

Construction of an Innovative Ecosystem for Art Education Empowered by AIGC: Institutional Design and Implementation Pathways for High-Quality Development

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Abstract: This study explores the construction of an innovative ecosystem for art education empowered by Artificial Intelligence-Generated Content (AIGC), focusing on institutional design and implementation pathways toward high-quality development. Drawing on collaborative governance theory, ecosystem theory and institutional change theory, this research adopts design-science research and action-research methods to analyze the logical framework of AIGC-empowered art education and propose a multi-dimensional institutional design scheme. The scheme covers the optimization of collaborative governance mechanisms and the reconstruction of the art-education ecosystem, and clarifies the dynamic evolution path of relevant institutions. This study aims to provide theoretical support and practical references for the high-quality development of art education in the AIGC era, promote the in-depth integration of technology and art education, and facilitate the modernization of the art-education governance system.

Keywords: AIGC; Art Education; Innovative Ecosystem; Institutional Design; High-Quality Development

1. Introduction

The explosive growth of Generative Artificial Intelligence (AIGC) is reshaping the production relations and ecological structure of global art education at an unprecedented speed, and has become a core driving force for the digital transformation of education. By simulating human creative logic through deep-learning algorithms, AIGC realizes automatic generation and high-precision conversion of multi-modal content including text, image, audio and video. Such leap in technical capability not only lowers the threshold for traditional artistic creation, but

also profoundly transforms the paths of knowledge dissemination and interaction modes among subjects. Nevertheless, rapid technological iteration is often accompanied by lagging institutional supply. Current art education faces multiple challenges such as algorithmic black boxes, ambiguous copyrights, misaligned evaluation criteria and the digital divide. It is urgent to re-examine its development path from the perspective of system theory and governance theory. How to build an innovative ecosystem adapted to the requirements of high-quality development and realize the organic unity of technological rationality and value rationality has become a major topic of common concern for academia and industry. This paper intends to put forward a set of operable and forward-looking implementation schemes, so as to provide theoretical basis and practical paradigms for cultivating high-quality artistic talents with interdisciplinary innovation capabilities, and ultimately form a new art-education ecosystem that is open-shared, fair-efficient and vibrant.

2. Logical Reconstruction: Paradigm Shift and Theoretical Examination of the AIGC-Driven Art-Education Ecosystem

2.1 From Tool-Aided Mode to Ecological Symbiosis: Connotation Expansion of High-Quality Development in Art Education

2.1.1 Transformation of Artistic Production Relations Enabled by Technology

The application of AIGC technology in art education is far more than simple tool upgrading; it represents a profound transformation of production relations. In traditional art education, teachers occupy an absolutely dominant position as knowledge monopolists and skill demonstrators, while students are placed in a passive-reception role. The intervention of AIGC blurs the boundary between subject and

object, making algorithms and data the core trend of creation. By understanding and leveraging AI technologies, artists can regain initiative and achieve the game and integration of logic and inspiration[1]. Under this new human-machine collaboration mode, the subjectivity of artistic creation undergoes a fundamental shift from individual creation to collective-wisdom generation through human-machine synergy. Serving as an instrumental role in artistic creation, AIGC supplies creative materials, inspirations and technical support for artists and becomes an important component of artistic productive forces. Such liberation of productive forces not only improves creation efficiency but also expands creative possibilities, shifting art education from mere skill training toward the cultivation of students' aesthetic competence, creativity and cultural reflective capacity[1].

AIGC provides foundations for human-machine collaborative creation by generating diverse design prototypes. Surveys show that 86% of students report that AI-generated content inspires new ideas; automated processing of repetitive tasks allows students to focus more on conceptual ideation and significantly boosts innovative competence[2]. It indicates that the transformation of artistic production relations under technological empowerment essentially evolves from the binary opposition of "teaching-learning" toward multi-dimensional symbiosis of "human-machine-environment", emphasizing meaning generation through interaction and value creation via collaboration.

2.1.2 Orientation of High-Quality Development from the "Student-Centered Education" Perspective

In the context of high-quality educational development, "student-centered education" acts as the core criterion for measuring educational quality, aiming to achieve the all-round development of educational stakeholders and adaptation to social demands[3]. The high-quality development of AIGC-empowered art education must transcend technology worship and return to the essential attributes of education. That means technological applications should serve human all-round development instead of reducing humans to appendages of technology. By analyzing students' emotional and cognitive states and generating personalized content with models such as MuseNet and Music LM, AIGC promotes music education to shift from pure

skill training to fostering students' aesthetic competence, creativity and cultural reflective capacity, realizing the transformation from knowledge transmission to wisdom cultivation. This shift reflects the emphasis on tapping individual potential and respecting individuality within high-quality development, stressing that educational processes should focus on students' continuous growth rather than short-term skill mastery.

2.2 Multi-Dimensional Theoretical Coupling: Integrated Framework of Collaborative Governance, Ecosystem and Institutional Change

2.2.1 Element Flow and Structural Restructuring under Ecosystem Theory

Ecosystem theory delivers a macro structural perspective for understanding AIGC-empowered art education. Within this system, four core elements including art products, agents, portals and procedures constitute a complete chain supporting the sustainable development of intelligent artistic production[4]. The introduction of AIGC triggers drastic element flow and structural restructuring inside the system. First of all, resource elements shift from static closure to dynamic openness. By automatically generating images, texts, audios, videos and other content, AIGC greatly increases the quantity and diversity of teaching resources. Research demonstrates that it can expand curriculum materials by approximately 67% and support multi-dimensional learning practices for students. Such exponential growth of resources breaks the scarcity hypothesis of traditional educational resources, requiring educational systems to establish new mechanisms for resource screening, integration and distribution.

2.2.2 Path Dependence and Breakthrough Mechanism from the Institutional-Change-Theory Perspective

Institutional change theory reveals the evolutionary logic of art education impacted by AIGC. Institutional innovation serves as the guarantee for high-quality development, which requires continuous removal of institutional and mechanism barriers at the micro level[5]. Traditional art-education institutions feature strong path dependence, manifested as excessive admiration for standardized skills, adherence to authoritative evaluation systems, and resistance to new-technology adoption. Such path dependence brings institutional inertia and

hinders in-depth educational innovation. Technological shocks brought by AIGC induce induced institutional change, namely spontaneous adjustments triggered by external environmental shifts. Nevertheless, spontaneous adjustments alone cannot overcome resistance from vested-interest groups, which calls for mandatory institutional change driven by top-level design.

2.3 Examination of Practical Dilemmas: Structural Tension between Technological Acceleration and Institutional Lag

2.3.1 Trust Crisis Triggered by Algorithmic Black Boxes and Ethical Anomie

Despite numerous opportunities brought by AIGC, the most prominent challenges concerning the rationality of its application lie in technology transparency, interpretability, availability and reliability, which may result in technical bottlenecks. Algorithmic black boxes prevent teachers and students from understanding the logical basis of AI-generated content and thus give rise to trust crises. In artistic creation, AIGC exerts influences on creative subjectivity and blurs the subject-object boundary, unveiling new possibilities for creation procedures. However, such ambiguity also arouses ethical disputes regarding originality, authorship and emotional authenticity. Challenges confronting AIGC-enabled art include absence of emotional experience, limited innovation capacity, potential copyright infringement risk and misuse[6].

2.3.2 Mismatch between Traditional Evaluation Systems and Generative Creation Competence

Traditional art-education evaluation systems focus on skill mastery and work completeness, and can hardly assess generative creation competence under the AIGC context effectively. Impacts of AIGC on art education include bringing challenges, providing new tools and driving transformations. Within generative creation, creative ideation, prompt engineering, human-machine collaboration competence and ethical judgment become core literacies, which are difficult to measure via conventional quantitative indicators. AIGC raises new issues for information-literacy education: continuous attention and follow-up research on technological development, innovation of educational contents and modes, and challenges for librarians' continuous learning and capacity

improvement[7]. Likewise, teachers' evaluation competence is challenged due to the shortage of formative-evaluation tools targeting AIGC-supported creation processes. Such evaluation mismatch disconnects teaching objectives from evaluation outcomes and inhibits students' innovative potential. On the one hand, students may abandon exploratory experiments to cater to evaluation indicators; on the other hand, teachers suffer evaluation anxiety for failing to accurately judge the quality of AI-assisted artworks.

3. Top-Level Design: Institutional Framework of the Innovative Ecosystem for Art Education toward High-Quality Development

3.1 Macro-Level Guidance: Constructing a Multi-Actor Co-Governance System of Policies, Laws and Regulations

3.1.1 Establishing Copyright Confirmation and Ethical Norms for AIGC-Generated Artworks

At the macro level, the primary task is to perfect laws and regulations for AIGC-based artistic creation and clarify copyright ownership as well as ethical bottom lines. Promoting high-quality AIGC application in online audio-visual content production requires advancing educational reform, guaranteeing technological innovation and clarifying legal boundaries[8]. A special Ethical Guidelines for AIGC Applications in Art Education shall be formulated to specify obligations to label AI-generated content, legitimacy of data sources and liabilities of users. For copyright ownership, the principle of "human-machine collaboration & contribution-based identification" shall be adopted. Copyright proportion is determined according to human creators' contributions in prompt design, parameter adjustment and post-processing, so as to protect human creators' rights while encouraging technological innovation. Meanwhile, an AIGC Art Ethics Review Committee shall be set up to conduct regular ethical-risk assessments on mainstream algorithm models and prevent algorithmic bias and dissemination of harmful content.

3.1.2 Perfecting Supervision Mechanisms for Data Security and Algorithm Transparency

Data security and algorithm transparency constitute cornerstones guaranteeing sound operation of the art-education ecosystem. Strict specifications for data collection, storage and utilization shall be formulated to protect

teachers' and students' private data from abuse. Educational AIGC platforms shall be mandatorily required to disclose basic algorithm principles, training-data sources and potential bias information to improve algorithm interpretability. An algorithm filing-and-auditing system shall be established to regularly audit critical algorithms for student assessment and resource recommendation and ensure their fairness and objectivity[9].

3.2 Building an Open-Shared Resource Allocation Mechanism

3.2.1 Constructing an Art-Data Resource Circulation Platform with University-Enterprise-Society Collaboration

At the meso level, an open-shared art-data resource circulation platform shall be built to break data silos. Institutions of higher education, primary and secondary schools, art organizations and tech enterprises shall be encouraged to jointly participate in platform construction, aggregating high-quality art datasets, teaching-case libraries and creation toolkits. A graded-and-classified data management system shall be established to distinguish public data, restricted data and private data, and formulate reasonable rules for data trading and sharing. Blockchain technology shall be adopted to guarantee traceability and security of data circulation and safeguard data providers' rights and interests. The platform realizes precise matching and efficient utilization of resources and reduces schools' costs for accessing high-quality resources. In addition, incentive mechanisms for data contribution shall be introduced to offer policy preferences or financial rewards for institutions supplying high-quality data resources and stimulate multi-party participation enthusiasm.

3.2.2 Optimizing Artwork Transaction and Incentive Systems Based on Blockchain Technology

To stimulate teachers' and students' creative vitality, artwork transaction and incentive systems based on blockchain shall be constructed. Leveraging blockchain's tamper-proof and decentralized features, unique digital fingerprints shall be generated for teachers' and students' AIGC artworks to confirm digital ownership. Art-trading platforms both on-campus and off-campus shall be built to support artwork exhibition, transaction and copyright licensing and realize market-oriented

transformation of artistic value. A point-based incentive system shall be developed, converting teachers' and students' behaviors including resource construction, artwork creation and community interaction into points redeemable for learning resources, training courses or physical rewards. By combining market-oriented mechanisms with incentive institutions, a virtuous cycle of "creation-transaction-incentive-re-creation" can be formed to facilitate self-sustaining and sustainable development of the art-education ecosystem.

3.3 Micro-Level Activation: Reshaping Teaching-Administration Institutions for Human-Machine Collaboration

3.3.1 Implementing the Teaching Organization Mode of "Teacher Guidance + AI Assistance + Student Subjectivity"

At the micro teaching level, teaching organization modes shall be thoroughly reshaped to establish a new teacher-student relationship of "Teacher Guidance + AI Assistance + Student Subjectivity". Teachers transform from knowledge transmitters into learning designers, thinking facilitators and emotional supporters; AI serves as an intelligent assistant offering resource recommendation, instant feedback and personalized tutoring; students, as learning subjects, undertake creative ideation, decision-making and ethical gate-keeping. Detailed teaching operation guidelines shall be formulated to standardize behaviors of teachers and students in each procedure. New teaching modes such as project-based learning and inquiry-based learning shall be promoted to give full play to AIGC's strengths. A teaching-reflection system shall be built to summarize human-machine collaborative teaching experience on a regular basis and continuously optimize teaching workflows. Transformation of organizational forms energizes classrooms and improves teaching effectiveness[9].

3.3.2 Establishing Developmental Evaluation Institutions Integrating Process-Oriented and Value-Added Evaluation

Traditional evaluation modes shall be reformed and developmental evaluation institutions combining process-oriented evaluation and value-added evaluation shall be constructed. AIGC technology is adopted to collect full-process learning data of students, including

prompt inputs, revision trajectories and collaboration records, so as to generate electronic growth portfolios. Value-added evaluation shall be applied to focus on students' progress rather than absolute scores, recognizing every student's efforts and growth. Multiple evaluation subjects including self-evaluation, peer evaluation, teacher evaluation and AI-assisted evaluation shall be introduced to enhance evaluation comprehensiveness and objectivity. An evaluation-result feedback mechanism shall be established to deliver personalized improvement suggestions to students in a timely manner and promote their continuous progress. Innovation of evaluation institutions reverses the score-oriented tendency and facilitates students' all-round development.

4. Practical Approaches: Implementation Strategies for Ecosystem Construction Based on Design-Science and Action Research

4.1 Scene Reconstruction: Building an Immersive Art-Teaching Environment Integrating Virtuality and Reality

4.1.1 Developing an AIGC-Based Personalized Learning-Path Recommendation System

Based on the design-science research method, an AIGC-based personalized learning-path recommendation system shall first be developed. By collecting students' historical learning data, interest preferences and competence levels, machine-learning algorithms are adopted to build learner profiles. AIGC optimizes teaching modes via learner profiles, breaks resource barriers by integrating multi-source data, and improves teaching-evaluation systems with instant-feedback mechanisms. The system dynamically generates personalized learning paths and recommends suitable learning resources and challenging tasks according to learner profiles. For instance, for students good at visual expression yet lacking theoretical foundations, the system may prioritize pushing art-history-theory videos and interactive quizzes; for students rich in creativity but weak in technical skills, targeted skill-training modules will be recommended. Precise push realizes teaching suited to individual aptitudes and boosts learning efficiency[10].

4.1.2 Developing a Cross-Media Integrated Virtual Laboratory for Artistic Creation

Secondly, a cross-media integrated virtual laboratory for artistic creation shall be developed.

VR/AR technologies and AIGC engines are deployed to construct immersive creation environments. The potential of generative AI in artistic creation lies in its powerful content-generation capability, cross-media integration capability and digital-reproduction capability for traditional cultural elements[10]. Inside the virtual laboratory, students can freely switch among diverse artistic media such as painting, sculpture, music and dance, and utilize AIGC tools to generate real-time materials for combinatorial creation. For example, students can convert hand-drawn sketches into 3D models, matched with AI-generated background music and dynamic special effects to produce multimedia artworks. Such cross-media integration not only enriches creation approaches but also stimulates students' cross-border innovative thinking and expands boundaries of artistic expression.

4.2 Workflow Optimization: Implementing Closed-Loop Iterative Actions of "Design-Implementation-Evaluation"

4.2.1 Prototype Design of Teaching Schemes Based on Pain-Point Diagnosis

Adopting the action-research method, closed-loop iterative actions of "Design-Implementation-Evaluation" shall be carried out. The first phase covers prototype design of teaching schemes based on pain-point diagnosis. Research teams go deep into front-line schools, identifying specific existing problems in art education such as resource scarcity, insufficient interaction and simplistic evaluation via questionnaires, interviews and classroom observations. Based on diagnostic results and combined with AIGC's technical strengths, preliminary prototypes of teaching schemes are designed.

4.2.2 Multi-Actor Participatory Teaching Practice and Data Collection

This phase focuses on multi-actor participatory teaching practice and data collection. Pilot classes are selected for teaching experiments. Teachers implement activities in accordance with prototype schemes while students participate in learning sessions. Research teams follow up the whole process and collect multi-source data through log analysis, video recording and artwork collection. AIGC supports real-time multi-user collaboration and enables fair evaluation via contribution tracking.

4.2.3 Reflection and Revision of Teaching

Modes Based on Evidence-Driven Feedback

Quantitative and qualitative analyses are conducted on collected data to assess teaching-scheme effectiveness. Differences between experimental groups and control groups in core literacy, learning interest and innovative competence are compared to verify scheme validity. Problems and obstacles emerging during implementation (including technical failures, operational difficulties and ethical disputes) are identified. Teaching schemes are revised and optimized on the basis of analytical outcomes, such as adjusting parameters of AI tools, simplifying operation workflows and adding ethical-guidance sessions. After multiple rounds of iteration, mature and replicable teaching modes are formed. Closed-loop iteration ensures continuous improvement and enhances practical outcomes.

5. Conclusion and Prospect

Constructing the innovative ecosystem for AIGC-empowered art education constitutes a systematic project involving technology, institution, culture and other dimensions. Drawing on collaborative-governance theory, ecosystem theory and institutional-change theory, this paper employs design-science and action-research methods to build institutional frameworks and implementation pathways for high-quality development. The research indicates that AIGC supplies new driving forces for high-quality development of art education by reshaping production relations, optimizing resource allocation and renovating evaluation systems. Nevertheless, release of technological dividends is constrained by institutional lags and ethical risks, which shall be addressed through collaborative innovation among macro policies-regulations, meso-level resource allocation and micro-level teaching administration. In the future, as technologies further advance, the art-education ecosystem will become more open, intelligent and inclusive. Continuous attention shall be paid to new challenges brought by technological evolution; theoretical research shall be deepened and practical strategies shall be refined to contribute to the modernization of art education.

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