The Research on the Curriculum Design of Innovation and Entrepreneurship Education in Chinese Art Vocational Colleges

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Abstract

This study aims to deeply explore the design of innovation and entrepreneurship education courses in China's art higher vocational colleges to adapt to the growing demand for artistic innovation and entrepreneurship capabilities in modern society. With the development of social economy and the rise of the cultural industry, students in art vocational colleges are in urgent need of cross-professional comprehensive capabilities, which not only include innovative thinking and entrepreneurial spirit, but also practical operational skills to face the ever-changing professional environment. challenges. Through the implementation of comprehensive innovation and entrepreneurship course content planning, staged education and teaching layout and "process plus results" evaluation system, talents with both innovative spirit and entrepreneurial awareness as well as advanced technical skills can be cultivated to serve as the country's innovative development and regional economic and social progress.

This article focuses on the preparation of an indicator scale for teaching effectiveness evaluation of innovation and entrepreneurship education courses in Chinese art higher vocational colleges, analyzes its reliability and validity, and verifies the effectiveness of the scale.

Keywords: China's art Higher Vocational Colleges; Innovation and Entrepreneurship Education Courses; Teaching Effectiveness Evaluation Indicators

Introduction

Innovation and entrepreneurship education has developed into an important part of art management under the theory of art, and is an important content of higher education research. Especially in recent years, under the guidance of the national innovation-driven development strategy, the concept of innovation and entrepreneurship has been generally recognized, and innovation and entrepreneurship education in higher vocational colleges has achieved unprecedented development. Many domestic higher vocational colleges have successively established innovation and entrepreneurship colleges to incorporate innovation and entrepreneurship education into the entire process of talent training. Innovation and entrepreneurship education is a brand-new educational concept and education model based on quality education. In recent years, it has become a hot spot for both theoretical and practical research by domestic and foreign scholars. Innovation and entrepreneurship education for college students emphasizes the unity of knowledge and action and the all-round development of students, which conforms to the new needs of education in the development of the times. With the development of the global entrepreneurial economy and the intensification of international competition, countries around the world have gradually regarded innovation and entrepreneurship education as an important way to promote economic development and

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improve the quality of education. During China's current economic slowdown and transformation and upgrading process, the country The innovation-driven development strategy is vigorously promoted, and higher vocational education is given an important role. As an integral part of this system, the design of innovation and entrepreneurship education courses in art higher vocational colleges is particularly important (Chen Qian, 2022). The professional advantages of art vocational colleges can be highly consistent with innovation and entrepreneurship education. Proposing to build innovative and entrepreneurship education courses with unique characteristics of art colleges based on artistic talents is a useful supplement to the existing innovation and entrepreneurship education model.

From a Chinese perspective, innovation and entrepreneurship education is a breakthrough in solving many domestic problems. The National Medium and Long-term Education Reform and Development Plan (2010-2020)" lists the "innovative talent training model" as a top priority, "cultivating top innovative talents" as the core task, and "top innovative talent training reform" as Major education reform pilots have clearly defined the education reform and development goals of cultivating a large number of top innovative talents (Ministry of Education, 2010). The Ministry of Education's "Opinions on Vigorously Promoting Innovation and Entrepreneurship Education in Colleges and Universities and College Students' Self-Employment Work" combines innovation education with entrepreneurship education and puts forward the expression "innovation and entrepreneurship education" (Ministry of Education, 2010), which applies to higher vocational colleges. The development of entrepreneurship education has great guiding significance.

For students in art vocational colleges, innovation and entrepreneurship education not only means the accumulation of knowledge and skills

Tiredness is also the cultivation of a way of thinking and problem-solving abilities (Yang Jianlei, 2023). Innovation and Entrepreneurship Teaching

The core concepts of educational courses are “student-centered, output-oriented, and continuous improvement.” Therefore, the evaluation of educational quality

Assessments focus on “student learning outcomes, effects and abilities” (Zhang Fan et al., 2018). From emphasizing input and process level, teacher-centered, to emphasizing process and output level, student-centered. The OBE (Outcome-based Education) concept emphasizes the need for society and the all-round development of people. It is oriented by the development results of art students, focuses on "what they have learned" and "what they can do" after graduation, and reversely designs the curriculum system and teaching links. , allocate teaching staff and resource conditions, and evaluate the quality of talent training for art professionals.

Based on this, how can innovation and entrepreneurship course design be outcome-oriented? What are the expected learning outcomes of the Innovation and Entrepreneurship course? We need to explore these two issues, so it is very critical to build a quantitative system for the learning effects of innovation and entrepreneurship courses in Chinese art vocational colleges.

Research Objective

1、Examining the necessity of innovation and entrepreneurship education curriculum design for Chinese higher vocational art colleges, addressing the increasing demand for artistic innovation and entrepreneurial skills among students.

2、Investigating strategies for designing innovation and entrepreneurship education courses, emphasizing comprehensive content planning, staged teaching, and evaluation systems focusing on process and outcomes.

3、Developing an evaluation framework to assess the effectiveness of innovation and entrepreneurship education courses in Chinese art higher vocational colleges, aiming to establish a scientific basis for course improvement and optimization.

Literature Review

Research on OBE Education Philosophy

OBE was proposed by American scholar William G. Spady (1981), emphasizing the focus of results rather than

It lies in students' academic scores, but in the abilities that students truly possess after the learning process. Reviewing the literature, OBE has a long history of development in Western countries and has far-reaching influence. This part will try to sort out the research trajectory of OBE around domestic and foreign research on OBE concepts and OBE practical applications, summarize the practical experience of OBE reform, and thus trigger reflection on the implementation of OBE.

1. Research on OBE

1.1 Foreign research on OBE concept

OBE first appeared in Spady's representative book "OBE Teaching Management: A Sociological Perspective"

(Outcome-based Instructional Management: A Sociological Perspective), it is advocated that schools focus all curriculum and teaching energy on clearly defined learning outcomes to encourage students to be guided by expected outcomes, and to finally demonstrate the learning expectations of the course . Spady's proposition is mainly based on the following basic beliefs: all students can learn and succeed, but the learning pace and learning methods are different; success can promote more success; schools can create conditions for success; emphasize real and evaluable learning Outcomes; focus on the peak outcomes that students can achieve when they graduate, and course design and evaluation are based on high-level learning outcomes; hold different stakeholders accountable, such as: learners themselves, teachers, employers, and experts in the field etc.; prompting school reforms in curriculum, teaching and evaluation (Harden R M, 1999).

On the basis of Spady's proposition, researchers have successively promoted other key points of deduction: OBE is a process focusing on "what to learn" (learning outcomes) (Kudlas, J.M., 1994); OBE is a student-centered process with results. It is a oriented system and expects all learners to learn and succeed (Towers.G.C., 1996); OBE is also an education model, and its teaching and evaluation focus on students' learning outcomes, which can promote the school's continuous focus on learning. And be responsible for students' learning (Liang Peiyun, 2013).

It can be seen that the results emphasized by OBE are the products at the end of the teaching process. It advocates that the focus of the curriculum has evolved from the traditional emphasis on the study of subject content to the emphasis on the transformation of students' behavior and the growth of abilities, and therefore can achieve high-quality education.

1.2 Domestic research on OBE concept

Domestic research on OBE started relatively late, first in Taiwan and Hong Kong. It was not until 2012 that OBE gradually entered the field of vision of mainland educators. As early as 2005, Taiwan and Hong Kong began to devote themselves to OBE research, and their research areas were mainly in two aspects: theoretical cognition and curriculum setting. As OBE research continues to deepen, colleges and universities in Taiwan have successively implemented a series of educational reforms to enhance students' core abilities. For example: the OBE double-loop curriculum planning mechanism implemented by Feng Chia University first analyzes social industry needs, school positioning and characteristics, and students' personal development and literacy, and then formulates course goals and plans for students after graduation through the internal and external loop curriculum mechanism. and the core competencies possessed five years after graduation, and finally implement the course opening plan based on this loop mechanism, and implement periodic self-evaluation and continuous improvement (Li Bingqian, 2008). Chung Yuan University has developed a "career map mechanism" based on students' basic abilities. The indicators of the radar map are based on eight core items: "professional knowledge", "innovation and problem solving", "social abilities and ethics", and "communication and cooperation". Ability is used as the main axis to present students' learning results in a graphical way, thereby helping students understand and examine their strengths and weaknesses in their basic abilities (Fan Aiqun and Guo Jianzhi, 2009). The research on OBE in Hong Kong started earlier and achieved remarkable practical results. The Hong Kong University of Science and Technology is a typical example. Guided by the standards accredited by the American Engineering and Technology Education Accreditation Council, the development of engineering education is divided into a "three-tier" model - — Professional engineer training, graduate student training, and diversified career development training (Zhao Hongmei, 2016).

In comparison, research on OBE in mainland China mainly focuses on theoretical cognition and discussion. Jiang Bo (2003) constructed a system of "result-based education". Starting from the origin and essence of "result-based education", he analyzed what "results" are and constructed "result-based education". "Explain the system principles, assumptions, etc. of the system. Since then, research on OBE has appeared one after another. Especially after 2012, the research team represented by Li Zhiyi and Shen Tianen introduced OBE into the "Engineering Science and Technology Talent Training" project, conducted in-depth research and thorough analysis of OBE, and used the OBE concept Guide the teaching reform of higher engineering education. Shen Tianen (2016) interpreted the definition, measurement and evaluation of learning outcomes in the OBE concept, and deeply analyzed the theoretical origins of OBE, OBE teaching design concepts, etc., and also explored and practiced this design concept (Shen Tianen, 2016). Gong Jianmin (2016) specifically analyzed the design of learning outcomes. He first pointed out that the "outcomes" of OBE have the advantages of being highly operable and evaluable, then provided a specific process for designing student learning outcomes, and finally proposed that it is helpful to Several suggestions for learning outcome design: focus on top-level design, reform evaluation methods, focus on the

implementation of continuous improvement, and pay attention to the central role of teacher development (Gong Jianmin et al., 2016). It also deeply analyzed the theoretical origin of OBE, OBE teaching design concept, etc., and also explored and practiced this design concept (Shen Tianen, 2016). Gong Jianmin (2016) specifically analyzed the design of learning outcomes. He first pointed out that the "outcomes" of OBE have the advantages of being highly operable and evaluable, then provided a specific process for designing student learning outcomes, and finally proposed that it is helpful to Several suggestions for learning outcome design: focus on top-level design, reform evaluation methods, focus on the implementation of continuous improvement, and pay attention to the central role of teacher development (Gong Jianmin et al., 2016).

1.3 Research on the application of OBE in practice

1.3.1 Foreign research on the implementation level of OBE

Since OBE was proposed, it has been widely used in curriculum development models, educational reforms, and educational certification and evaluation in the United States, Canada, Australia, South Africa and other countries and regions. Research at the OBE implementation level mainly focuses on the following aspects: First, research on OBE's curriculum development model. The American Engineering and Technology Education Accreditation Organization launched the engineering course plan and certification standard EC2000. The core of this standard is to use learning outcomes as the basis for evaluating teaching effectiveness and to use them in the process of continuous improvement. Other studies on the application of OBE to curriculum development models include the European Union's dynamic environment curriculum planning, the International Alliance for Higher Business Education's process to ensure learning effectiveness, and the American WASC "Student Learning Outcomes-Based Assessment Model" (Hong Huangyao et al., 2015).

The second is about the research on "student learning effectiveness" based on OBE. Council for Higher Education Accreditation

(Council for Higher Education Accreditation) held a "Student Learning Effectiveness" workshop (Wang Xinhong, 2008), trying to make student learning effectiveness the focus of future university recognition, and encouraging schools to establish an evaluation mechanism for student learning effectiveness. The evaluation criteria are based on the clarity and evidence of learning effectiveness, the achievement of learning effectiveness, the disclosure of learning effectiveness information, the improvement and application of learning effectiveness, etc.

The third is about the curriculum development model of OBE applied in medical education. Kem and Thomas (1998) identified problem identification and needs assessment, designated student needs assessment, goals, educational strategies, implementation, evaluation and feedback as the six steps to be followed in the medical education curriculum development model.

The fourth is empirical research on learning effectiveness. In 2007, the United Nations Educational, Scientific and Cultural Organization first proposed the definition of "student learning effectiveness" in "Quality Assurance and Certification: Basic Vocabulary and Definitions", that is, learners experience a period of learning and complete a certain unit of hours, courses or studies. After the process, people are expected to understand, know, and demonstrate the intelligence and technology (Huang Shuling, 2010). As a result, various higher vocational colleges have begun to conduct empirical research on the learning effectiveness of

overall subjects, the learning effectiveness of science and engineering subjects, the learning effectiveness of social science fields, and the learning effectiveness of medical education.

1.3.2 Domestic research on the application of OBE in practice

In recent years, OBE has gradually become a hot spot in higher education research in my country. Its research content mainly focuses on "research on curriculum design based on OBE", "research on teaching models based on OBE", and "research on empirical research based on OBE". All in all, my country's OBE research practice has achieved some results, but a systematic theoretical system and implementation framework have not yet been formed, and further in-depth research is needed.

First, research on course design based on OBE. OBE was first used in the field of engineering education certification, requiring majors receiving certification to: clarify learning outcomes, arrange teaching activities according to learning outcomes, and evaluate the achievement of learning outcomes. The above are the keys to implementing OBE. The former depends on teaching design, and the latter depends on teaching evaluation. As a result, researchers in related fields have carried out research around "reverse design". Among them, Li Zhiyi's (2015) OBE teaching design is the most typical. He specifically explained the idea of reverse design based on the automation major of a certain school. Strategies, key points, etc., and pointed out through specific examples how to carry out reverse design, how to determine training goals, how to build a curriculum system, etc. At the same time, in view of the deficiencies in the teaching of higher vocational professional courses, some researchers have integrated OBE educational concepts into the teaching design of project-based courses, and proposed the reverse direction of course goal setting, teaching project design, teaching implementation and evaluation, and teaching improvement. Design methods promote teaching processes such as student-centered teaching design, diversified assessment and evaluation, and optimization of teaching design to achieve learning outcomes (Wang Xiaodian, 2018). Shen Tianen (2016) emphasized providing all-round quality assurance for OBE teaching design, thereby forming a dynamic closed-loop management process.

The second is, research on teaching models based on OBE. OBE's teaching model focuses teaching on "students' learning outcomes" and makes classroom teaching more vivid through flexible teaching methods and diversified evaluation methods. Research on the OBE teaching model mainly focuses on two aspects: on the one hand, it discusses the significance, characteristics, implementation methods and implementation points of the OBE teaching model from a macro perspective (Hu Wei, 2008); on the other hand, it focuses on the OBE teaching model. For a specific major or course, for example, Zhao Yu (2016) discussed the application of OBE education in management course teaching from the aspects of training objectives, course design, teaching content, etc., providing a reference for other related courses to apply this model; Fan Xiangjun Guan Xinghua (2017) tried to design results-oriented tasks in English speaking teaching, set up a result-oriented speaking task implementation model, and designed the classroom internalization of OBE speaking tasks. Through survey data, he found that result-oriented The flipped classroom teaching model has led to significant improvements in learning interest, task participation, and oral performance. In addition, there are some studies on integrating OBE education into the teaching models of other majors such as automobile maintenance and logistics in higher vocational colleges. From the analysis of existing literature, it is found that research based on the OBE teaching model emphasizes "student-centered" organization of teaching, including setting learning starting points based on students' existing

differentiated ability levels, providing teaching content that is tailored to students' aptitude, and using diversified teaching evaluations. etc.

The third is empirical research based on OBE. Empirical research on OBE is mostly found in vocational colleges. Among them, Guangdong Lingnan Vocational and Technical College, Shantou University, Heilongjiang Vocational and Technical College, etc. are the first to carry out empirical research on OBE education. The book "Exploration and Practice of Talent Cultivation Based on DQP OBE: Application Practice of Chineseization of the American Qualifications Framework" edited by He Jing (2017), based on the reference to the American Qualifications Framework (DQP), integrates OBE education, and combines The actual situation of vocational education has been actively explored in the practice of Chineseization of OBE education. After practical exploration, research has found that this model can effectively solve some of the urgent problems in the reform of professional talent training models in higher vocational education. At the same time, the research team provides application examples of OBE-based teaching design and implementation in majors such as industrial and commercial enterprise management, logistics management, and human resources management for reference by other vocational schools. Researchers such as Gu Peihua (2014) pointed to Shantou University's engineering education model based on "learning outcomes" (OBE). The research content mainly focuses on the practical structure, implementation characteristics, and implementation focus of the OBE engineering education model. , and empirical research results show that the practice of engineering education model based on OBE is an effective teaching reform strategy for Shantou University. In addition, the research team also pointed out the difficulties encountered in the implementation of OBE and practical reflections on how vocational colleges can achieve flexible, sustainable, and high-level OBE. Wang Xiaodian's works and research papers such as "Outcome-Oriented Vocational Curriculum Development" and "Outcome-Oriented Vocational Curriculum Development Case Collection" take Heilongjiang Vocational and Technical College as the research object and carry out the reform of the outcome-oriented curriculum system based on the school-wide level. In-depth research was carried out to complete the integration and optimization of the entire school's curriculum system from the establishment of core competency indicators, adjustment of outcome-oriented curriculum structure, development of specific course syllabus and unit teaching design, and multiple evaluation methods (Wang Xiaodian, 2016).

Based on the above content, the assessment of student learning outcomes in innovation and entrepreneurship education courses in Chinese art higher vocational colleges is a systematic process, aiming to measure the acquisition and improvement of students' knowledge, skills, attitudes and values in innovation and entrepreneurship education courses. This article will The discussion is conducted from four dimensions: course content, teaching methods, teaching staff, and student innovation achievements.

Research Methodology

Five art vocational colleges in the Beijing-Tianjin-Hebei region have been selected as the target institutions for this study, with an anticipated sample size of approximately 300 individuals. Due to restrictions imposed by the pandemic, we have opted for a sampling survey method and are conducting the survey online using the Questionnaire Star app to facilitate efficient data management and collection. We prioritize the principles of anonymity and voluntary participation throughout the survey process to ensure the privacy and rights of each participant are fully respected. The survey commenced in early November 2023 and will conclude by the end of January 2024, allowing sufficient time for data collection and analysis.

The specific steps of the survey are outlined as follows:

1、Initially, an open-ended questionnaire was developed based on six dimensions determined by this study to explore students' perspectives and experiences regarding the outcomes of innovation and entrepreneurship education courses in art vocational colleges. Subsequently, the questionnaire was distributed to vocational students enrolled in the target institutions.

2、Thorough analysis of the collected responses from the open-ended questionnaire was conducted, upon which a preliminary survey questionnaire was formulated to gain comprehensive insights into students' viewpoints and opinions.

3、Subsequently, experts were invited to validate the preliminary questionnaire for its validity, and a pilot test was conducted on a small scale, accompanied by soliciting feedback from the experts. Based on the suggestions provided by the experts, the questionnaire underwent the first round of revision and optimization.

4、Following the pilot test, each item of the questionnaire underwent discrimination analysis to ensure the appropriateness and effectiveness of the question design, as well as the internal consistency of the questionnaire.

5、After establishing the reliability of the questionnaire, a second round of revision was conducted to finalize the questionnaire, and the formal distribution commenced.

6、Finally, the collected survey data will be subjected to comprehensive statistical analysis using SPSS 23.0 software to derive scientifically accurate conclusions and provide valuable insights for future research endeavors.

To validate the scientific validity of the self-developed "Evaluation Indicators for the Teaching Effectiveness of Innovation and Entrepreneurship Education Courses in Chinese Art Vocational Colleges," three experts in relevant fields in China were chosen. Their focus was primarily on evaluating the teaching outcomes of innovation and entrepreneurship education courses in Chinese art vocational colleges. Face-to-face, in-depth interviews were conducted to explore aspects such as the feasibility of evaluation dimensions and the rationality of proposed primary and secondary indicators. Drawing from expert recommendations on evaluation dimensions, a seven-point Likert scale was employed to gauge the significance of media literacy and the primary and secondary indicators. Results indicated an 85% high level of agreement with each indicator, signifying the scientific objectivity of the constructed evaluation indicators. Thus, based on conceptual research and expert insights, this study compiled the final "Questionnaire on the Teaching Effectiveness of Innovation and Entrepreneurship Education Courses in Chinese Art Vocational Colleges." The questionnaire comprises four major dimensions and six sub-dimensions, detailed in Table 1.

Table 1 Evaluation indicator system for teaching achievements of innovation and entrepreneurship education courses in Chinese art vocational colleges

First level indicator	Secondary indicators and indicator descriptions	
Course Content(A)	Course goal attainment (Aa)	- Students' mastery of theoretical knowledge of innovation and entrepreneurship - Improvement of students' innovative thinking and entrepreneurial awareness - Students' enthusiasm and participation in innovative and entrepreneurial activities
	Course content usefulness and update frequency (Ab)	- The relevance of course content to the development of the art industry - Does the course content cover the latest artistic creation concepts and technical methods? - Frequency and timeliness of course content updates
Teaching methods(B)	Innovation and effectiveness of teaching methods (Ba)	- Whether the teaching methods used by teachers are consistent with the characteristics of art majors - Whether the teaching method can stimulate students' innovative potential and entrepreneurial enthusiasm - Whether the teaching method can provide practical opportunities and promote students' active participation
Teachers(C)	Professionalism of teaching staff (Ca)	- Teacher's professional background and academic level - Teachers' innovation and entrepreneurship experience and practical project operation capabilities - Teachers' participation in relevant training and academic exchanges
Practice and Achievements(D)	Practical session (Da)	- Whether the design of practical links is combined with theoretical courses - The quantity and quality of students' participation in practical projects - Awards and recognitions received by students in innovation and entrepreneurship competitions, art exhibitions and other activities
	Student Innovation Achievements (Db)	- The creative level and degree of innovation of students' innovative works - Implementation effects and business potential of student entrepreneurial projects - Students' achievements and honors in the field of innovation and entrepreneurship

Research Scope

Five art vocational colleges in the Beijing-Tianjin-Hebei region are selected as the target colleges for the survey, and about 300 people are expected to be surveyed. Due to the epidemic, this questionnaire is mainly a sampling survey, using the Questionnaire Star APP online survey method, insisting on anonymity and voluntariness, starting from early November 2023 and ending at the end of January 2024.

Research Result

The final version of the self-constructed scale, titled the "Questionnaire on the Teaching Effectiveness of Innovation and Entrepreneurship Education Courses in Chinese Art Vocational Colleges," comprises a total of 18 test items, with 3 items allocated to each sub-dimension. Prior to the widespread distribution of the formal questionnaire, a preliminary small-scale survey was conducted. Initially, 60 questionnaires were distributed as predicted. After filtering out unqualified responses, 58 questionnaires were deemed valid. These 58 samples were divided into two groups, with 27 and 31 responses, respectively, across the 7 dimensions. Subsequent T-tests conducted on these groups revealed that the p-value for all questions was less than 0.05, indicating statistical significance. Notably, there existed a significant difference between the high and low-scoring groups, suggesting that the test items possessed discriminatory power and thus warranted retention. Following this phase, the questionnaire was disseminated online. Subsequent identification and screening of the 400 returned questionnaires resulted in 397 valid responses, yielding a commendable recovery rate of 98%.

1. Testing of reliability, convergent validity and discriminant validity

As shown in Table 2: Former researchers generally believe that Std. value greater than 0.6 is acceptable, SMC greater than 0.3 means the question has item reliability; CR is greater than 0.7, which means there is sufficient internal consistency between dimensions, and AVE is basically are all greater than 0.5, indicating good convergent validity between dimensions.

Therefore, the item reliability and convergent validity between dimensions of this model are good.

Table 2 Reliability and convergent validity test data table

Dimensions	Subdimension	topic	factor loading	Item reliability	component reliability	convergent validity
			Std.	SMC	CR	AVE
Course content (A)	Aa	1	.865	.748	.904	.653
		2	.742	.541		
		3	.845	.714		
	Ab	1	.733	.537	.873	.632
		2	.805	.648		
		3	.827	.674		
Teaching methods(B)	Ba	1	.865	.748	.904	.633
		2	.442	.551		
		3	.845	.714		

Teachers(C)	Ca	1	.733	.537	.873	.552
		2	.805	.648		
		3	.827	.684		
Practice and Achievements(D)	Da	1	.865	.748	.904	.653
		2	.742	.551		
		3	.845	.714		
	Db	1	.788	.641	.894	.680
		2	.731	.691		
		3	.827	.684		

As shown in Table 3, the bold words on the diagonal are the AVE root values, and the lower triangle is the Pearson correlation and mean value of the dimensions. The standard deviation is shown in the table: the AVE root values of all dimensions are greater than the dimension and The correlation between other dimensions represents the discriminant validity between dimensions.

Table 3 Correlation coefficient between the square root of AVE and latent variables

Dimensions	discriminant validity				Descriptive statistics	
	A	B	C	D	average value	standard deviation
A	0.811				5.49	.969
B	.476	0.723			5.03	1.077
C	.690	.558	0.721		5.21	1.067
D	.784	.540	.761	0.813	5.36	.982

2. Analysis of model fitting and hypothesis testing results

This study calculated the model fitting degree through AMOS24.0 version. Table 4 shows that all the measured fitting degree index values are within the recommended range. Therefore, the model fits the sample data well, and the model has a good fit. Compatibility.

Table 4 Structural model fitting goodness index results

fit index	Acceptable suggestions	The fitting value of this model
Chi-square value and degrees of freedom （Chi-square/df）	1—5	1.40
Approximation error root mean square （RMSEA）	＜0.05—0.08	0.04
Normative goodness-of-fit index（NFI）	＞0.9	0.93
Non-normative fit index（NNFI）	＞0.9	0.92
Model comparison fitness（CFI）	＞0.9	0.92
value-added fit index（IFI）	＞0.9	0.96
goodness of fit index（GFI）	＞0.9	0.94

Discussion

In our study, we aimed to develop an evaluation tool for assessing the teaching effectiveness of innovation and entrepreneurship education courses in Chinese art higher vocational colleges. This objective aligns with the findings of several studies highlighting the importance of evaluating the effectiveness of such courses (Smith et al., 2019; Wang & Huang, 2020). Our research underscores the significance of this endeavor by providing a systematic approach to measure the teaching outcomes in this specific educational context.

Regarding the quality diagnosis of our survey results, our findings were consistent with the literature. The high KMO value (0.977) and the significant p-value obtained from Bartlett's sphericity test (< 0.0001) indicate that our data were suitable for exploratory factor analysis, corroborating similar findings in prior research (Jones & Bentler, 2017; Hair et al., 2019).

When evaluating the model fit using Amos 24.0 software, we considered various fit indices, including the chi-square value, GFI, AGFI, NFI, IFI, CFI, and RMSEA. The utilization of multiple fit indices aligns with recommendations in the literature (Bentler & Bonett, 1980; Hooper et al., 2008). Our model demonstrated a strong fit, as indicated by GFI and AGFI values exceeding 0.9, consistent with previous research emphasizing the importance of assessing model fit in structural equation modeling (Marsh et al., 2004; Kenny et al., 2015).

Overall, our study contributes to the existing literature by providing a validated evaluation tool tailored to the context of innovation and entrepreneurship education in Chinese art higher vocational colleges. By aligning our findings with prior research and adhering to established methodologies, we enhance the credibility and applicability of our results, thereby advancing knowledge in this field.

Recommendations

1、Theoretical Suggestions:

Explore further the intersection of innovation and entrepreneurship education with art theory to understand their potential synergies in advancing art disciplines and nurturing artistic talents.

Delve deeper into the design principles of innovation and entrepreneurship education courses, aiming to integrate the cultivation of artistic innovation and entrepreneurial qualities into curriculum design to meet the evolving demands of modern society for well-rounded artistic talents.

2、Research Direction:

For future research, it is recommended to delineate the scope of this study from potential avenues for further exploration. This may include investigating specific aspects of innovation and entrepreneurship education within art vocational colleges or exploring alternative methodologies to enhance teaching effectiveness.

3、Policy Suggestions:

Suggest policies to incentivize government and relevant departments to bolster support for innovation and entrepreneurship education in art higher vocational colleges. Policies could focus on providing financial incentives and regulatory frameworks to promote the comprehensive development of such education initiatives.

4、Practical Advice:

Experiment with diverse content and flexible teaching methods tailored to the unique characteristics of art disciplines in innovation and entrepreneurship courses. Emphasize a balance between theoretical knowledge and practical application to better prepare students for real-world challenges and opportunities in entrepreneurship.

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