promote the reform and innovation of art and design teaching, so as to improve the level and effectiveness of education and cultivate a steady stream of innovative talents for the field of art and design.

2. Influencing factors of the digital-intelligent transformation of art and design teachers

2.1. Enabling factors

Enabling factors are positive elements that promote the digital-intelligent transformation of art and design teachers. Through the dual support of technology and resources, they can lower the threshold for teachers' transformation and improve the effectiveness of education and teaching. From the perspective of technological efficiency enhancement, digital-intelligent technologies can directly drive the reconstruction of art and design teaching, breaking the drawbacks of traditional teaching models. For example, in traditional teaching, teachers often need to spend a lot of time on hand-drawn demonstrations and revising design sketches one by one. However, AI-based design assistance tools can quickly generate creative graphics, allowing teachers to focus on guiding design thinking in teaching rather than "basic drawing" as in the traditional model. At the same time, 3D modeling software can be integrated with VR virtual classrooms, enabling students to more intuitively perceive the spatial design effect of works without relying on 2D drawings for explanation, thus improving classroom teaching efficiency. At the level of resource integration, digital-intelligent technologies can break down the barriers to resource integration in traditional teaching. For instance, online design platforms can deeply integrate excellent industry design cases, industry development trend reports, and enterprise real demand research reports. They can also link teachers from other institutions to carry out inter-school joint teaching and research, which enables more three-dimensional integration of teaching resources, thereby realizing educational empowerment and promoting teachers' digital-intelligent transformation.

2.2. Challenging factors

Challenging factors are important obstacles to the digital-intelligent transformation of art and design teachers, mainly reflected in aspects such as ability gaps, teaching imbalance, and changes in teachers' roles. In terms of ability gaps, there is a certain disparity between the traditional teaching skills of some teachers and the needs of digital-intelligent teaching. For example, some older teachers with weak learning abilities are more proficient in hand-drawing and traditional craftsmanship but are not skilled in operating AI design tools, digital copyright management, and virtual teaching systems. Although young teachers are good at using digital tools, they lack the ability to deeply integrate digital-intelligent technologies with art and design teaching, leading to a

significant phenomenon of ability gaps. In terms of teaching imbalance, although digital-intelligent technologies can break the original balance of teaching and learning, some teachers rely too much on digital teaching tools in teaching, simplifying the teaching process into technical operation demonstrations and ignoring inspiration stimulation, creative guidance, and humanistic literacy cultivation in art and design education. This results in an imbalance between teaching and learning, which is not conducive to improving the effectiveness of art and design education. From the perspective of changes in teachers' roles, the digital-intelligent teaching transformation requires teachers to shift from "knowledge imparters" in the traditional sense to "innovation guides." They can no longer simply conduct one-way knowledge infusion but need to become stimulators of students' creativity and gatekeepers of technical application. This transformation not only requires teachers to adjust their teaching mindset but also to master multiple teaching methods such as project-based learning, hierarchical guidance, and flipped classrooms, thus putting forward higher requirements for teachers' classroom decision-making ability and comprehensive capabilities.

2.3. Institutional constraints

Institutional constraints are invisible factors affecting the digital-intelligent transformation of art and design teachers, mainly stemming from the mismatch between the current educational management system and digital-intelligent needs, which is mainly reflected in two aspects. First, lagging evaluation. The current teacher evaluation system often cannot fully adapt to digital-intelligent teaching achievements. For example, the evaluation of art and design teachers still mainly takes paper publication, offline course quality, and traditional teaching achievements as core indicators, while the evaluation of digital teaching resource construction, virtual course development, and inter-school joint teaching and research achievements in the digital-intelligent teaching transformation is relatively insufficient. As a result, the evaluation system has weak incentives for teachers. Second, resource barriers. Teachers' digital-intelligent transformation faces the challenge of uneven distribution of teaching resources. For example, in terms of hardware resources, some institutions have insufficient investment in the purchase of VR equipment and professional design servers, leading to a lack of hardware facilities. At the same time, there are also certain barriers in data resource construction, resulting in insufficient integration of high-quality industry design case databases and enterprise project resources. This makes it difficult for teachers to obtain sufficient teaching resource support in teaching, thus facing the impact of insufficient resources in the digital-intelligent transformation.

3. Strategies for improving the teaching quality of art and design teachers empowered by AI

3.1. Teacher dimension: digital literacy and role reconstruction

In the stage of improving the teaching quality of art and design teachers empowered by AI, teachers are the implementers of teaching, who need to promote the improvement of their digital literacy and decision-making transformation. Firstly, to advance the iteration of teachers' capabilities, the focus should be on the dual dimensions of the application of AI teaching tools and the integration of creative design. Teachers should be guided to deeply learn the operating logic of AI design tools and explore the application scenarios of AI technology in creative design, thereby enhancing their teaching ability and enabling them to comprehensively use AI tools to boost art and design education^[1]. Secondly, in terms of innovating teaching methods, it is necessary to actively construct an integrated educational model of "AI + Project-based Teaching." Then,

combined with the highly practical characteristics of art and design, project-based teaching scenarios should be designed to guide students to learn and use digital tools in the process of promoting projects. For example, students can be required to complete the whole process from project research to design output in groups. This process not only allows students to apply the theoretical knowledge they have learned to practice, but also enables teachers to achieve decision-making transformation while assisting students in promoting projects, thereby improving teaching quality.

3.2. School dimension: Ecosystem construction and resource integration

From the school dimension, to promote the improvement of the teaching quality of art and design teachers empowered by AI, it is necessary to actively promote ecosystem construction and resource integration. Therefore, an educational ecosystem should be built around AI to break resource barriers^[2]. Firstly, colleges and universities should strengthen school-enterprise cooperation and establish a two-way cooperation mechanism of “AI + Art and Design.” Colleges and universities should join hands with AI technology enterprises and design institutions to promote joint teaching, introducing real enterprise projects, AI teaching resources, etc. into teaching, so as to make project-based teaching more in line with industry realities and form a more complete talent cultivation model. For instance, schools and enterprises can jointly build practical bases to provide teachers with training opportunities for AI technology application^[3]. Secondly, to promote curriculum reconstruction, AI elements should be integrated to optimize the curriculum system. For example, courses such as “Fundamentals of AI Design” and “Digital Intelligent Design Thinking” can be added to existing teaching, effectively integrating AI technology into the whole process of art and design education. At the same time, consideration should be given to promoting interdisciplinary curriculum construction based on AI, forming diversified curriculum forms such as “AI + Interaction Design” and “AI + Visual Communication”, so as to expand curriculum resource content and cultivate students’ comprehensive design capabilities.

3.3. Governance dimension: Policy support and infrastructure construction

From the governance dimension, it is necessary to actively promote policy support and infrastructure construction to remove obstacles for AI-empowered art and design teaching. In practice, the top priority is to strengthen the construction of incentive mechanisms. For example, improve the teacher evaluation and reward system: in the process of teacher evaluation, include AI teaching resource construction, AI curriculum development, AI teaching achievements, etc., into the teacher assessment index system; at the same time, provide policy preferences in professional title evaluation, scientific research funding support, etc., for teachers with remarkable achievements. In addition, set up “AI Teaching Innovation Awards” at the regional level to encourage teachers to actively participate in the exploration of new AI teaching models and promote the improvement of art and design teaching quality^[4]. In terms of resource inclusiveness, efforts should be made to promote the sinking of AI teaching resources. For example, build an AI art and design teaching resource database through the establishment of a regional art and design education school alliance, and then open high-quality AI teaching courses, excellent design case materials, AI tool debugging guidance, etc., to local colleges and universities for free. This will enable the widespread popularization and promotion of AI tools and help enhance the quality of art and design teaching.

4. Reconstruction of the digital-intelligent teaching quality evaluation system

4.1. Transformation of evaluation concepts

The primary task in reconstructing the digital-intelligent teaching quality evaluation system is to shift from a “single-result orientation” to a “value-added creation orientation.” This process requires downplaying the weight of final exam scores and traditional homework grades, and instead focusing on the “value increment” of teaching. For example, emphasis should be placed on evaluating the actual transformation effect of students’ innovative works, such as industry awards obtained for design schemes and implemented cultural and creative projects. At the same time, attention should also be paid to the cultural communication effectiveness of the works, such as online display and communication volume, as well as the dissemination and recognition of cultural symbols. This serves to highlight the enabling effect of digital-intelligent transformation on students’ practical abilities and cultural expression skills^[5-7]. Secondly, it is necessary to promote the construction of an ethical “one-vote veto” system, considering the integration of hard indicators such as data security and algorithm transparency into evaluation feedback. These indicators may include the compliant storage and use of students’ learning data, the logic and interpretability of AI-assisted scoring, and the copyright compliance of AI-generated design content. Incorporating these indicators enables a comprehensive judgment of teaching quality and reflects the effectiveness of teachers’ digital-intelligent transformation.

4.2. Innovation in evaluation dimensions and tools

Reconstructing the digital-intelligent teaching quality evaluation system requires efforts in terms of evaluation dimensions and tool innovation. In terms of evaluation dimensions, two major aspects—teaching process and teaching effectiveness—should be covered. For instance, teaching process evaluation should include teachers’ proficiency in using digital-intelligent tools and the scientificity of AI-assisted teaching design. The teaching effectiveness dimension should encompass multiple indicators such as the improvement of students’ digital literacy, cross-disciplinary collaboration capabilities, and the development of innovative thinking^[8-10]. At the level of specific evaluation tools, AI evaluation systems should be used to achieve automated collection of various evaluation data indicators. For example, classroom interaction analysis systems can be used to statistically analyze the frequency of digital-intelligent interactions between teachers and students, and AI-based design work evaluation tools can be combined to assess the creativity and technical application level of students’ works. These assessments, presented in the form of quantitative scoring, reflect teaching effectiveness and realize innovation in teaching quality evaluation^[11-13].

4.3. Evaluation implementation mechanisms

At the implementation level of the evaluation system, a dynamic and diversified evaluation process needs to be constructed to accurately reflect the improvement of teaching quality among art and design teachers^[14]. First, dynamic tracking: in this link, big data can be comprehensively used to construct digital portraits of teachers’ digital-intelligent teaching, and classroom behavior data (such as the proportion of class time occupied by teachers’ digital-intelligent teaching and the improvement curves of students’ design abilities at different stages) can be integrated. Real-time tracking of various data reflects teaching quality, and dynamic adjustment strategies are adopted^[15]. Secondly, constructing a multi-subject collaborative evaluation model: this link should adopt a three-level evaluation model of “AI preliminary screening → expert review → enterprise/student feedback.” First, AI conducts a quantitative preliminary evaluation of teaching data and students’ works; then,

expert teams conduct a comprehensive review from aspects such as teaching concepts and design creativity; finally, comprehensive feedback is obtained by combining enterprises' evaluations of students' practical abilities and students' satisfaction with digital-intelligent teaching. This forms a three-dimensional evaluation result that reflects the teaching quality.

5. Conclusion

The study finds that the digital-intelligent transformation of teaching quality for art and design teachers is of profound significance and value. It has improved teaching standards to a certain extent and played a significant role in enhancing students' comprehensive art and design capabilities. In this paper, the proposed comprehensive strategy framework of "teacher dimension + school dimension + governance dimension" is conducive to promoting the optimization of art and design teachers' comprehensive capabilities and improving their teaching quality. Moreover, the reconstruction of the teaching quality evaluation system can more comprehensively reflect the achievements of digital-intelligent transformation in art and design, providing a reference for subsequent teaching optimization. In the future, art and design teaching can further deepen the integrated application of "AI + art and design", actively promote the construction of personalized teaching models, and consider seeking research breakthroughs from the perspective of the adaptability of dynamic evaluation systems, thereby advancing the digital-intelligent transformation of art and design education.

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