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Research on the Path of Intangible Cultural Heritage Knowledge Graph Empowering Art Design Education in Colleges and Universities

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Abstract: To further improve the level and quality of art design education in colleges and universities and promote the reform and innovation of higher education, this paper conducts research from the perspective of intangible cultural heritage (ICH) knowledge graph empowering education, aiming to break through the current bottlenecks in the integration of ICH and art education and advance the innovative reform of art design education in colleges and universities. Firstly, it analyzes and interprets the significance of ICH knowledge graph empowering college art design education. Then, it elaborates on the challenges faced in this process. Finally, it proposes multiple educational measures, including optimizing graph construction, strengthening literacy education, deepening curriculum integration, and improving the support system, so as to effectively promote the innovative reform of college art design education and enhance the level and quality of talent cultivation in colleges and universities.

Keywords: Intangible cultural heritage knowledge graph; College art design; Educational innovation

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1. Introduction

With the implementation of China's cultural power strategy, the importance of intangible cultural heritage protection has become increasingly prominent. As an important carrier for inheriting the cultural genes of the Chinese nation, promoting the dynamic inheritance and innovative development of ICH has become a key task. In college art design education, inheriting and carrying forward the excellent traditional Chinese culture is essential, and integrating ICH, an outstanding crystallization of excellent traditional Chinese culture, into college art design education is a crucial link, which also helps to promote the innovative reform of college art design education [1]. To advance the in-depth integration of college art design education and ICH, knowledge graphs can be used to strengthen the connection between ICH and college art education, thereby realizing the systematic integration and visual presentation of ICH resources in college art design education. This not only promotes the innovative reform of college art design education but also effectively facilitates the widespread

inheritance and promotion of ICH, cultivates the cultural confidence of college students majoring in art design, and enhances the level and quality of talent cultivation [2].

2. The significance of intangible cultural heritage knowledge graph empowering art design education in colleges and universities

In college art design education, the integration of the Intangible Cultural Heritage (ICH) Knowledge Graph holds profound significance and value, contributing to the innovation and reform of such education. The ICH Knowledge Graph can systematically sort out and summarize core ICH elements, including traditional craftsmanship, ethnic traditional culture, and aesthetic symbols, and construct a multi-dimensional associated knowledge network. This addresses the problem of ICH elements being fragmented and scattered, enabling the systematic integration of ICH into college art design education.

By transforming originally dispersed ICH resources into structured and systematic teaching content, it not only allows students to deeply perceive the cultural connotation of ICH during their studies but also helps them understand the internal logic between different ICH projects and art design. In turn, this enables students to form a three-dimensional cognitive framework and enhances the quality of college art design education [3]. Furthermore, the empowerment of college art design education by the ICH Knowledge Graph helps drive the innovation of educational models, shifting college art design education from traditional lecture-based teaching to more immersive and inquiry-oriented learning methods. For example, teachers can combine the associated exploration and visual analysis of the knowledge graph to deeply tap the innovative potential of ICH elements in the field of art design. This also helps stimulate students' interdisciplinary thinking, thereby improving the utilization efficiency of ICH resources, enabling students to learn to transform ICH cultural symbols into modern art design resources, and strengthening the effectiveness of cultivating students' design capabilities. It contributes to the comprehensive improvement of students' cultural literacy and artistic level, promotes the two-way empowerment of ICH inheritance and design innovation, and enhances the quality of talent cultivation in colleges and universities [4].

3. Challenges faced by the empowerment of intangible cultural heritage (ICH) knowledge graph in higher education of art and design

3.1. Challenges arising from incomplete construction and insufficient standardization of ICH knowledge graph

The empowerment of ICH knowledge graph in higher education of art and design is confronted with challenges brought by incomplete construction and insufficient standardization of the graph, which also limits the innovation effect of art and design education in colleges and universities [5]. In practice, this is mainly reflected in the fact that the construction of ICH knowledge graph mostly focuses on well-known ICH items, such as embroidery and ceramics, while the integration of ICH contents with distinct local characteristics but limited influence, such as traditional crafts and folk culture is insufficient. This further leads to structural gaps in the ICH knowledge system. Moreover, the current construction of ICH knowledge graph focuses on explicit knowledge such as craft processes and historical origins, while the excavation of implicit knowledge contained in ICH, such as cultural spirit and aesthetic concepts, is relatively insufficient, making it difficult to promote the innovation of art and design education in colleges and universities.

At the standardization level, a unified construction standard has not been formed for the ICH knowledge

graph, resulting in significant differences in data formats, term definitions, and relationship types of the ICH knowledge graph. For example, there are differences in the description methods adopted for classification standards of traditional patterns and steps of ICH crafts. This also makes it difficult to connect different knowledge graphs and creates data barriers for data sharing, affecting the integration effect of knowledge graphs and hindering the innovation of art and design in colleges and universities [6].

3.2. Challenges arising from insufficient cognition and application ability of teachers and students towards ICH knowledge graph

The empowerment of ICH knowledge graph in higher education of art and design faces the challenge that teachers and students in colleges and universities have insufficient cognition and application ability of the ICH knowledge graph. This is mainly because teachers and students often have cognitive biases towards the ICH knowledge graph and lack corresponding application abilities [7]. For instance, some teachers lack an in-depth understanding of the technical characteristics and value of the ICH knowledge graph, simply regarding it as a digital teaching resource without deeply exploring the knowledge connection between ICH and college art and design in teaching. Meanwhile, their application of core functions such as intelligent retrieval is also relatively insufficient. In teaching practice, some teachers still adopt the traditional cramming-style classroom teaching method instead of making full use of the graph to guide students in independent inquiry, resulting in poor teaching effects [8]. Students also have weak application abilities; for example, some students lack a systematic understanding of the logical structure and retrieval methods of the knowledge graph, making it difficult for them to fully utilize ICH resources for art design, thus reducing the effect and quality of talent cultivation [9].

3.3. Challenges arising from inadequate integration between ICH knowledge graph and art and design curriculum system

In college art and design courses, there is a challenge of inadequate integration between the ICH knowledge graph and the art and design curriculum system. This is mainly manifested in the fact that college curriculum design often only takes the ICH knowledge graph as a supplementary resource for elective courses or special lectures, rather than integrating it into the core art and design curriculum system. As a result, the integration of the ICH knowledge graph in art and design education in colleges and universities lacks systematisms and coherence [10]. For example, in core courses such as visual communication design and product design, the application of the ICH knowledge graph often stays at the level of case display, without deeply penetrating into the comprehensive educational processes such as design concepts, creative conception, and practical creation. Therefore, the value of the ICH knowledge graph is not fully explored, the teaching effect is poor, and it is difficult to enhance the quality and effectiveness of art and design talent cultivation in colleges and universities [11].

3.4. Challenges arising from weak technical support and resource guarantee for the application of ICH knowledge graph

The empowerment of ICH knowledge graph in higher education of art and design is faced with challenges in technical support and resource guarantee, which reduces the quality and effectiveness of education [12]. For example, at the technical level, the current university knowledge graph platforms often have insufficient functions and weak interactive experience, and lack functional modules designed specifically for college art and design education, such as intelligent functions like ICH element extraction, design inspiration stimulation, and virtual creation deduction.

At the resource guarantee level, the application of the ICH knowledge graph also faces certain

shortcomings. For example, the construction and maintenance of the ICH knowledge graph often require continuous capital investment, but most current universities have the problem of insufficient funding, which cannot support the regular update and technical upgrading of the ICH knowledge graph platform. This leads to weak resource guarantee in college art and design education and fails to improve the quality and effectiveness of education.

4. Suggested paths for intangible cultural heritage knowledge graph to empower art and design education in universities

4.1. Optimize graph construction and consolidate the digital teaching foundation of ICH resources

To enable the ICH knowledge graph to empower art and design education in universities, efforts should be made to actively optimize the graph construction model, thereby consolidating the digital teaching foundation of ICH resources. In practice, measures need to be taken from aspects such as content expansion and standard unification. For instance, in terms of the content construction of the ICH knowledge graph, it is necessary to clearly distinguish between national-level and local-level ICH resources, and sort them hierarchically based on different levels. The graph should not only cover representative ICH projects but also explore local characteristic ICH projects, forming a three-dimensional ICH knowledge system [13].

Meanwhile, the integration of the ICH knowledge graph into university art and design education should also emphasize the excavation of tacit knowledge. Activities such as interviewing ICH inheritors and conducting cultural origin research can help integrate multiple factors behind traditional ICH techniques, such as aesthetic concepts and cultural spirits into teaching. This will create an educational pattern where ICH techniques and art and design education are deeply integrated, and enhance the effectiveness of talent cultivation in university art and design programs. In terms of standardization construction, core standards for the ICH knowledge graph, such as data formats and terminology systems, should be clearly defined. This ensures the standardized construction of the ICH knowledge graph, enabling it to be deeply integrated into university art and design education and improving the quality of talent cultivation.

4.2. Strengthen literacy cultivation and enhance teachers' and students' ability to apply the knowledge graph

Cultivating the literacy of university teachers and students is a key link in improving the utilization efficiency of the ICH knowledge graph and promoting innovation in art and design education. Therefore, educational reforms should be advanced centering on teachers' and students' ability to apply the knowledge graph. Firstly, for teachers, workshops, special lectures, and other activities related to the ICH knowledge graph should be actively organized. This will enable teachers to gradually master core educational skills such as correlation analysis and visual presentation of the knowledge graph, allowing them to carry out inquiry-based educational activities using the ICH knowledge graph and improve the quality of talent cultivation [14].

For students, the ability to apply the knowledge graph should be incorporated into the university's talent cultivation target system. For example, specialized compulsory courses related to the ICH knowledge graph can be developed. These courses will systematically guide students to learn about the ICH knowledge graph and teach them multiple art and design skills such as graph retrieval, knowledge extraction, and creative transformation, thereby promoting the comprehensive improvement of students' abilities.

4.3. Deepen curriculum integration and build a teaching model based on knowledge graphs

To enable intangible cultural heritage (ICH) knowledge graphs to empower university art and design education, it is necessary to deepen curriculum integration and further build a more comprehensive teaching model based on knowledge graphs. Firstly, teachers need to pursue research and innovation in terms of curriculum design. For example, ICH knowledge graphs should be integrated into the core curriculum system of university art and design education, and students should be guided to learn and understand ICH knowledge graphs in a hierarchical manner. Progressive courses can be offered around multiple dimensions such as basic cognition, element extraction, creative transformation, and comprehensive practice. Through such progressive learning, students can gradually enhance their ability to apply knowledge graphs and make full use of ICH knowledge in art and design [15].

In addition, the integration of teaching content also requires teachers to continuously optimize and improve. For instance, in the actual delivery of art and design education, teachers can retrieve the correlations between course knowledge points and ICH elements, and organize classroom discussions around design cases. This allows students to constantly exchange views and opinions during discussions, draw experience from cases, and learn how to extract cultural connotations and design elements from ICH knowledge graphs, thereby strengthening their comprehensive abilities and improving the effectiveness of university art and design education.

4.4. Improve the support system and build an ICH knowledge graph sharing and application platform

Universities should strive to improve the support system during the process of leveraging ICH knowledge graphs to empower art and design education, thereby building an ICH knowledge graph sharing and application platform to realize the comprehensive utilization of ICH knowledge graphs. In terms of platform construction, for example, it is necessary to enrich platform function support: ensure that the platform has personalized functional modules such as intelligent retrieval, element extraction, and inspiration stimulation, while optimizing multi-terminal adaptation and interactive experience. This ensures that teachers and students in the university can fully use the platform for art and design, which not only strengthens the support system for university art and design education but also helps to continuously improve students' professional level. In addition, in terms of resource guarantee, it is necessary to actively promote in-depth cooperation between universities and enterprises. First, universities need to optimize their fund budgets to ensure sufficient financial support for the construction of ICH knowledge graphs. Second, establish in-depth cooperation relationships between universities and enterprises to recruit ICH researchers, art and design teachers, and enterprise information technology personnel to form a collaborative team for the co-construction and sharing of ICH knowledge graph resources. In this way, ICH knowledge graphs can be fully utilized to promote innovation in university art and design education and improve the level of talent cultivation in universities.

5. Conclusion

The study found that integrating the intangible cultural heritage (ICH) knowledge graph into university art and design education is an innovative initiative. This initiative helps improve the university education model, stimulate students' subjective initiative in learning, and enhance the quality and effectiveness of university art and design education.

Focusing on how the ICH knowledge graph empowers university art and design education, this study has proposed a comprehensive framework system of "knowledge graph construction + literacy enhancement + curriculum deepening + platform support". Through this framework system, the effect of integrating the ICH knowledge graph into university art and design has been significantly improved, and the level of university art and design education has been elevated. In the future, the empowerment of the ICH knowledge graph in university art and design education will gradually develop and innovate in the direction of intelligence and digitalization. In subsequent studies, research breakthroughs can also be sought around the construction of a dynamically updated interdisciplinary ICH knowledge graph correlation model, thereby continuously cultivating high-quality talents for the field of art and design.

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Disclosure statement

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