The Logic of Developing Core Competencies in Smart Teaching Among Art Education Students in Chinese Higher Education

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Abstract
The digitization of education has spurred a transformation in teachers' smart teaching competencies; however, existing research lacks a systematic analysis of the mechanisms underlying the development of these competencies among art education students. Combining domestic and international smart education policies with the distinctive characteristics of art education, this paper draws upon the Competency Iceberg Model to construct a five-dimensional, progressive competency framework comprising "awareness of smart teaching—knowledge and skills—instructional organization—instructional evaluation—comprehensive student development." It clarifies the complete developmental logic driven by policy and disciplinary restructuring, thereby providing a theoretical reference for the digital professional training of art education students in Chinese higher education.

Keywords: art education students, core competencies in smart teaching, digital teaching, competency theory

1 INTRODUCTION

The rapid development of digital technology is driving the transformation of education from informatization to smart education. In this process, teachers are gradually evolving into learning plan designers, resource integrators, learning supporters, and value guides (Zong et al. 2025). The development of teachers' professional competencies is shifting from traditional subject-specific teaching abilities toward a comprehensive competency system that deeply integrates technology, teaching, and holistic education . How to cultivate teachers capable of adapting to the development of smart education has become a major topic in current teacher education research.

From the perspective of international trends, international organizations such as UNESCO, the OECD, and ISTE have successively released frameworks related to teachers' digital competencies and smart teaching, emphasizing that teachers should possess competencies in technology integration, learning design, data application, and continuous professional development (Henriksen et al., 2025).Countries such as Japan, Singapore, and South Korea are also continuously refining their teacher digital training systems, driving a shift in teachers' professional competencies from a technology-application orientation toward a smart teaching orientation. Since the implementation of China's "Decade Development Plan for Education Informatization (2011–2020)," teacher competency development has undergone a process of continuous deepening, evolving from information technology application skills and digital literacy to smart teaching capabilities (Chai et al., 2023).The "Outline of the Plan for Building an Education Powerhouse (2024–2035)" further calls for enhancing teachers' digital literacy and smart teaching capabilities, promoting the coordinated advancement of teacher professional development and the digital transformation of education (Ma, 2025). Overall, relevant policies across countries indicate that teacher capacity building has gradually converged on core areas such as technology integration, instructional innovation, data-driven assessment, and value-oriented leadership.

For art education students in China, the development of smart education not only signifies changes in

teaching tools and environments but also imposes new demands on the professional competencies of art teachers (Fatma & Benaissa, 2025). Art education is characterized by distinct creativity, practicality, and aesthetic qualities; its instructional objectives not only encompass the cultivation of knowledge and skills but also emphasize artistic creation, aesthetic development, and cultural understanding (Fang & Jiang, 2024).Therefore, the development of smart teaching competencies among art education students cannot be simply equated with the cultivation of digital competencies in the general sense; it requires achieving an organic integration of technology-enabled teaching, artistic creation, and value-based education on the foundation of digital technology application. This determines that the core smart teaching competencies of art education students follow a distinct developmental pathway from those of general teachers.

Existing research has primarily focused on constructing frameworks for teachers' digital competencies, developing indicators for smart teaching competencies, and designing competency evaluation systems, yielding a wealth of research findings (Apriyanto et al., 2025). However, while current studies largely address "which competencies should be possessed" and "how to evaluate competency levels," there is relatively little discussion regarding "why these competencies form" and "how their structure emerges."Particularly in the field of art teacher education, there remains a lack of systematic explanations regarding how core competencies for smart teaching gradually take shape under the combined influence of policy guidance, disciplinary characteristics, and teacher professional development needs, as well as why specific structural relationships exist among different competency dimensions (Cao, 2024). Due to the absence of an analysis of the mechanisms underlying competency formation, existing research struggles to fully reveal the intrinsic logic behind competency structures.

This paper takes art education students in Chinese higher education as its research subjects. By tracing the development trajectories of smart education policies from international organizations, major Asian countries, and China, and by integrating the characteristics of the art discipline with competency theory, this study analyzes the foundations and formation mechanisms of core competencies for smart teaching. It explores the structural formation process of these competencies under the combined influence of policy drivers and disciplinary restructuring, with the aim of providing theoretical references for optimizing the training system for art education students and advancing research on smart teaching competencies.

2 THE LOGICAL EVOLUTION OF POLICIES ON CORE COMPETENCIES FOR SMART TEACHING

Core competencies for smart teaching are not the product of a single educational philosophy or technological development; rather, they represent a system of teacher professional competencies that has gradually taken shape amid the ongoing global digital transformation of education (Liu & Wang, 2023).From a developmental perspective, teacher competency building has undergone a process of continuous deepening—from information technology application skills to digital literacy, and then to smart teaching competencies. The focus has gradually shifted from mastery of technological tools to a comprehensive competency structure that integrates technology, teaching innovation, data application, and value-driven leadership (Abdul-Raof & Musta'amal, 2022).By examining the development trajectories of policies related to smart education from international organizations, major Asian countries, and China, it becomes evident that the formation of teachers' core competencies in smart teaching follows a relatively clear evolutionary logic.

2.1 Competency-Oriented Approaches of International Organizations and European and American Countries

International organizations recognized early on the impact of digital technology development on teachers' professional competencies and have gradually established widely influential teacher competency frameworks

(see Table 1).UNESCO emphasizes teachers' abilities in technology integration, curriculum design, and professional development within digital environments (United Nations Educational, Scientific and Cultural Organization, 2018); the OECD focuses on fostering innovative learning, problem-solving, and lifelong learning competencies (Organisation for Economic Cooperation and Development, 2023); and ISTE further positions teachers as facilitators, designers, and analysts of learning, highlighting the crucial role of learning support and innovative development in digital environments (International Society for Technology in Education, 2016).

Table 1 International Policies & Standards on Teachers' Digital Teaching Competencies

Global Organizations / National Authorities Organizations / National Authorities Organizations / National Authorities	Document / Theory Name	Core Theoretical Content	Data Source
International Society for Technology in Education (ISTE)	ISTE Standards for Educators	This standard covers educational technology practice, instructional design, multicultural literacy, digital citizenship and digital-age professional learning.	International Society for Technology in Education (2016)
United Nations Educational, Scientific and Cultural Organization (UNESCO)	ICT Competency Framework for Teachers	Six modules encompassing educational cognition, curriculum evaluation, pedagogy, digital proficiency, administration and teacher training form an integrated competency system ranging from digital literacy to knowledge generation.	United Nations Educational, Scientific and Cultural Organization (2018)
Organisation for Economic Co-operation and Development (OECD)	Digital Education Outlook 2023	This report highlights digital education equity, focusing on student digital literacy, data privacy and technological governance ' s transformative effects on education.ance on education systems.	Organisation for Economic Cooperation and Development (2023)
United States Department of Education	National Educational Technology Plan	The plan stresses equity in digital education, proposing that teachers should act as designers rather than mere consumers of educational technologies.	United States of America, Department of Education (2019)
Department for Education (United Kingdom)	Education Technology Strategy	The strategy leverages technological innovation to advance personalized learning and educational equity, aiming to narrow achievement gaps in education.	Department for Education (2019)

Ministry of Education and Culture, Finland	National Education Development Plan 2020–2025	Centered on student-oriented personalized learning, this plan supports the digital professional development of teachers and fosters educational innovation.	Ministry of Education and Culture, Finland (2020)

Note: This table summarises international and European-American views on smart teaching, compiled by the authors.

The development pathways for teacher competency building in European and American countries are generally consistent with those of international organizations. Countries such as the United States, the United Kingdom, and Finland have continuously strengthened the development of competencies in technology-integrated teaching, learning environment design, and personalized learning support within their teacher training systems, driving a shift in the teacher's role from knowledge transmitter to learning facilitator (Napitupulu et al., 2024).Overall, teacher capacity building in international organizations and European and American countries has undergone a process of continuous deepening—shifting from a technology-application orientation to a teaching-innovation orientation, and then to a comprehensive education orientation—reflecting a trend toward the comprehensive development of teachers' competencies.

2.2 Competency Development Orientations in Asian Countries

Against the backdrop of the global digital transformation of education, Asian countries are actively promoting the development of smart education and have gradually established teacher competency development models with local characteristics (see Table 2).Japan emphasizes the development of inquiry-based and creative learning supported by digital technology (Government of Japan, Cabinet Office, 2015); South Korea relies on its smart education strategy to strengthen teachers' abilities in data application and personalized learning guidance (Ministry of Education, Republic of Korea, 2015); and Singapore prioritizes the integration of technology into teaching, innovative design capabilities, and continuous professional development as key components of teacher training (Ministry of Education, Singapore, 2023).

Table 2 Table of Research Perspectives from Asian Countries

National Authority	Document Name	Core Policy Points	Data Source
Cabinet Office, Japan	Super Smart Society	Integrates ICT, AI and IoT to digitise and intelligilise all social sectors including education.	Government of Japan, Cabinet Office (2015)
Ministry of Education, Republic of Korea	Smart Education Promotion Strategy	Uses ICT and digital resources to deliver personalised, interactive, future-oriented education for 21st-century talents.	Ministry of Education, Republic of Korea (2015)
Ministry of Education, Singapore	EdTech Masterplan 2030	Transforms learning, teaching and educational environments via tech integration; requires teachers to master e-pedagogy as learning designers for resource collaboration.	Ministry of Education Singapore (2023)
Ministry of Education,	Education 4.0 Policy	Advances learner-centred, skill-based lifelong learning; prioritises teacher digital	Ministry of Education Thailand (2017)

Thailand	literacy, tech integration and project-based interdisciplinary teaching.

Note: This table summarises Asian national perspectives on smart teaching, compiled by the authors.

Although there are differences in the level of educational development and policy priorities among these countries, teacher capacity building exhibits several common characteristics: first, an emphasis on the deep integration of digital technology and teaching activities; second, a focus on innovative learning and students' personalized development; third, an emphasis on the application of learning data and instructional improvement; and fourth, a gradual strengthening of teachers' role in guiding values. Compared with European and American countries, Asian nations place greater emphasis on the coordinated advancement of smart education and national education development strategies, reflecting stronger characteristics of localized development.

2.3 The Development Trajectory of Smart Education Policies in China

The development of Chinese teachers' smart teaching capabilities has gradually taken shape and evolved amid the ongoing advancement of educational informatization.

During the educational informatization phase, identified teachers' information technology application skills as a key priority, emphasizing the use of digital resources, multimedia instruction, and the integration of information technology with curriculum and teaching. Teacher capacity building primarily focused on the technical application level (Chai et al., 2023); During the educational digital transformation phase, the "Action Plan for Educational Informatization 2.0" further proposed enhancing teachers' information literacy and promoting innovation in teaching models and transformation of learning methods supported by digital technologies (Pu et al., 2023).Teacher capacity building began to expand from purely technical application to pedagogical innovation; upon entering the stage of smart education development, the *Outline of the Plan for Building a Strong Educational Nation (2024–2035)* further emphasized the implementation of strategic actions for educational digitization, promoting the in-depth application of artificial intelligence, big data, and intelligent learning environments in the education sector (Wen & Zhang, 2024).Teacher capacity building has gradually moved beyond the scope of traditional information technology application, placing greater emphasis on data-driven support, pedagogical innovation, and value-led guidance, and is characterized by the coordinated development of technical, pedagogical, and educational competencies.

In summary, the development process of teacher capacity building in China reflects a trend of continuous deepening—from technology application to instructional integration, and then to value-led education—and its direction is generally consistent with international trends in teacher capacity building.

2.4 Summary of Competency Elements in Policy Evolution

A comparative analysis of policies related to smart education from international organizations, major Asian countries, and China reveals that, although different countries and organizations vary in their policy objectives and implementation pathways, teacher capacity building is gradually converging on four core competency elements:

1. Technology integration competence serves as a crucial foundation for teachers to adapt to digital educational environments, emphasizing their ability to effectively integrate digital technologies into teaching activities.
2. Teaching innovation has gradually become a core component of teacher professional development, requiring teachers to redesign learning environments and innovate teaching methods.
3. The importance of data evaluation capabilities continues to rise, as teachers need to utilize learning data to support instructional decisions and learning improvements.
4. Value-oriented leadership is gradually emerging as a key direction for teacher capacity building in the

context of smart education, emphasizing the vital role teachers play in promoting students' holistic development, cultural heritage, and value formation.

In summary, the development of teachers' smart teaching competencies has gradually crystallized into four core competency elements: technology integration, pedagogical innovation, data-driven assessment, and value-oriented leadership. These elements not only form the common foundation for the development of teachers' smart teaching competencies but also provide a crucial basis for establishing the structure of core smart teaching competencies for art education students.

3 DISCIPLINARY FOUNDATIONS FOR THE CORE COMPETENCIES IN SMART TEACHING AMONG ART EDUCATION STUDENTS

Although core competencies in smart teaching share universal attributes of teacher professional development, their composition and development pathways vary across disciplines due to differences in knowledge structures, instructional objectives, and talent cultivation requirements (Luo & Wang, 2024). Therefore, when analyzing the logic behind the formation of core competencies in smart teaching for art education students, it is necessary not only to focus on the common requirements for teacher competency development in the context of smart education but also to examine the specific influence of the art discipline's characteristics on the formation of this competency structure.

3.1 The Shift in Art Education Development in the Context of Smart Education

With the development of artificial intelligence, big data, virtual reality, and digital art technologies, the teaching environment, artistic resources, and creative methods in art education are undergoing profound changes (Fang & Jiang, 2024). The traditional teaching model, which primarily relied on classroom demonstrations and practical guidance, is gradually evolving toward one supported by digital resources, featuring diverse interactive participation, and utilizing intelligent learning environments (Apriyanto et al., 2025).Digital museums, virtual exhibitions, online art resources, and digital creation platforms are continuously enriching art learning methods, driving the transformation of art education from an experience-driven model toward one that combines technological support with data-driven approaches.

This transformation not only alters the way art learning is organized but also places new demands on teachers' professional competencies. Teachers need to possess skills in integrating digital resources, designing smart instruction, and applying technology in an integrated manner to meet the practical needs of art education development in the context of smart education.

3.2 Special Requirements for Competency Development Due to the Nature of the Art Discipline

Art education is characterized by its practical, creative, and aesthetic nature. These characteristics dictate that the development of smart teaching competencies among art education students cannot be limited to the application of digital technology alone but must reflect the professional principles of art education (Zhang et al., 2024).

Its practical nature means that teachers must be able to use digital technology to support artistic practice, fostering students' observation, experience, creation, and expression by constructing authentic or near-authentic art learning contexts (Lendínez Turón et al., 2024). Therefore, the application of technology must serve the artistic practice process rather than simply replace traditional teaching activities. Its creative nature means that teachers must not only master digital tools but also be able to utilize digital technology to support the development of students' innovative thinking and the conduct of artistic creative activities.In the context of smart education, the value of technology lies more in fostering creativity than in merely improving teaching efficiency (Shi et al., 2019). Aesthetic considerations dictate that teachers must adhere to an aesthetic education orientation when conducting smart teaching (Ma, 2025). Although digital technology enriches art learning

resources and modes of expression, it cannot replace the function of aesthetic education. Teachers need to guide students in developing aesthetic judgment and cultural understanding through the application of technology.

Furthermore, art education bears the important responsibility of cultural heritage transmission and value formation. Teachers need to utilize digital resources to broaden students' cultural horizons, strengthen their sense of cultural identity and social responsibility, and leverage the unique role of art education in fostering virtue and nurturing talent.

3.3 Reconstruction of Competency Elements in Art Education

The development of teachers' smart teaching competencies has gradually crystallized into four core competency elements: technology integration, instructional innovation, data-driven assessment, and value-oriented guidance (Dmitrenko et al., 2023). However, in the context of art education, these competency elements do not manifest directly but are further restructured by the nature of the discipline.

Specifically, the practical dimension requires that technological integration serve the conduct of artistic practice (Manakul et al., 2021); the creative dimension requires that pedagogical innovation foster students' artistic creativity; and the aesthetic dimension requires that value-oriented guidance reflect the achievement of aesthetic education goals (Chen, 2024);the cultural dimension requires that smart teaching consistently focus on cultural heritage and character development (González-Fernández et al., 2024). Therefore, the general requirements for teacher competency development in the context of smart education are intertwined with the specific requirements for the development of the art discipline, jointly shaping a structure of smart teaching competencies with disciplinary characteristics.

In summary, the core competencies for smart teaching among art education students stem not only from the contemporary demands of smart education but are also rooted in the disciplinary attributes of art education itself. It is precisely through the combined influence of policy guidance and disciplinary restructuring that the elements of teacher competencies have gradually evolved into a competency structure with distinctive features of art education, thereby laying the foundation for subsequent analysis of the mechanisms underlying competency formation.

4 MECHANISMS FOR THE DEVELOPMENT OF CORE SMART TEACHING COMPETENCIES AMONG ART EDUCATION STUDENTS IN CHINESE HIGHER EDUCATION

Although different countries and organizations vary in their policy objectives and implementation pathways, teacher competency development in all cases exhibits a trend of continuous deepening—from technology application to instructional integration, and further toward value-led education. International organizations emphasize technology integration and learning innovation; Asian countries focus on smart teaching practices and data support; while China places greater emphasis on fostering virtue and cultivating talent, as well as enhancing teachers' digital literacy, against the backdrop of educational digital transformation. Policy requirements at various levels collectively constitute a key source for the formation of smart teaching competencies.

4.1 The Development of Competency Elements Under Policy Guidance

A comparative analysis of smart education policies from international organizations, major Asian countries, and China reveals that teacher capacity building primarily centers on four core elements.

First, technology integration capabilities. Whether it is UNESCO's Information and Communication Technology Competency Framework or China's Digital Education Strategic Action Plan, both emphasize that teachers should be able to integrate digital technologies into teaching activities to achieve a deep integration of technology and curriculum.

Second, instructional innovation capabilities. Relevant policies from the OECD, ISTE, and countries such

as Singapore and Japan all emphasize the restructuring of learning environments, innovative learning methods, and student-centered development, reflecting how the role of teachers in the context of smart education is gradually shifting from knowledge transmitters to learning facilitators.

Third, data evaluation capabilities. With the development of learning analytics technologies and intelligent platforms, recent policies in South Korea, Singapore, and China have begun to emphasize the application of learning data and precision teaching. Teachers need to possess the ability to use data to support instructional decisions and improve teaching practices.

Fourth, the ability to provide value-based guidance. In recent years, both international organizations and Chinese education policies have gradually incorporated educational equity, lifelong learning, cultural heritage, and holistic development into the framework of teacher competencies, indicating that the development of smart teaching competencies goes beyond the application of technology and ultimately serves human development.

In summary, smart teaching competence is not a single technical skill, but rather the result of the integrated development of multiple competency elements, including technology integration, instructional innovation, data-driven evaluation, and value-led guidance.

4.2 Reconstruction of Competency Elements Based on Disciplinary Characteristics

While the analysis of competency elements reflects the general requirements for teacher competency development in the context of smart education, for art education students, these elements must be reconceptualized within a disciplinary context.

Art education is characterized by its practical, creative, and aesthetic nature; its instructional objectives not only encompass the acquisition of knowledge and skills but also emphasize artistic creation, aesthetic experience, and cultural understanding (Liu & Qin, 2022).Therefore, the technology integration emphasized by smart education in the art discipline manifests not only in the use of digital tools but also in the development of digital art resources and support for artistic learning; teaching innovation is reflected not only in the reform of teaching models but also in the organization and guidance of the artistic creation process; data-driven assessment serves not only to evaluate learning outcomes but also to facilitate continuous improvement in the artistic learning process; and value-oriented guidance is further embodied in the organic integration of aesthetic education, cultural heritage, and moral education.

In summary, under the combined influence of the developmental requirements of smart education and the characteristics of the fine arts discipline, the structure of teachers' competencies is gradually shifting from general digital literacy to smart teaching competencies with distinct features of fine arts education.

4.3 From Competency Elements to Competency Structure

Based on policy and disciplinary analyses, it can be observed that the formation of core smart teaching competencies among art education students undergoes a process of transformation from competency elements to a competency structure.

In this process, the development of technology integration competencies requires teachers to first develop an understanding of and commitment to the digital transformation of education, thereby fostering an awareness of smart teaching; the continuous advancement of technology application and instructional innovation demands that teachers master the knowledge and skills related to digital resource development, smart instructional design, and the application of intelligent tools, thereby forming the knowledge and skills for smart teaching; the implementation of instructional innovation competencies in specific teaching contexts further transforms into the ability to organize smart teaching;data evaluation competence gradually evolves into smart teaching evaluation competence; and value-oriented leadership competence ultimately points toward holistic education, serving as the value destination for the development of smart teaching competence. This forms the progressive structure of core smart teaching competencies for Chinese art education students outlined in this study:

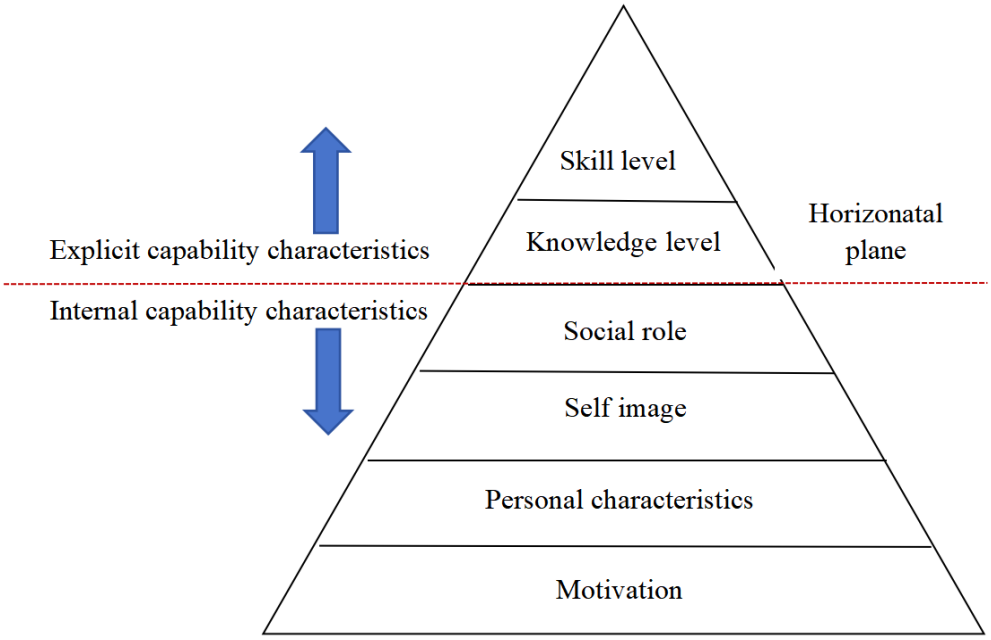
"awareness of smart teaching—knowledge and skills in smart teaching—organization of smart teaching—evaluation of smart teaching—holistic education."

In summary, the formation of core smart teaching competencies among art education students in Chinese higher education essentially manifests as a process of transforming policy requirements into competency elements and evolving those elements into a competency structure.

5. INTERPRETATION OF THE CORE COMPETENCY STRUCTURE FOR SMART TEACHING AMONG ART EDUCATION STUDENTS FROM THE PERSPECTIVE OF COMPETENCY THEORY

Based on policy and disciplinary analyses, it has been revealed that the core competencies in smart teaching for art education students consist of five dimensions: awareness of smart teaching, knowledge and skills in smart teaching, organization of smart teaching, evaluation of smart teaching, and comprehensive education. To further illustrate the theoretical validity of this competency structure, it is necessary to interpret it through the lens of competency theory.

Figure 1 The Competency Iceberg Model



Note: This figure outlines the contents of the competency iceberg model.

Competency theory posits that an individual's performance depends not only on overt competencies such as knowledge and skills but is also influenced by deeper factors such as values, motivation, and professional identity (Orellana-Solórzano & Bermúdez-Cevallos, 2022).In this context, the iceberg model divides competencies into two parts: the visible layer and the hidden layer. The visible layer primarily includes knowledge and skills—competencies that are easily observed and cultivated—while the hidden layer encompasses elements such as attitudes, values, and intrinsic motivation, which are not readily measurable. Compared to visible competencies, hidden competencies often exert a deeper influence on the direction of an individual's behavior and the level of their professional development.

From the perspective of the iceberg model, the core competencies of smart teaching among art education students exhibit distinct hierarchical characteristics. Among these, smart teaching knowledge and skills, smart teaching organization, and smart teaching assessment primarily manifest as specific behaviors of teachers in

teaching practice and belong to the explicit competency level (Ji & Yang, 2023). These competencies can be gradually acquired through coursework, teaching training, and educational practice, and directly influence the effectiveness of smart teaching activities.

In contrast, awareness of smart teaching and holistic education primarily reflect teachers'认同 of the value of digital transformation in education and their understanding of the educational mission, and thus belong to the implicit competence level (Spencer & Spencer, 2011).Awareness of smart teaching determines whether teachers can proactively adapt to the demands of smart education development and continuously pursue pedagogical innovation; comprehensive student development, in turn, determines how teachers balance the application of technology with educational values, ensuring that smart teaching consistently serves students' holistic development (Chen, 2024). Therefore, although these two aspects are difficult to cultivate directly through short-term training, they play a foundational and guiding role in the development of other competencies.

Furthermore, the five-dimensional competencies do not exist in a simple parallel relationship; rather, they form a developmental logic in which implicit competencies underpin explicit competencies, and explicit competencies realize educational values. Awareness of smart teaching constitutes the intrinsic driving force for competency development; knowledge and skills provide the foundational support; instructional organization and assessment reflect the concrete process of translating competencies into teaching practice; and holistic education embodies the ultimate value orientation of competency development (Zhang & Yuan, 2022).These dimensions are interconnected and collectively constitute a comprehensive system of core competencies for intelligent teaching.

In summary, competency theory—particularly the iceberg model—effectively explains the structural characteristics of the core competencies for 智慧教学 among art education students. This competency system not only embodies the fundamental laws of teacher professional development in the context of 智慧教育 but also reflects the practical requirements for the coordinated development of technology-enabled instruction and value-based education in the field of art education, thereby validating the rationality of the five-dimensional competency structure at the theoretical level.

6 CONCLUSIONS AND IMPLICATIONS

The development of smart education is driving a shift in teachers' professional competencies from traditional information technology application skills toward comprehensive competencies that deeply integrate technology, teaching, and character education (Liu et al., 2024). For art education students, this transformation is influenced not only by the digital transformation of education but also by the combined effects of the disciplinary characteristics of art education and the goals of aesthetic education. Therefore, exploring the logic behind the formation of core competencies for smart teaching is of great significance for deepening research on teacher competencies and optimizing the training system for teacher candidates.

Based on a comparative analysis of smart education policies from international organizations, major Asian countries, and China, this paper finds that teacher competency development is gradually shifting from a technology-application orientation toward a comprehensive competency system characterized by the synergistic development of technology integration, instructional innovation, data-driven evaluation, and value-based guidance. These competency elements constitute the external foundation for the formation of core smart teaching competencies.

Further analysis, incorporating the characteristics of art education, reveals that creativity, practicality, and aesthetic sensibility determine that the development of smart teaching competencies among art education students cannot remain confined to the application of digital technology; rather, it requires the organic integration of technology-enabled teaching, artistic creation, and value-based education. Under the combined

influence of the requirements for smart education development and the attributes of the art discipline, the elements of teacher competencies have gradually evolved into a competency structure with distinct disciplinary characteristics.

Research indicates that the core competencies for smart teaching among art education students ultimately form a progressive structure comprising "awareness of smart teaching—knowledge and skills in smart teaching—organization of smart teaching—evaluation of smart teaching—comprehensive education." Among these, awareness of smart teaching embodies the intrinsic driving force behind competency development; knowledge and skills in smart teaching constitute the foundational support for competency development; the organization and evaluation of smart teaching reflect the process of translating these competencies into teaching practice; and comprehensive education embodies the ultimate value of smart teaching competency development.These five dimensions are interrelated and collectively constitute a core competency system for smart teaching with distinctive features of art education.

Based on the above research, teacher training institutions should, in the process of cultivating art education students, place greater emphasis on the coordinated development of technical skills and educational values, promote the organic integration of digital technology learning, smart teaching practices, and the achievement of aesthetic education goals, and continuously enhance the professional capabilities of future art teachers to adapt to the development of smart education.

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