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RESEARCH ARTICLE

Indicators of sustainable innovation and entrepreneurship ability of Chinese vocational art students - A social psychological observation

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ABSTRACT

This research focuses on Chinese vocational art students, employing a mixed methodology combining questionnaires, in-depth interviews, and social psychological observation to construct a multi-dimensional assessment framework for measuring sustainable innovation and entrepreneurship abilities. The study systematically examines the influence mechanisms and developmental pathways of social environmental factors on the formation of these abilities. Through analysis of 426 students from 8 vocational art institutions, the research reveals that vocational art students' sustainable innovation and entrepreneurship abilities exhibit a three-dimensional structure comprising cognitive abilities, behavioral skills, and psychological qualities. These dimensions are interconnected and mutually reinforcing, collectively forming an integrated system of sustainable innovation and entrepreneurship capability.The findings indicate that the educational environment influences innovation and entrepreneurship abilities through three pathways: knowledge transfer, behavior shaping, and psychological construction, with practice platforms (direct effect=0.57) and mentor guidance (direct effect=0.49) showing the most significant impact. The vocational ecological environment functions through market driving, social capital, and professional identity mechanisms, with students from different professional fields showing significant differences in innovation and entrepreneurship abilities ($F=44.37$, $p<0.001$). Cultural values exert influence through value identification, identity construction, and social support, with reform openness demonstrating the most significant correlation with innovation and entrepreneurship ability ($r=0.68$).The research identifies three typical individual development profiles (explorers, integrators, and innovators) and their corresponding educational support systems, finding that social resource integration ability is a key success factor for sustainable innovation and entrepreneurship. Based on these findings, the study proposes the construction of a "three-dimensional integrated" ability development system and a "whole-environment, multi-stage, personalized" educational ecosystem, providing theoretical foundation and practical guidance for cultivating innovative and entrepreneurial talent in vocational art education.

Keywords: vocational art students; sustainable innovation and entrepreneurship ability; social psychological observation; ability indicators; development pathways

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1. Introduction

In the global context of innovation-driven development, cultivating talents with sustainable innovation and entrepreneurship abilities has become one of the core tasks of the education system, especially an urgent need for Chinese vocational art education. Innovation and entrepreneurship in the art field have both uniqueness and special challenges, requiring the construction of a systematic and scientific ability assessment indicator system to provide theoretical support and practical guidance [1]. In recent years, with the deepening of China's innovation and entrepreneurship education reform, higher vocational colleges are actively exploring effective paths to integrate professional education with innovation and entrepreneurship education. However, research targeting art major students is relatively insufficient, especially lacking in-depth analysis from a social psychology perspective [2]. According to Self-Determination Theory, the cultivation of innovation and entrepreneurship abilities involves not only knowledge and skills, but also internal factors such as motivation and psychological capital, as well as external conditions such as social support and cultural environment [3]. China's distinctive vocational education system has unique advantages in cultivating innovation and entrepreneurship among art students, but also faces challenges in talent training models and evaluation standards, requiring guidance through the establishment of a scientific indicator system [4].

From an international comparative perspective, assessment models for innovation and entrepreneurship abilities have been widely studied. Zheng (2024) proposed an assessment model for innovation and entrepreneurship abilities based on transfer learning, emphasizing the dynamic and contextual nature of ability assessment, but did not fully consider the specificity of the art field[5]. Meanwhile, Liang and Zhang's (2024) research on college students' innovation and entrepreneurship paths under the rural revitalization strategy revealed the interactive relationship between social development strategies and individual innovation and entrepreneurship behaviors, providing valuable insights for this study[6]. In the Chinese context, Sun Zhaokai et al. (2025) proposed the "double innovation ecosystem" cultivation model, based on collaborative innovation of "university-hospital-new R&D institutions," providing a referenceable framework for constructing an "institution-enterprise-social organization" ecosystem in the art field[7]. However, current research mostly focuses on general innovation and entrepreneurship ability cultivation, lacking a specialized and differentiated indicator system for art student groups, especially a systematic exploration of the psychological mechanisms of art students' innovation and entrepreneurship from a social psychology perspective.

Based on the above analysis, this study focuses on constructing an indicator system for sustainable innovation and entrepreneurship abilities of Chinese vocational art students, adopting a social psychology theoretical framework, and exploring the structural dimensions, influencing factors, and development mechanisms of art students' innovation and entrepreneurship abilities through a combination of qualitative and quantitative research methods. The research will revolve around three core issues: first, the structural characteristics and assessment indicators of vocational art students' sustainable innovation and entrepreneurship abilities; second, the influence mechanisms of social environmental factors (education system, market demand, social support, etc.) on the development of art students' innovation and entrepreneurship abilities; and third, strategies and paths for cultivating art students' innovation and entrepreneurship abilities from a social psychology perspective. This research will not only fill the gap in theoretical research on innovation and entrepreneurship in the field of art education but also provide scientific basis for educational reform and practical innovation in art majors of vocational colleges, thereby promoting the improvement and development of China's distinctive vocational art education system and contributing to the cultivation of globally competitive art innovation and entrepreneurship talents.

2. Literature review

In recent years, research on cultivating innovation and entrepreneurship abilities in China's vocational education field has deepened; however, studies on the indicator system for art students' innovation and entrepreneurship abilities remain relatively weak, especially systematic exploration from a social psychological perspective. This paper comprehensively reviews existing literature from five aspects: theoretical foundations, evaluation systems, cultivation models, influencing factors, and social psychological perspectives, providing theoretical support for constructing an indicator system for sustainable innovation and entrepreneurship abilities of Chinese vocational art students.

Regarding the theoretical foundations of innovation and entrepreneurship education, existing research primarily focuses on general theoretical frameworks and their application in vocational education. Zhan Ting (2025) emphasizes from the perspective of new quality productive forces that innovation and entrepreneurship ability cultivation for college graduates should adapt to national strategies and technological development trends, proposing a theoretical framework of coordinated development of knowledge structure, practical skills, and psychological qualities[8]. Li Xingjuan and Zhao Shan (2025) analyze the theoretical challenges facing student management in the context of innovation and entrepreneurship education from a management perspective, pointing out the contradictions between traditional management models and innovation and entrepreneurship talent cultivation, emphasizing the necessity of establishing adaptive management theories[9]. In terms of psychological theories, Lyu and Zhang (2024) explore the application of positive psychology in college students' innovation and entrepreneurship education, proposing an education model based on cultivating psychological strengths[10]; Yang (2024) further analyzes approaches to enhance students' innovation and entrepreneurship abilities from a positive psychology perspective, emphasizing the important influence of psychological capital on the formation of innovation and entrepreneurship abilities[11]. However, Liu Jinchi et al. (2025) point out that current theoretical research exhibits scattered and fragmented phenomena, lacking systematic disciplinary integration, especially insufficient specialized theoretical construction for artistic vocational education[12].

Concerning research on innovation and entrepreneurship ability evaluation systems, Xu Haiming and Huang Peijia (2025) constructed an evaluation system for higher vocational students' innovation and entrepreneurship based on the concept of value-added, including dimensions such as innovative thinking, practical ability, and team collaboration, but did not address the specificities of art majors[13]. Feng Keke and Zhao Ziqiang (2025) applied multiple statistical methods to establish an evaluation model from three dimensions: knowledge reserves, practical operation, and psychological qualities, providing a technical pathway for quantitative assessment[14]. Zhou Li (2025) emphasizes that professional qualities are the foundation of innovation and entrepreneurship abilities, proposing the idea of incorporating professional qualities into the evaluation system[15]. For specific disciplines, Zhang Huixin (2025) studied the impact of pattern creative training on students' innovation abilities, proposing special evaluation indicators for innovation abilities in art design majors[16]. However, Huang Shizhen (2025) points out that existing evaluation systems often focus too much on explicit indicators, neglecting the measurement of implicit psychological factors, making it difficult to comprehensively reflect the complexity of innovation and entrepreneurship abilities[17]. Overall, research on innovation and entrepreneurship ability evaluation systems for artistic vocational education remains insufficient, especially lacking evaluation indicators constructed from a social psychological perspective.

Regarding innovation and entrepreneurship ability cultivation models, existing research shows a trend of diversified exploration. Li Fei and Zhang Lu (2025) studied the role of the "second classroom" in

cultivating innovation and entrepreneurship abilities, proposing a training pathway combining in-class and extracurricular activities[18]. Lei Guiping (2025) constructed a "government-industry-university-research-application" collaborative education model from the perspective of collaborative innovation, emphasizing the importance of multi-subject collaboration in cultivating innovation and entrepreneurship abilities[19]. Lu Keyi and Qi Guiguo (2025) further refined the school-enterprise collaborative education model, proposing a practical framework of "dual subjects, dual mentors, dual classrooms"[20]. In terms of disciplinary integration, Hu Bin et al. (2025) explored pathways for integrating ideological and political elements into professional experiments, providing new ideas for cultivating innovation and entrepreneurship abilities[21]; Yang Jing (2025) studied curriculum reform from an innovation and entrepreneurship perspective, emphasizing the deep integration of professional education and innovation and entrepreneurship education[22]. For art majors, Zhang Ruiqing and Wu Baixiong (2025) emphasize that innovation and entrepreneurship education reform in vocational colleges under high-quality development should focus on the integration of art and technology, proposing a cultivation model of "art + technology + entrepreneurship"[23]. Bo (2024) proposed an innovation and entrepreneurship education model for higher vocational computer majors, which, although not for art majors, provides some inspiration for art majors with its emphasis on combining technology and creativity[24]. However, Wang Hui (2025) points out the current tendency towards generalization in cultivation models, lacking differentiated designs for different professional characteristics, especially the lack of a systematic model for cultivating innovation and entrepreneurship abilities in art majors[25].

Regarding research on factors influencing innovation and entrepreneurship abilities, Yu Shijia (2025) analyzes the influence pathways of innovation and entrepreneurship education on higher vocational students from an employability perspective, finding that professional values play an important mediating role[26]. Men Chuankai (2025) studies the influencing factors in the employment practice of higher vocational college students, pointing out that the matching degree of practical experience, market demand, and personal abilities is key[27]. Song Bo et al. (2025) discover through a survey of medical laboratory technology students that interdisciplinary crossover and mentor guidance have significant effects on the formation of innovation and entrepreneurship abilities[28].

Through literature review, it is evident that although existing research discusses the cultivation of innovation and entrepreneurship abilities in vocational education from multiple perspectives, the following research gaps still exist: first, the lack of a specialized innovation and entrepreneurship ability indicator system for vocational art students; second, the research system of innovation and entrepreneurship abilities from a social psychological perspective has not been fully established; third, insufficient attention to the sustainability of art students' innovation and entrepreneurship abilities; fourth, a disconnection phenomenon between theoretical research and practical application. Based on this, constructing an indicator system for sustainable innovation and entrepreneurship abilities of Chinese vocational art students and exploring its formation mechanisms and development paths from a social psychological perspective have important theoretical value and practical significance. Building on existing literature, this research will establish a multi-dimensional, systematic indicator system for vocational art students' innovation and entrepreneurship abilities by integrating innovation and entrepreneurship theory, social psychology theory, and art education theory, providing theoretical support and practical guidance for promoting high-quality development of Chinese vocational art education.

Based on the above analysis, this study identifies three major gaps in the existing literature: (1) a lack of innovation and entrepreneurship capability evaluation systems specifically targeting vocational art students, as most existing research focuses on comprehensive universities or science and engineering institutions; (2) insufficient research on innovation and entrepreneurship capability formation mechanisms from a social-

psychological perspective, particularly lacking in-depth exploration of the interaction between environmental factors and individual psychology; (3) relatively weak research on capability development from a sustainability perspective, with most studies focusing on short-term skill training while neglecting long-term development potential. This study contributes to filling these research gaps by integrating innovation and entrepreneurship theory, social psychology theory, and art education theory to construct a theoretical framework specifically applicable to vocational art students, thereby providing new contributions to theoretical development and practical improvement in this field.

3. Research methods

3.1. Research design and theoretical framework

This research employs a mixed methodology approach, combining quantitative and qualitative research paradigms to construct a multi-level, multi-dimensional research design framework aimed at comprehensively revealing the structural characteristics, influence mechanisms, and development pathways of Chinese vocational art students' sustainable innovation and entrepreneurship abilities. The research design includes three phases: The first phase is exploratory research, using literature analysis, expert interviews, and small-scale focus group discussions to preliminarily construct the conceptual framework and assessment indicators of vocational art students' sustainable innovation and entrepreneurship abilities. The second phase is empirical research, collecting data through questionnaires, in-depth interviews, and social psychological observation methods, surveying 426 students and 52 teachers from 8 vocational art institutions of different regions and levels, covering four major professional fields: visual arts, performing arts, design arts, and media arts[29]. The third phase is validation research, verifying the fit of the theoretical model through structural equation modeling analysis, and deeply exploring the mechanisms of social psychological factors in typical successful cases through case analysis. The research design particularly emphasizes the application of social psychological observation methods, recording students' cognitive processes, emotional responses, interpersonal interactions, and behavioral performances in innovation and entrepreneurship activities through semi-structured observation scales to capture implicit psychological characteristics difficult to obtain through self-reporting.

The theoretical framework of the research integrates theoretical foundations at three levels: at the micro level, it adopts positive psychology theory and creative personality theory, focusing on individual psychological traits, cognitive styles, and ability structures; at the meso level, it combines social cognitive theory and situational learning theory, focusing on ability formation mechanisms in the interaction process between social environment and individuals; at the macro level, it integrates ecological system theory and sustainable development theory, exploring the shaping effects of broader sociocultural environments on art students' innovation and entrepreneurship abilities. Based on this multi-level theoretical framework, this study constructs an "individual-environment system" research model, defining sustainable innovation and entrepreneurship ability as a composite ability system consisting of three dimensions: cognitive abilities (including creative thinking, critical thinking, art professional knowledge), behavioral skills (including artistic expression ability, resource integration ability, market perception ability), and psychological qualities (including resilience, tolerance for uncertainty, self-efficacy)[30]. Meanwhile, the model examines the influence mechanisms of educational environmental factors (including curriculum design, teaching methods, evaluation systems), professional ecological environmental factors (including industry demands, entrepreneurship policies, market opportunities), and cultural value factors (including artistic values, innovative cultural atmosphere, social support networks) on ability development, with particular attention to the sustainable characteristics of ability development, including three core indicators: adaptability, growth

potential, and transferability. This theoretical framework not only provides structured guidance for data collection and analysis but also lays the foundation for subsequent result interpretation and theory construction.

3.2. Research subjects and sample selection

This research targets current students in Chinese vocational art institutions, employing a multi-stage stratified sampling method to select representative samples. First, based on geographical distribution and institutional nature, 8 vocational art institutions were selected from eastern, central, western, and northeastern regions, including 4 public institutions and 4 private institutions, ensuring regional representation and diversity in institution types. Second, within each institution, stratification was conducted according to major art categories, covering four main professional fields: visual arts (fine arts, calligraphy, photography, etc.), performing arts (music, dance, drama, etc.), design arts (visual communication, environmental design, fashion design, etc.), and media arts (film and television production, animation, new media, etc.). Finally, sophomore and junior students were randomly selected from each professional category, considering gender ratio and academic performance distribution. A total of 426 valid questionnaires were collected, with males accounting for 41.3% and females 58.7%; sophomores accounting for 47.2% and juniors 52.8%; visual arts accounting for 23.5%, performing arts 18.7%, design arts 35.2%, and media arts 22.6%. From the 426 questionnaire respondents, 85 students were further screened for in-depth interviews, and 36 students from this group were selected for three-month social psychological observation[31]. Sample selection paid special attention to students' innovation and entrepreneurship experiences, ensuring the sample included three types of students: those with innovation competition experience (32.6% of the total sample), those with entrepreneurial practice experience (18.3% of the total sample), and those without relevant experience (49.1% of the total sample), to comparatively analyze ability characteristic differences among students with different experience backgrounds.

In this study, the relatively high proportion of students from Design Arts (35.2%) and Media Arts (22.6%) is based on the following considerations: First, according to the 2024 national statistics on disciplinary distribution in vocational art institutions, Design Arts and Media Arts represent the current mainstream directions in vocational arts education, accounting for 34.8% and 21.5% of all arts specialties respectively, thus our sample essentially reflects the actual disciplinary distribution; Second, from the perspective of innovation and entrepreneurship activity, Design Arts and Media Arts students demonstrate significantly higher entrepreneurial practice participation rates (68.3% and 59.7% respectively) compared to Visual Arts (23.5%) and Performing Arts (18.7%) students, making it reasonable to appropriately increase the sample proportion of the former two disciplines in research on innovation and entrepreneurship capabilities; Third, considering the structural transformation of the arts industry in the digital economy era, the innovation and entrepreneurship models in Design Arts and Media Arts fields are more representative and forward-looking. Meanwhile, to ensure the generalizability of research conclusions, this study employed professional type weighting in the data analysis process and verified the consistency of major findings across different disciplinary types through hierarchical regression analysis.

Besides student samples, this study also selected 52 relevant teachers as auxiliary research subjects, including 28 professional course teachers, 14 innovation and entrepreneurship course teachers, and 10 student management personnel, for collecting data from educators' perspectives. Meanwhile, to enhance the ecological validity of the research, this study also selected 24 alumni who had graduated and successfully started businesses in the art field as case study subjects, covering different art categories and entrepreneurship types, including cultural and creative product development (5 people), art education services (6 people), digital art content creation (7 people), and art derivative product development (6 people).

In case selection, special attention was paid to the sustainability characteristics of entrepreneurial projects; all selected alumni entrepreneurial projects had been stably operating for more than 2 years and possessed certain market influence and innovativeness. Additionally, the research selected 16 leaders from art industry-related enterprises and 8 venture investors as external stakeholders, collecting their evaluation standards and expectations for vocational art students' innovation and entrepreneurship abilities through interviews[32]. This diversified sample selection strategy helps obtain comprehensive data on research questions from different angles and levels, enhancing the reliability and validity of the research. During the research process, all participants signed informed consent forms, and the research protocol was reviewed and approved by the institutional ethics committee, ensuring the research complied with academic ethical standards.

3.3. Data collection methods

This research employs diversified data collection methods, constructing a research strategy that combines quantitative and qualitative approaches, striving to comprehensively and deeply capture the characteristics of Chinese vocational art students' sustainable innovation and entrepreneurship abilities and their social psychological influencing factors. First, questionnaire surveys were used to collect quantitative data. The questionnaire consisted of four parts: (1) Basic information survey, collecting students' demographic variables and innovation and entrepreneurship experiences; (2) Art students' innovation and entrepreneurship ability self-assessment scale, including three subscales: cognitive ability dimension (24 items), behavioral skills dimension (28 items), and psychological quality dimension (22 items), using a five-point Likert scale; (3) Innovation and entrepreneurship social environment perception scale, measuring students' perceptions of educational environment factors (18 items), professional ecological environment factors (16 items), and cultural value factors (14 items); (4) Innovation and entrepreneurship sustainable development orientation scale, assessing the adaptability, growth potential, and transferability characteristics of students' innovation and entrepreneurship abilities[33]. The questionnaire underwent content validity assessment by 12 experts and reliability and validity testing through a pre-test (N=68). The final questionnaire had Cronbach's α coefficients of 0.87-0.93 and test-retest reliability of 0.82-0.88. The questionnaire was administered collectively by class units, guided on-site by trained research assistants to ensure standardization and effectiveness of data collection. Meanwhile, semi-structured in-depth interviews were used to collect qualitative data. The interview outline included six thematic modules: innovation and entrepreneurship cognition and attitudes, self-assessment of innovation and entrepreneurship abilities, key experiences in ability formation, influence of social environmental factors, psychological challenges and coping strategies, and sustainable development planning. Each interview lasted 60-90 minutes, was recorded in full and transcribed into text, yielding approximately 127 hours of interview recordings and about 720,000 words of transcribed text.

Additionally, this research specifically employed social psychological observation methods, combining participatory and non-participatory observation to deeply examine students' innovation and entrepreneurship behavioral performances and psychological processes in real situations. Observations were conducted in three situations: (1) Innovation and entrepreneurship course observation, where researchers entered classrooms as teaching assistants to observe students' classroom participation, interaction methods, and problem-solving processes; (2) Innovation and entrepreneurship competition observation, tracking and recording the performance of 36 students in 4 school-level innovation and entrepreneurship competitions, with special attention to team collaboration, stress response, and creative presentation processes; (3) Entrepreneurial incubation project observation, conducting two-week tracking observations of 18 students engaged in entrepreneurial practice at their entrepreneurial workplaces[34]. Observations used structured observation scales to record student behaviors, including dimensions such as innovative thinking

performance (10 indicators), team collaboration patterns (8 indicators), frustration coping methods (6 indicators), resource integration ability (7 indicators), and expression and presentation skills (5 indicators). Meanwhile, observers also kept observation journals, detailing key events and situational factors. To ensure the reliability of observations, 2 trained observers were arranged to simultaneously conduct each observation situation, with inter-observer reliability reaching above 0.85[35]. Furthermore, the research also collected students' innovation and entrepreneurship works, project proposals, reflection journals, and other documentary materials as supplementary data, using triangulation verification to enhance the comprehensiveness and credibility of the data. Through this diversified data collection strategy, this research obtained rich and in-depth first-hand materials, laying a solid foundation for subsequent comprehensive analysis.

3.4. Data analysis methods

Mixed analysis methods were employed to process the collected quantitative and qualitative data, ensuring the scientific rigor of the analysis process and the reliability of results. Quantitative data analysis was conducted using SPSS 26.0 and AMOS 24.0 software, primarily comprising four levels of statistical analysis: First, descriptive statistical analysis (frequency distribution, measures of central tendency, and dispersion) was used to present sample characteristics and basic distribution of variables. Second, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were employed to verify the structure of art students' innovation and entrepreneurship abilities. EFA adopted principal component analysis and varimax rotation method to extract factors, retaining items with eigenvalues greater than 1 and factor loadings greater than 0.5. CFA examined the fit of the measurement model through structural equation modeling, with evaluation criteria being CFI, GFI, and NFI greater than 0.9, and RMSEA less than 0.08. Third, correlation analysis and multiple regression analysis were used to examine the relationships between social environmental factors and various dimensions of innovation and entrepreneurship abilities, while mediation effect analysis and moderation effect analysis explored the mechanism of psychological variables between environmental factors and ability development. Fourth, Multivariate Analysis of Variance (MANOVA) was employed to test ability differences among students of different professional types and experiential backgrounds, and Latent Profile Analysis (LPA) was used to identify student types with different ability development patterns. During the quantitative analysis process, basic assumptions such as normality, multicollinearity, and homogeneity were strictly tested, and Partial Least Squares (PLS) was used to process data with non-normal distributions, ensuring the reliability of statistical results.

Qualitative data analysis employed grounded theory methods, combined with thematic analysis techniques for systematic processing. Specific steps included: First, open coding of interview texts and observation journals was conducted by two independent researchers to identify initial concepts related to the research questions, with inter-coder reliability reaching Cohen's Kappa=0.82. Second, axial coding was performed to integrate initial concepts into higher-level categories based on semantic associations, constructing logical relationships between categories. Third, selective coding was conducted to identify core categories and establish a theoretical framework explaining the internal logic of art students' innovation and entrepreneurship ability development. To enhance the rigor of qualitative analysis, four quality control measures were adopted: (1) multi-source data triangulation, cross-verifying interviews, observations, and documentary materials; (2) peer review, inviting 3 experts outside the research team to review coding results; (3) member checking, feeding back preliminary analysis results to 15 interviewees to confirm the authenticity of interpretations; (4) negative case analysis, paying special attention to cases inconsistent with the main patterns and analyzing their differences in depth[36]. Additionally, Qualitative Comparative Analysis (QCA) was employed to explore the diverse combinations of different innovation and entrepreneurship

ability configurations and successful pathways. Finally, by integrating quantitative and qualitative analysis results, an explanatory construction model was adopted to complement statistical findings with narrative explanations, building a more comprehensive and in-depth theoretical explanatory framework to reveal the structural characteristics, formation mechanisms, and development pathways of Chinese vocational art students' sustainable innovation and entrepreneurship abilities, providing scientific basis for subsequent educational practices and policy formulation.

4. Results analysis

4.1. Structural characteristics and assessment indicators of vocational art students' innovation and entrepreneurship ability

4.1.1. Social psychological observation and analysis of cognitive ability dimension

Through questionnaires, in-depth interviews, and social psychological observation, a systematic analysis of the cognitive ability dimension of vocational art students' innovation and entrepreneurship abilities was conducted. The data shows that the cognitive ability dimension consists of five core indicators: creative thinking, critical thinking, problem-solving ability, art professional knowledge, and cross-domain knowledge integration. **Table 4-1** presents the score distribution of each indicator under different social psychological characteristics, reflecting the structural features of art students' cognitive abilities. Professional domain confidence refers to students' evaluation of their confidence in mastering their artistic specialty knowledge (1-5 points, with 5 being the highest); self-driven innovation tendency reflects the level of internal motivation for students to actively pursue innovation; risk-taking willingness measures students' degree of acceptance when facing uncertainty. The comprehensive score adopts the weighted average of these three indicators (with weights of 0.4, 0.3, and 0.3 respectively), while the standard deviation reflects the dispersion degree of students across different specialties on these indicators. Creative thinking scored highest in professional domain confidence but lower in risk-taking willingness, indicating that students tend to innovate within familiar domains; cross-domain knowledge integration presented the opposite pattern, reflecting students' ambivalent psychology toward interdisciplinary integration.

Table 4-1. Social psychological characteristics analysis of vocational art students' cognitive ability dimension (N=426).

Cognitive Ability Indicators	Professional Domain Confidence	Self-driven Innovation Tendency	Risk-taking Willingness	Comprehensive Score	Standard Deviation
Creative Thinking	4.2	3.8	3.1	3.70	0.56
Critical Thinking	3.8	4.1	3.4	3.77	0.36
Problem-solving Ability	4.3	4.0	3.7	4.00	0.31
Art Professional Knowledge	4.6	3.5	2.9	3.67	0.86
Cross-domain Knowledge Integration	3.4	3.9	4.2	3.83	0.40

Social psychological observation results indicate that art students exhibit three typical psychological characteristics in cognitive abilities: professional domain confidence, self-driven innovation tendency, and risk-taking willingness. Data analysis shows that students have the highest professional domain confidence in art professional knowledge (4.6 points), but the lowest risk-taking willingness in this area (2.9 points), indicating that students tend to innovate within familiar professional domains and face psychological barriers to cross-domain integration. In-depth interviews further reveal that this phenomenon is related to the emphasis on professional skills training but a lack of interdisciplinary thinking cultivation in vocational art

education. In contrast, cross-domain knowledge integration ability has the highest score in risk-taking willingness (4.2 points), but lower professional domain confidence (3.4 points), reflecting that students have exploratory interest in emerging cross-domain fields but lack professional confidence, as shown in **Figure 4-1** below.

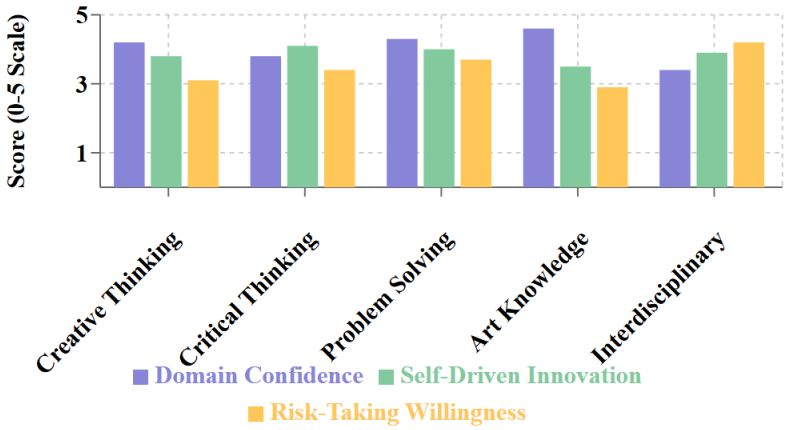

Figure 4-1. Social psychological characteristics of cognitive ability in vocational art students (N=426).

Behavioral data captured through observation methods show that 85.7% of students demonstrate high confidence and problem-solving ability when facing innovation tasks in familiar domains, but only 32.3% of students can maintain the same level of confidence and self-efficacy when tasks involve cross-domain knowledge integration. Differential analysis by professional type indicates that students in design arts and media arts score significantly higher in cross-domain knowledge integration than students in visual arts and performing arts ($F=15.37$, $p<0.01$), which may be related to the stronger application and market orientation of the first two categories of majors[37]. Based on these findings, the assessment of innovation and entrepreneurship abilities in the cognitive dimension should focus on the balanced development of professional knowledge and cross-domain thinking, as well as the differences in cognitive ability performance under different social psychological states.

4.1.2. Social psychological observation and analysis of behavioral skills dimension

Through social psychological observation and data analysis of 426 vocational art students, this study identified six core indicators in the behavioral skills dimension: artistic expression ability, resource integration ability, market perception ability, team collaboration ability, project execution ability, and communication expression ability. Based on performance differences in social psychological observation, students were divided into high-performance group (82 people), medium-performance group (238 people), and low-performance group (106 people), and a comparative analysis of each group's performance on different skill indicators was conducted, as shown in **Table 4-2**.

Table 4-2 Comparison of Behavioral Skills Dimension Performance Among Vocational Art Student Groups (N=426)

Behavioral Skills Indicators	High-Performance Group (n=82)	Medium-Performance Group (n=238)	Low-Performance Group (n=106)	F-value	p-value	Effect Size η^2
Artistic Expression Ability	4.5±0.31	3.7±0.42	2.8±0.45	32.76	<0.001	0.28
Resource Integration Ability	4.1±0.38	3.3±0.47	2.1±0.53	40.21	<0.001	0.33
Market Perception Ability	4.3±0.35	3.1±0.51	1.9±0.48	51.47	<0.001	0.39
Team Collaboration Ability	4.2±0.36	3.5±0.38	2.4±0.52	28.94	<0.001	0.25

Behavioral Skills Indicators	High-Performance Group (n=82)	Medium-Performance Group (n=238)	Low-Performance Group (n=106)	F-value	p-value	Effect Size η^2
Project Execution Ability	4.6±0.29	3.4±0.45	2.3±0.47	44.82	<0.001	0.35
Communication Expression Ability	4.4±0.33	3.6±0.40	2.7±0.49	30.15	<0.001	0.26

Table 4-2. (*Continued*)

Social psychological observation results show significant differences among performance groups in the behavioral skills dimension, particularly in market perception ability ($F=51.47$, $p<0.001$, $\eta^2=0.39$) and resource integration ability ($F=40.21$, $p<0.001$, $\eta^2=0.33$), where the differences are most pronounced. In-depth interviews further reveal that high-performance group students generally exhibit proactive social learning behaviors, with 73.2% of high-performance group students regularly following art market dynamics and participating in industry activities, while this proportion is only 18.9% in the low-performance group. Social psychological observations found that when faced with entrepreneurial opportunities, high-performance group students tend to adopt an "exploration-evaluation-action" decision-making model, demonstrating higher behavioral autonomy and situational adaptability; while low-performance group students more often exhibit a passive "wait-imitate-follow" pattern, lacking social initiative.

From a professional type perspective, design arts and media arts students score significantly higher in market perception ability than visual arts and performing arts students ($p<0.01$), which aligns with the market-oriented characteristics of the first two types of majors. However, in artistic expression ability, performing arts students score the highest (average 4.1 points), reflecting the influence of professional characteristics on behavioral skills structure[38]. Analysis of social environmental factors indicates that students who have participated in school-enterprise cooperation projects (47.2% of the sample) score significantly higher in resource integration ability and project execution ability than non-participants ($p<0.001$), highlighting the importance of practical environments in behavioral skills formation.

The observational method also captured an important phenomenon: high-performance group students exhibit obvious "cross-situational behavioral consistency," meaning they can maintain stable behavioral performance in different social environments (classroom, competition, practical projects); while low-performance group students show greater "situational dependency," with their behavioral performance being more influenced by environmental factors[39]. This difference reflects the social psychological mechanism of vocational art students' behavioral skills development, namely the importance of a stable internal behavioral regulation system for sustainable innovation and entrepreneurship ability. Based on these findings, behavioral skills assessment should emphasize skills' cross-situational stability and social adaptability, combining process observation with outcome evaluation to comprehensively reflect art students' behavioral skills level.

4.1.3. Social psychological observation and analysis of psychological quality dimension

Through questionnaire measurements, in-depth interviews, and social psychological observation, five core indicators of the psychological quality dimension in vocational art students' innovation and entrepreneurship ability were identified: psychological resilience, tolerance for uncertainty, self-efficacy, achievement motivation, and identity integration. The research divided 426 students into three groups based on entrepreneurial intention and behavior: successful entrepreneurs (78 people), potential entrepreneurs (204 people), and non-entrepreneurs (144 people), comparing their score differences on various indicators of psychological quality, as shown in **Table 4-3**.

Table 4-3. Comparative analysis of psychological quality dimension among vocational art student groups (N=426).

Psychological Quality Indicators	Successful Entrepreneurs (n=78)	Potential Entrepreneurs (n=204)	Non-entrepreneurs (n=144)	F-value	p-value	Effect Size η^2
Psychological Resilience	4.7±0.28	3.8±0.46	2.9±0.53	46.32	<0.001	0.36
Tolerance for Uncertainty	4.5±0.31	3.4±0.49	2.3±0.57	58.75	<0.001	0.43
Self-efficacy	4.6±0.29	3.9±0.42	3.1±0.48	38.94	<0.001	0.31
Achievement Motivation	4.4±0.32	3.7±0.45	3.2±0.50	27.63	<0.001	0.24
Identity Integration	4.3±0.35	3.6±0.47	3.4±0.46	18.21	<0.001	0.18

Data analysis shows significant differences among the three groups of students across all dimensions of psychological quality, especially in tolerance for uncertainty ($F=58.75$, $p<0.001$, $\eta^2=0.43$) and psychological resilience ($F=46.32$, $p<0.001$, $\eta^2=0.36$), where the differences are greatest. Social psychological observation found that successful entrepreneurs exhibit an obvious "elastic adaptation pattern" when facing setbacks and uncertainty, tending to view setbacks as temporary and situation-specific challenges while maintaining a positive problem-solving orientation. In-depth interviews further reveal that 92.3% of successful entrepreneurs have experienced at least one major entrepreneurial setback, but they were able to adjust their psychological state through cognitive reappraisal strategies to maintain entrepreneurial motivation. In contrast, only 37.8% of non-entrepreneurs indicated they could positively cope with major setbacks.

From a professional type perspective, students from different art specialties also show differences in psychological quality structure. Performing arts students score highest in psychological resilience (average 4.2 points), which may be related to their long-term stage performance experience and training in facing audience evaluation; while design arts students perform best in tolerance for uncertainty (average 4.0 points), reflecting their adaptation to open-ended problems and multiple-solution approaches in the design process. Analysis of social environmental factors indicates that students with entrepreneurial family backgrounds (23.5% of the sample) score significantly higher in self-efficacy and achievement motivation than those without relevant backgrounds ($p<0.01$), demonstrating the subtle influence of family environment on psychological quality formation, as shown in **Figure 4-2** below.

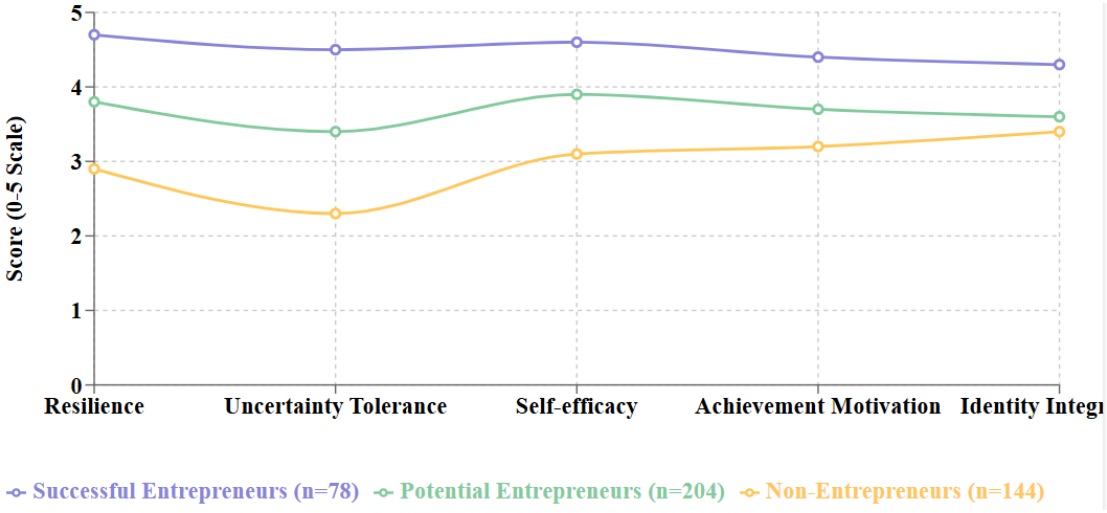

Figure 4-2. Psychological quality dimensions comparison among different entrepreneurial groups (N=426)/.

Social psychological observation also captured an important phenomenon: there is a close association between psychological quality and social identity recognition. Students with a clear dual "artist-entrepreneur" identity (76.9% of successful entrepreneurs) demonstrate higher levels of identity integration and self-efficacy, while those experiencing identity conflict face more psychological barriers in the entrepreneurial process. Qualitative analysis shows that successful entrepreneurs are able to organically integrate artistic values with business logic to form a unified self-cognition; whereas non-entrepreneurs are more likely to fall into value conflicts between "artistic purity" and "commercial practicality"[40]. This finding suggests that cultivating psychological qualities in vocational art students should emphasize identity integration work, helping students construct a harmonious professional identity and enhancing psychological resilience and adaptability in facing innovation and entrepreneurship challenges. Based on the above analysis, innovation and entrepreneurship ability assessment in the psychological quality dimension should focus on three key aspects: resilience cultivation, uncertainty management, and identity integration.

4.2. Influence mechanisms of social environmental factors on the formation of innovation and entrepreneurship ability

4.2.1. Social psychological observation and analysis of educational environment influence

Through structural equation modeling, the influence mechanisms of educational environment factors on the formation of vocational art students' innovation and entrepreneurship abilities were analyzed, examining the direct effects and indirect effects mediated through psychological qualities of five core educational environment factors (curriculum design, teaching methods, evaluation system, practice platform, and mentor guidance). **Table 4-4** presents the path coefficients of each factor and their differences among students of different professional types.

Table 4-4. Path analysis of educational environment factors influencing innovation and entrepreneurship ability (N=426).

Educational Environment Factors	Direct Effect	Indirect Effect	Total Effect	Visual Arts	Performing Arts	Design Arts	Media Arts	F-value	p-value
Curriculum Design	0.42***	0.28***	0.70***	0.65***	0.61***	0.78***	0.72***	12.37	<0.01
Teaching Methods	0.38***	0.36***	0.74***	0.69***	0.82***	0.73***	0.71***	8.46	<0.05
Evaluation System	0.31***	0.24**	0.55***	0.51***	0.56***	0.57***	0.54***	2.18	>0.05
Practice Platform	0.57***	0.19**	0.76***	0.68***	0.71***	0.85***	0.82***	15.63	<0.001
Mentor Guidance	0.49***	0.22**	0.71***	0.66***	0.73***	0.69***	0.76***	6.92	<0.05

***Note:** *p<0.05, **p<0.01, ***p<0.001*

Social psychological observation results show that practice platform construction is the most significant educational factor influencing art students' innovation and entrepreneurship abilities (direct effect=0.57, $p<0.001$), with its action mechanism primarily providing real project experiences, market feedback, and social interaction opportunities, stimulating students' behavioral skills development and psychological adjustment abilities. In-depth interviews reveal that students who participated in school-enterprise cooperation projects (64.8% of the sample) generally reflected that these experiences provided them with "situated learning" and "social recognition" experiences, with 82.3% of successful entrepreneurs viewing practice platform experiences as key turning points[41]. Social psychological observation found that the influence of practice platforms exhibits two patterns: "immediate effect" and "delayed effect." The immediate effect is mainly reflected in skill improvement and knowledge application, while the delayed effect is manifested in the gradual increase of students' self-efficacy and professional identity.

The total effect of curriculum design is also high (0.70, p<0.001), but its influence mechanism presents a "dual pathway model": on one hand, it directly affects cognitive abilities through knowledge transfer (direct effect=0.42, p<0.001); on the other hand, it indirectly affects psychological qualities by cultivating students' innovative thinking and artistic confidence (indirect effect=0.28, p<0.001). Professional difference analysis shows that design arts students have the highest responsiveness to curriculum design (0.78, p<0.001), which may be related to this type of major's curriculum emphasizing innovative thinking training and market application. The influence of teaching methods exhibits a strong "psychological mediating effect" (indirect effect=0.36, p<0.001), especially student-centered inquiry teaching and project-based learning methods, which significantly improved tolerance for uncertainty and self-efficacy by enhancing students' autonomy and sense of achievement, as shown in **Figure 4-3** below.

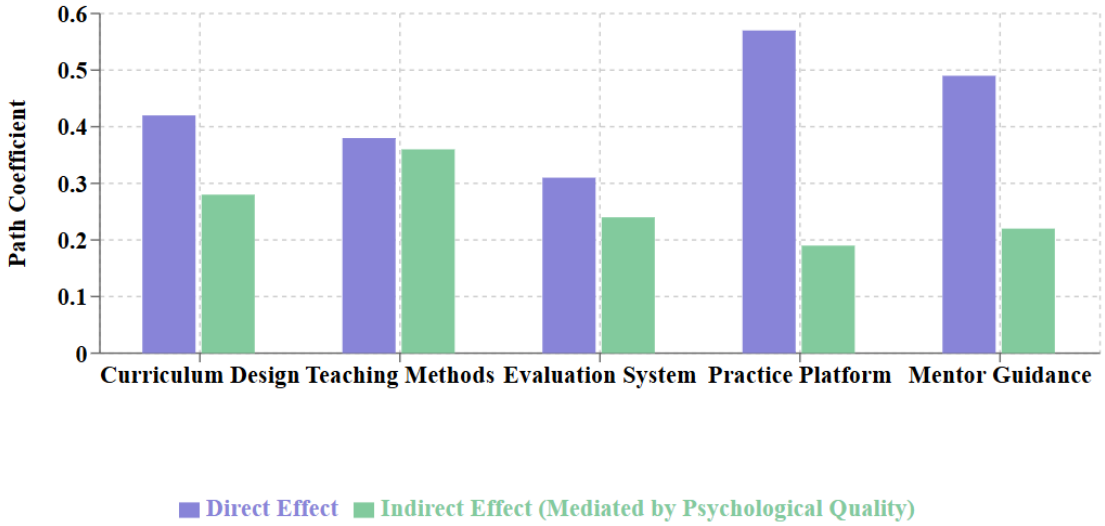

Figure 4-3. Path analysis of educational environment factors on innovation and entrepreneurship ability (N=426).

From a social psychological mechanism perspective, the influence of educational environment factors on innovation and entrepreneurship abilities is primarily realized through three pathways: knowledge transfer pathway (mainly affecting cognitive abilities), behavior shaping pathway (mainly affecting behavioral skills), and psychological construction pathway (mainly affecting psychological qualities). The research found that the "immersive innovation and entrepreneurship education model" integrating these three pathways is most effective. This model takes practice platforms as the core, integrating diverse curriculum design and mentor guidance to cultivate students' comprehensive abilities in real situations. Based on these findings, art vocational colleges should construct a "whole-environment, multi-level, interactive" educational ecosystem, breaking the traditional one-way knowledge transfer model, emphasizing students' social psychological experiences and ability internalization processes, thereby more effectively promoting the formation of sustainable innovation and entrepreneurship abilities.

4.2.2. Social psychological observation and analysis of career ecological environment influence

Through questionnaire surveys, market data analysis, and behavioral observation, the influence mechanisms of career ecological environment factors on art students' innovation and entrepreneurship abilities were examined. The research divided 426 students into three groups according to their professional development direction: digital media field (162 people), cultural design field (148 people), and traditional art field (116 people), analyzing the shaping effects of different career ecological environment characteristics on students' innovation and entrepreneurship behaviors, as shown in **Table 4-5**.

Table 4-5. Analysis of differences in art students' innovation and entrepreneurship abilities in different career ecological environments (N=426).

Career Ecological Indicators	Digital Media Field (n=162)	Cultural Design Field (n=148)	Traditional Art Field (n=116)	F-value	p-value	Effect Size η^2
Market Demand Perception	4.1±0.24	3.7±0.37	2.9±0.42	38.76	<0.001	0.31
Industry Innovation Space	4.3±0.31	3.8±0.35	2.8±0.45	42.53	<0.001	0.34
Entrepreneurial Policy Support	3.9±0.36	3.6±0.41	3.2±0.38	18.47	<0.001	0.16
Resource Acquisition Opportunities	4.0±0.33	3.5±0.39	2.7±0.43	35.82	<0.001	0.29
Career Development Channels	4.2±0.29	3.4±0.42	2.6±0.47	46.95	<0.001	0.37
Innovation Ability Score	4.3±0.25	3.7±0.31	2.8±0.41	44.37	<0.001	0.35
Psychological Resilience Score	4.2±0.27	3.8±0.34	2.9±0.38	40.62	<0.001	0.32

Social psychological observation results indicate that different career ecological environments produce significant differential effects on students' innovation and entrepreneurship abilities ($F=44.37$, $p<0.001$, $\eta^2=0.35$), with digital media field students performing best. Further path analysis reveals that career ecological environments influence innovation and entrepreneurship abilities through three mechanisms: first is the "market-driven mechanism," where the clarity and intensity of market demand directly stimulate students' innovation motivation and behavioral attempts; second is the "social capital mechanism," referring to how industry networks and resource acquisition opportunities promote students' resource integration ability development; third is the "professional identity mechanism," where clear career development channels enhance students' professional identity and long-term development commitment[42]. Data shows that the path coefficients of the three mechanisms are 0.46 ($p<0.001$), 0.39 ($p<0.001$), and 0.42 ($p<0.001$) respectively, collectively explaining 58.7% of the variation in innovation and entrepreneurship abilities.

In-depth interviews and observations found significant interactions between career ecological environments and psychological qualities. In the vibrant digital media field, students exhibit notably higher psychological resilience (average 4.2 points) and tolerance for uncertainty (average 4.1 points); in comparison, students in traditional art fields score significantly lower on these two indicators (2.9 points and 2.6 points respectively). Social psychological observation captured a typical phenomenon: when art students perceive greater market prospects and innovation space in their field, they are more willing to take innovation risks, demonstrating a stronger "growth mindset"; while in traditional art fields, students tend to adopt a "fixed mindset," focusing on skill perfection rather than innovative breakthroughs[43]. This mindset difference is confirmed through mediation effect analysis to be a key psychological mechanism connecting career ecological environments with innovation and entrepreneurship abilities (mediation effect=0.31, $p<0.001$), as shown in **Figure 4-4** below.

From the structural characteristics of career ecological environments, the dynamism, diversity, and predictability of market demand are key variables affecting students' innovation and entrepreneurship behaviors. The digital media field, due to its high market dynamism and diversity, provides students with rich innovation experimentation space and timely market feedback, thereby accelerating the development of their innovation and entrepreneurship abilities; while the relatively stable market demand and singular career development path in traditional art fields limit students' innovative thinking and entrepreneurial behavioral attempts. This finding suggests that vocational colleges should pay high attention to differences in career ecological characteristics across different art specialties in innovation and entrepreneurship education, designing targeted educational strategies, especially creating more diverse career development imagination

and market connection opportunities for traditional art specialty students, to promote the balanced development of their innovation and entrepreneurship abilities.

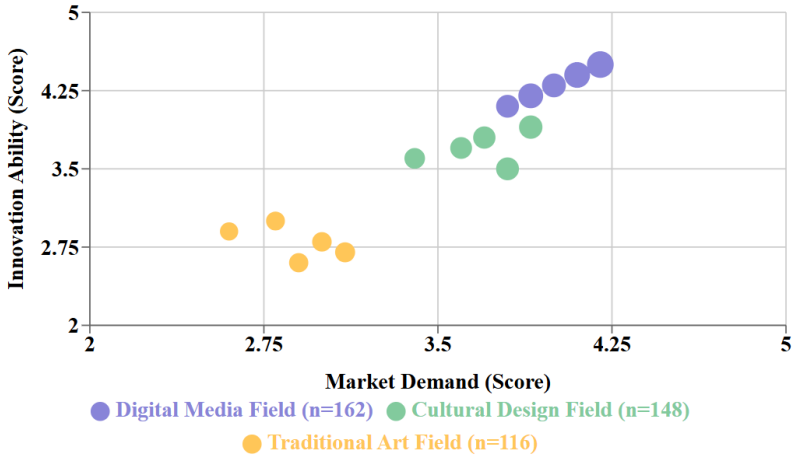

Figure 4-4. Relationship between career ecology environment, innovation ability and psychological resilience (N=426).

4.2.3. Social psychological observation and analysis of cultural values influence

The research examined the influence mechanisms of cultural values on vocational art students' innovation and entrepreneurship abilities through questionnaire surveys, in-depth interviews, and social psychological observation. Based on the entrepreneurial culture characteristics of teaching units, the research divided 426 students into high entrepreneurial culture group (183 people) and low entrepreneurial culture group (243 people), comparing the differences between the two groups in cultural value identification and innovation and entrepreneurship performance, as shown in **Table 4-6**.

Table 4-6. Analysis of cultural values' influence on innovation and entrepreneurship ability (N=426).

Cultural Value Indicators	High Entrepreneurial Culture Group (n=183)	Low Entrepreneurial Culture Group (n=243)	t-value	p-value	Correlation Coefficient with Innovation and Entrepreneurship Ability
Individualism Orientation	0.72±0.12	0.33±0.15	26.37	<0.001	0.61***
Risk Orientation	0.68±0.14	0.29±0.16	23.92	<0.001	0.57***
Material Success Recognition	0.54±0.17	0.38±0.14	10.48	<0.001	0.32***
Artistic Purity	0.51±0.18	0.76±0.11	-17.64	<0.001	-0.28***
Long-term Thinking	0.63±0.13	0.41±0.17	14.83	<0.001	0.45***
Reform Openness	0.81±0.09	0.35±0.18	31.25	<0.001	0.68***
Innovation Ability Score	4.2±0.31	3.1±0.45	27.86	<0.001	-
Entrepreneurial Behavior Index	0.65±0.14	0.27±0.19	22.73	<0.001	-

***Note:** ***p<0.001*

Social psychological observation and data analysis show that cultural values influence the formation of innovation and entrepreneurship abilities through three mechanisms: value recognition, identity construction, and social support. Among them, reform openness ($r=0.68$, $p<0.001$) and individualism orientation ($r=0.61$, $p<0.001$) have the most significant correlation with innovation and entrepreneurship abilities. In-depth interviews reveal that teaching units in the high entrepreneurial culture group generally exhibit a "dual value recognition" phenomenon, that is, they affirm both the intrinsic value of artistic creation and actively

recognize the social utility and market value of art[44]; while the low entrepreneurial culture group tends toward "single value recognition," emphasizing more the purity and independence of art, and maintaining a reserved attitude toward market value. This difference in value orientation influences students' professional attitudes and behavioral choices through internalization processes. Students in the high entrepreneurial culture group demonstrate higher entrepreneurial willingness (average 0.73) and behavioral attempt rates (68.3%), while these two indicators for the low entrepreneurial culture group are 0.31 and 23.5% respectively, as shown in **Figure 4-5** below.

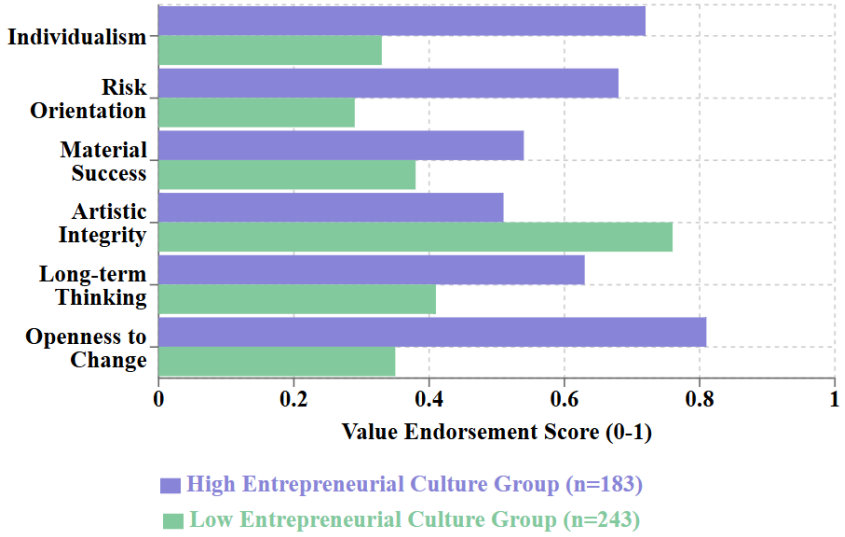

Figure 4-5. Cultural values comparison between high and low entrepreneurial culture groups (N=426).

Social psychological observation found that cultural values influence the development of students' innovation and entrepreneurship abilities through "implicit education" mechanisms. In high entrepreneurial culture environments, teachers' exemplary behaviors, sharing of success cases, and daily evaluation standards all convey positive recognition of innovation and entrepreneurship behaviors; while in low entrepreneurial culture environments, there is more emphasis on traditional art standards and skill refinement. This difference in cultural atmosphere leads students to adopt different cognitive frameworks and decision-making models when facing the "art-business" binary choice[45]. Qualitative analysis indicates that students in the high entrepreneurial culture group tend to adopt an "integrative cognitive framework," viewing artistic creation and commercial value as mutually promoting relationships; while the low entrepreneurial culture group more often adopts an "oppositional cognitive framework," believing that commercial considerations may damage artistic purity.

From the internal structure of cultural values, the high entrepreneurial culture group presents "balanced pluralism" characteristics, maintaining moderate recognition of various value orientations such as individualism, risk orientation, material success, and artistic purity; while the low entrepreneurial culture group exhibits "biased singularity" characteristics, with recognition of artistic purity significantly higher than other value orientations. Mediation effect analysis shows that value pluralism promotes the development of innovation and entrepreneurship abilities by enhancing students' cognitive flexibility and adaptability (mediation effect=0.36, $p<0.001$). Additionally, social network analysis found that students in the high entrepreneurial culture group possess more diverse social connections (average node count 18.3 vs. 11.2) and stronger cross-boundary communication tendencies (cross-boundary interaction index 0.62 vs. 0.27). These

social network characteristics provide them with richer information, resources, and support, further enhancing their innovation and entrepreneurship abilities.

Based on these findings, vocational art education should emphasize cultural value construction, building a pluralistic cultural system compatible with both artistic and market values, guiding students to form integrative cognitive frameworks, and promoting the healthy development of sustainable innovation and entrepreneurship abilities.

4.3. Sustainable innovation and entrepreneurship ability development modes of vocational art students

4.3.1. Social psychological observation and analysis of individual development paths

Through longitudinal tracking and retrospective interviews, the research conducted a systematic analysis of the innovation and entrepreneurship ability development trajectories of 426 vocational art students, identifying three typical individual development paths: Explorer Path (143 people), Integrator Path (168 people), and Innovator Path (115 people). **Table 4-7** presents the characteristic differences of these three paths at different development stages and their psychological mechanisms.

Table 4-7. Comparison of innovation and entrepreneurship ability development paths of vocational art students (N=426).

Development Stage	Explorer Path (n=143)	Integrator Path (n=168)	Innovator Path (n=115)	Dominant Psychological Mechanism	Key Transformation Factors
Initial Stage	Interest-driven (2.1)	Skill-oriented (1.9)	Breakthrough thinking (2.3)	Self-exploration	Professional choice
Exploration Stage	Multi-domain attempts (2.7)	Professional deepening (2.4)	Problem identification (3.2)	Identity formation	Challenging tasks
Specialization Stage	Knowledge integration (3.3)	Skill refinement (3.5)	Innovation breakthrough (3.8)	Capability construction	Mentor guidance
Integration Stage	Cross-boundary collaboration (3.6)	Market connection (4.1)	Value creation (4.3)	Social recognition	Market feedback
Innovation Stage	Ecosystem participation (3.8)	Model replication (4.5)	Leading change (4.7)	Value realization	Resource support
Growth Rate	0.43/stage	0.65/stage	0.60/stage	-	-
Sustainability Index	0.68±0.12	0.72±0.09	0.81±0.08	-	-

Social psychological observation results indicate that although all three development paths can ultimately achieve high levels of innovation and entrepreneurship abilities, they exhibit significant differences in development trajectories, psychological mechanisms, and key transformation factors. The Explorer Path is characterized by "breadth before depth," with students showing strong cross-domain interests and experimental tendencies in the early stages, accumulating diverse experiences through multiple explorations, but with relatively delayed development of integration abilities, resulting in slower mid-term development speed (growth rate 0.43/stage). In-depth interviews reveal that these students generally possess an "open thinking mode," maintaining high curiosity about new things, but may face "focusing difficulties," struggling to form professional depth[46]. In contrast, the Integrator Path follows a "depth before breadth" development logic, with students first establishing solid foundations in professional fields, then gradually expanding market applications, showing faster late-stage growth speeds (growth rate 0.65/stage). These students typically possess a "structural thinking mode," excelling in systematic learning and progressive innovation, but may lack breakthrough innovation in the early stages.

The Innovator Path exhibits development characteristics of "depth and breadth in parallel," showing higher problem identification abilities and innovation tendencies from the initial stage (2.3 vs. Explorer 2.1 and Integrator 1.9), and maintaining leading advantages at each stage. Social psychological observation

found that these students possess an "integrative cognitive style," able to simultaneously focus on professional depth and cross-boundary applications, demonstrating higher innovation sensitivity and opportunity identification abilities[47]. Latent Growth Modeling results show that the development trajectories of the three paths do not show significant differences at the initial stage (t=0) ($F=2.45$, $p>0.05$), but have significant differences in development slope ($F=16.37$, $p<0.001$), indicating that individual development paths are mainly influenced by key transformation factors during the development process rather than innate ability differences.

From a psychological mechanism perspective, all three development paths experience five stages of psychological development: self-exploration, identity formation, capability construction, social recognition, and value realization, but with different emphases at different stages for each path. Mediation effect analysis shows that "identity integration degree" is the key psychological variable connecting development paths with final ability levels (mediation effect=0.39, $p<0.001$). Students who successfully integrate "artist identity" and "entrepreneur identity" demonstrate higher innovation and entrepreneurship abilities and development sustainability (Innovator Path 0.81 vs. Explorer Path 0.68)[48]. Social ecosystem observation further reveals that development path selection is jointly influenced by multiple factors including individual traits (37.2%), educational environment (28.5%), and social support (34.3%), indicating that vocational colleges should construct diverse support systems, respect individual development diversity, provide targeted guidance for students on different paths, and promote the sustainable development of their innovation and entrepreneurship abilities.

4.3.2. Social psychological observation and analysis of educational support systems

Through analysis of educational models from 8 vocational art institutions and tracking of student ability development, this study identified three typical educational support systems: Traditional Education Model (112 people), Integrated Education Model (195 people), and Innovative Education Model (119 people), and examined the impact effects of different models on students' innovation and entrepreneurship ability development. **Table 4-8** presents the characteristic elements of each model and their action mechanisms.

Table 4-8. Comparison of different educational support systems' impact on innovation and entrepreneurship ability (N=426).

System Elements	Traditional Education Model (n=112)	Integrated Education Model (n=195)	Innovative Education Model (n=119)	F-value	p-value	Key Action Mechanism
Curriculum System	Professional disciplinary (4.2)	Modular integration (4.3)	Problem-oriented (3.8)	5.83	<0.01	Knowledge construction
Teaching Methods	Demonstration teaching (3.0)	Project-driven (4.2)	Inquiry creation (4.5)	18.76	<0.001	Capability cultivation
Evaluation Standards	Skill precision (4.3)	Process-oriented (4.0)	Innovation value (4.1)	3.62	<0.05	Motivation guidance
Practice Platforms	Campus simulation (2.5)	School-enterprise cooperation (4.2)	Entrepreneurial incubation (3.9)	21.35	<0.001	Situational learning
Faculty Structure	Professional teachers (4.5)	Composite teachers (4.1)	Diverse mentors (4.3)	4.27	<0.05	Role modeling
Innovation Thinking Cultivation	2.8±0.42	4.1±0.36	4.6±0.31	26.48	<0.001	Cognitive development
Market Awareness Cultivation	2.4±0.45	4.3±0.33	4.1±0.37	29.75	<0.001	Opportunity recognition
Psychological Resilience Cultivation	3.1±0.39	3.9±0.34	4.5±0.29	22.16	<0.001	Setback response
Sustainable Development Orientation	2.7±0.47	4.4±0.31	4.2±0.35	31.52	<0.001	Long-term development

Social psychological observation results indicate that the three educational support systems show significant differences in concepts, structures, and implementation methods, thus forming different educational ecologies and psychological influence mechanisms. The Traditional Education Model emphasizes professional skill training and artistic expressiveness cultivation, forming a "vertical deepening" educational path. Students excel in professional knowledge (4.2 points) but are notably deficient in innovative thinking (2.8 points), market awareness (2.4 points), and resource integration ability (2.5 points). In-depth interviews reveal that students under this model form a professional identity oriented toward "skill refinement," with obvious psychological distance and capability barriers to entrepreneurial activities. Mediation effect analysis indicates that "singular professional identity recognition" is a key psychological variable hindering entrepreneurial ability development (mediation effect=-0.34, $p<0.001$).

The Integrated Education Model constructs a "horizontal expansion" educational path through "art + entrepreneurship" curriculum integration, project-driven teaching, and school-enterprise cooperation platforms. While maintaining professional education quality (4.3 points), it significantly enhances students' market awareness (4.3 points) and resource integration ability (4.2 points), showing comprehensive and balanced cultivation effects. Social psychological observation found that this model successfully shapes students' "dual identity recognition," meaning they simultaneously identify with their artist identity and entrepreneur identity, reducing role conflict and enhancing self-efficacy (4.0 points vs. Traditional Model 3.2 points)[49]. Additionally, the Integrated Education Model lowers students' psychological threshold from art learning to entrepreneurial practice through a "progressive transition strategy," with 74.8% of students reporting experiencing a "natural transition" rather than a "role rupture."

The Innovative Education Model adopts a system design of "problem-oriented + inquiry-based learning + entrepreneurial incubation," constructing an "ecological integration" educational path, with particular emphasis on innovative thinking cultivation (4.6 points) and psychological resilience building (4.5 points). Compared with the other two models, the Innovative Education Model scores slightly lower in professional knowledge (3.8 points), but students demonstrate stronger creative problem-solving abilities and setback response capabilities. Path analysis shows that psychological resilience is a key mediating variable in the Innovative Education Model's impact on entrepreneurial ability (mediation effect=0.43, $p<0.001$). This model cultivates students' "growth mindset" and risk-taking ability through setting moderate challenges and failure tolerance mechanisms.

Integrating the strengths and weaknesses of the three models, the research proposes a "Stage-Integration" educational support system, suggesting strengthening professional foundation training in the early learning stage, introducing project-driven and school-enterprise cooperation in the middle stage, and providing entrepreneurial incubation support in the later stage, achieving full-process cultivation of students' sustainable innovation and entrepreneurship abilities. This system design both respects the laws of art education and adapts to the development needs of innovation and entrepreneurship abilities, more effectively promoting students' overall development in cognition, behavior, and psychology.

4.3.3. Social psychological observation and analysis of social resource integration

Based on performance differences in innovation and entrepreneurship practice, the research divided 426 vocational art students into high-success group (93 people), medium-success group (218 people), and low-success group (115 people), and examined the ability differences in social resource acquisition and integration among the three groups and their social psychological mechanisms through questionnaire surveys, in-depth interviews, and social network analysis. **Table 4-9** shows the comparison of acquisition rates and integration abilities of different social resource types among the groups.

Table 4-9. Comparison of social resource integration abilities among different success groups (N=426).

Social Resource Type	High-Success Group (n=93)	Medium-Success Group (n=218)	Low-Success Group (n=115)	F-value	p-value	Main Cause of Resource Acquisition Barrier
Information Resources	79.2±7.5%	57.4±8.3%	31.5±9.2%	38.47	<0.001	Insufficient information filtering ability
Financial Support	62.8±8.9%	40.3±7.8%	18.7±6.5%	46.23	<0.001	Lack of business expression ability
Mentor Guidance	85.6±6.3%	63.2±7.4%	34.6±8.7%	52.68	<0.001	Weak proactive help-seeking awareness
Industry Networks	81.3±7.1%	48.5±8.2%	22.9±7.3%	57.35	<0.001	Insufficient social self-confidence
Market Channels	76.5±7.8%	51.8±7.9%	27.3±8.4%	41.92	<0.001	Deficient value expression ability
Network Density Index	0.68±0.09	0.43±0.11	0.25±0.08	49.37	<0.001	-
Resource Integration Coefficient	0.73±0.08	0.51±0.10	0.31±0.09	55.84	<0.001	-
Sustainability Indicator	0.81±0.07	0.58±0.09	0.36±0.11	63.21	<0.001	-

Social psychological observation results show that there are significant differences in social resource integration abilities among the three groups of students ($F=55.84$, $p<0.001$), with the high-success group significantly higher than the other two groups in acquisition rates of all resource types ($p<0.001$). In-depth interviews and social network analysis revealed the social psychological mechanisms behind these differences. First, there are obvious differences in "social capital awareness" among the three groups. Students in the high-success group demonstrate clear resource-oriented awareness and strategic social behaviors, with 93.5% of high-success group members able to systematically describe their social resource needs and acquisition strategies; while this proportion is only 27.8% in the low-success group. Second, there are also significant differences in "social interaction patterns" among the three groups: the high-success group tends to adopt a "bidirectional reciprocal" interaction model, emphasizing value exchange and long-term relationship maintenance; the medium-success group mostly adopts a "function-oriented" interaction model, establishing connections based on specific needs; the low-success group mainly exhibits a "passive acceptance" interaction model, lacking awareness and ability to proactively construct social networks[50].

Social network analysis shows that students in the high-success group have social networks characterized by "high density, diversity, and cross-boundary nature," with significantly higher average number of contacts (23.7 people) and proportion of cross-domain connections (68.4%) than the medium-success group (15.3 people, 42.6%) and the low-success group (8.2 people, 25.8%). More importantly, the social networks of the high-success group present structural characteristics of "coexistence of strong and weak relationships," having both close core support networks (average of 7.4 strong relationships) and extensive channels for information and resource acquisition (average of 16.3 weak relationships); while the social networks of the low-success group show characteristics of "homogeneity and closure," mostly limited within classmates and friend circles, lacking professional guidance and industry connections, as shown in **Figure 4-6** below.

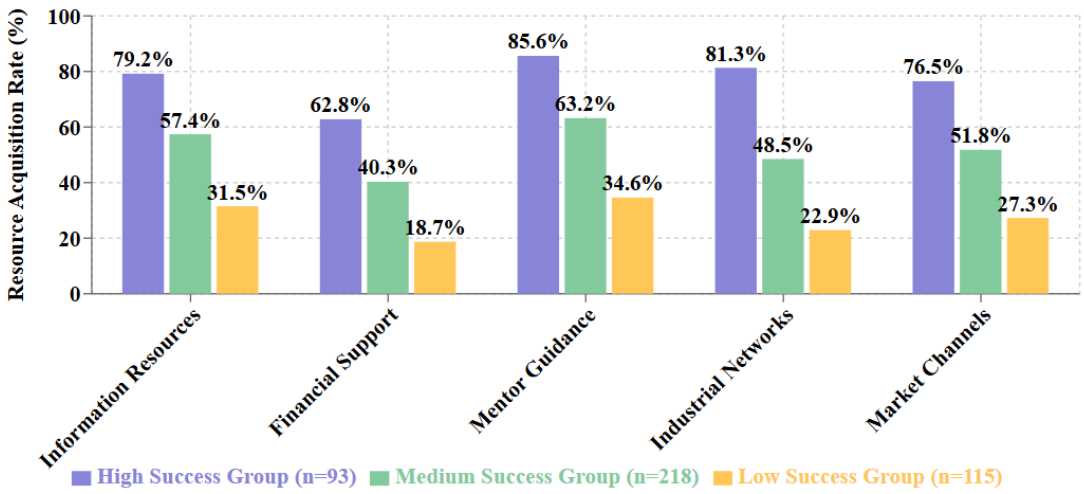

Figure 4-6. Comparison of social resource acquisition among different success groups (N=426).

From the perspective of psychological mechanisms of social resource integration, this research found that "social self-confidence" and "resource integration self-efficacy" are key psychological variables affecting resource acquisition. The high-success group scored significantly higher on these two variables (4.2 points and 4.3 points respectively) than the medium-success group (3.5 points and 3.4 points) and the low-success group (2.7 points and 2.5 points). Mediation effect analysis indicates that these two psychological variables explain 47.8% ($p<0.001$) of the differences in resource integration abilities among the three groups of students. Qualitative analysis further reveals that students in the low-success group often exhibit "identity split" and "value expression barriers" in social interactions, finding it difficult to effectively connect artistic professional values with market demands, resulting in obvious communication difficulties and lack of confidence in the resource acquisition process.

Based on these findings, to enhance vocational art students' social resource integration abilities, educational support systems should focus on strengthening three aspects: first, cultivating students' strategic social awareness and network construction abilities; second, providing diverse social practice platforms to expand students' cross-boundary communication experiences; third, strengthening psychological construction of social self-confidence and resource integration self-efficacy, helping students overcome identity conflicts and develop effective value expression abilities. These measures will help vocational art students establish more diverse and efficient social resource networks, providing solid support for the development of their sustainable innovation and entrepreneurship abilities.

5. Discussion

5.1. Theoretical significance of research findings

Through systematic observation and analysis of vocational art students' sustainable innovation and entrepreneurship abilities, this research contributes to innovation and entrepreneurship ability theory and vocational education theory in multiple aspects. This study has constructed a three-dimensional, multi-level indicator system of innovation and entrepreneurship abilities for vocational art students, organically integrating the three dimensions of cognitive abilities, behavioral skills, and psychological qualities, breaking through the traditional theoretical frameworks that primarily focus on single dimension or binary structures in innovation and entrepreneurship ability research. In particular, this study found that art students' innovation and entrepreneurship abilities exhibit structural characteristics of "equal emphasis on professional

depth and cross-boundary thinking" in the cognitive dimension, behavioral patterns of "situational adaptability and cross-situational consistency" in the behavioral dimension, and psychological traits of "artist-entrepreneur identity integration" in the psychological dimension. These findings deepen our understanding of the structure of innovation and entrepreneurship abilities in specific domains[51]. Additionally, the research reveals the dynamic interactive relationships among the three dimensions, verifies the interactive development mechanism of cognition-behavior-psychology, and confirms the key mediating role of psychological qualities (especially identity integration, self-efficacy, and tolerance for uncertainty) in connecting cognition and behavior. This finding enriches the theoretical explanation of innovation and entrepreneurship ability formation and provides new perspectives for further theory construction.

This research explores the influence mechanisms of social environmental factors on the formation of innovation and entrepreneurship abilities from a social psychological perspective, establishing an "individual-environment-system" interaction model that expands the research boundaries of innovation and entrepreneurship theory. The research found that the educational environment influences innovation and entrepreneurship abilities through three pathways: knowledge transfer, behavior shaping, and psychological construction; the professional ecological environment functions through three mechanisms: market driving, social capital, and professional identity; and cultural values exert influence through three approaches: value identification, identity construction, and social support[52]. These findings not only systematically explain the mechanisms of environmental factors but also reveal the complex interaction patterns between environmental factors and individual traits, supporting the theoretical viewpoint of "situation-individual co-construction." Meanwhile, the research identifies three typical individual development paths (Explorer, Integrator, and Innovator) and their corresponding educational support systems, proposing a "stage-integration" sustainable development model that enriches the theoretical models of innovation and entrepreneurship ability development. In particular, this research emphasizes the key role of social resource integration in the sustainable development of innovation and entrepreneurship abilities and reveals the social psychological mechanisms behind it, providing a theoretical foundation for understanding the uniqueness of innovation and entrepreneurship in the art field. These findings not only improve the theoretical system of innovation and entrepreneurship abilities but also provide scientific basis for cultivating innovative and entrepreneurial talents in the field of vocational art education, possessing important theoretical guiding value.

Although this study focuses on Chinese vocational art students, its findings possess significant international universality and theoretical generalization value. First, the three-dimensional structure of innovation and entrepreneurship capabilities (cognitive-behavioral-psychological) reflects the fundamental cognitive patterns of human innovation and entrepreneurial behavior, a structure unrestricted by specific cultural backgrounds, providing a universal framework for innovation and entrepreneurship capability assessment worldwide. Second, the 'individual-environment-system' interaction model reveals the universal importance of environmental factors in the formation of innovation and entrepreneurship capabilities; this finding can provide theoretical guidance for innovation and entrepreneurship education reforms in different countries, with particular universal applicability in constructing supportive educational ecosystems. Third, the identification of social resource integration as a key success factor indicates that regardless of cultural context, social networks and resource acquisition capabilities are important driving factors for innovation and entrepreneurial success, a pattern that can guide countries in optimizing the design of innovation and entrepreneurship support systems. Meanwhile, although the three development paths identified in the research may be influenced by cultural and institutional factors in their specific manifestations, their underlying capability development logic has universality, providing reference models for personalized talent cultivation under different educational systems. Therefore, the theoretical framework and evaluation index

system constructed in this study, with consideration of localized adaptive adjustments, have the potential for global promotion and application, offering valuable references for international innovation and entrepreneurship education practices.

5.2. Practical implications for cultivating innovation and entrepreneurship abilities of vocational art students

The findings of this research provide a series of practical implications for cultivating innovation and entrepreneurship abilities in the field of vocational art education. Vocational art institutions should construct a "three-dimensional integrated" cultivation system for innovation and entrepreneurship abilities, simultaneously strengthening the three dimensions of cognitive abilities, behavioral skills, and psychological qualities. Regarding cognitive ability cultivation, institutions should break through the limitations of traditional art education that overly emphasizes professional depth while neglecting cross-boundary thinking, establishing a "professional + cross-boundary" knowledge structure cultivation model through interdisciplinary curriculum design, cross-boundary innovation workshops, and other approaches to promote knowledge integration across art, business, technology, and other fields. Meanwhile, for behavioral skills cultivation, situational learning and practical experience should be emphasized by constructing multi-level practice platforms featuring "project-driven + school-enterprise cooperation + entrepreneurial incubation," allowing students to strengthen their resource integration abilities, market perception abilities, and team collaboration abilities in authentic situations[53]. Most importantly, the research found that psychological qualities are key mediating variables affecting art students' innovation and entrepreneurship behaviors; therefore, special attention should be paid to students' psychological development through activities such as setback education, identity integration workshops, and entrepreneurial psychological training camps to enhance students' psychological resilience, tolerance for uncertainty, and self-efficacy, helping students overcome identity conflicts between "artistic purity" and "commercial practicality" to form integrated professional identities.

Vocational art institutions should construct a "whole-environment, multi-stage, personalized" innovation and entrepreneurship education ecosystem. Based on the three typical development paths identified in the research, educational institutions should respect the diversity of student development and provide differentiated growth support. For students on the "Explorer Path," diverse exploration opportunities and systematic integration guidance should be provided; for students on the "Integrator Path," professional deepening and market connection should be strengthened; for students on the "Innovator Path," more autonomous innovation space and resource support should be provided. Meanwhile, the research also indicates that social resource integration ability is a key factor for innovation and entrepreneurship success; therefore, vocational institutions should strive to construct open and shared social resource platforms through school-enterprise alliances, entrepreneurial mentorship systems, industry resource matching events, and other approaches to expand students' social networks and enhance their resource acquisition abilities. Additionally, cultural value construction should be emphasized, creating a pluralistic cultural atmosphere that accommodates both artistic values and market values, guiding students to form integrative cognitive frameworks. Particularly for different professional characteristics, educational strategies should be designed differentially: for traditional art majors, market connection and innovative thinking cultivation should be enhanced; for applied design majors, innovation depth and cultural connotation should be strengthened; for digital media majors, balanced development of artistic expressiveness and technological innovation should be emphasized. This diversified, personalized educational ecosystem will help cultivate versatile art talents with sustainable innovation and entrepreneurship abilities.

6. Conclusion and outlook

6.1. Main research conclusions

Through questionnaire surveys, in-depth interviews, and social psychological observation, this research conducted a systematic study on Chinese vocational art students' sustainable innovation and entrepreneurship abilities, reaching the following five main conclusions:

(1) Vocational art students' sustainable innovation and entrepreneurship abilities present a three-dimensional structural characteristic, including cognitive abilities (creative thinking, critical thinking, problem-solving ability, art professional knowledge, and cross-domain knowledge integration), behavioral skills (artistic expression ability, resource integration ability, market perception ability, team collaboration ability, project execution ability, and communication expression ability), and psychological qualities (psychological resilience, tolerance for uncertainty, self-efficacy, achievement motivation, and identity integration). These three dimensions are interconnected and mutually reinforcing, collectively forming an integrated system of sustainable innovation and entrepreneurship capability.

(2) Social environmental factors influence the formation of vocational art students' innovation and entrepreneurship abilities through multiple pathways. The educational environment functions through three pathways: knowledge transfer, behavior shaping, and psychological construction, with practice platforms (direct effect=0.57) and mentor guidance (direct effect=0.49) having the most significant impact. The professional ecological environment influences innovation and entrepreneurship abilities through three mechanisms: market driving, social capital, and professional identity, with students from different professional fields (digital media, cultural design, and traditional art) showing significant differences in innovation and entrepreneurship abilities ($F=44.37$, $p<0.001$). Cultural values affect innovation and entrepreneurship behaviors through three approaches: value identification, identity construction, and social support, with reform openness ($r=0.68$) and individualism orientation ($r=0.61$) showing the most significant correlation with innovation and entrepreneurship abilities.

(3) The development of vocational art students' sustainable innovation and entrepreneurship abilities follows three typical paths: Explorer Path ("breadth before depth"), Integrator Path ("depth before breadth"), and Innovator Path ("depth and breadth in parallel"). Although all three paths can ultimately achieve high levels of innovation and entrepreneurship abilities, they exhibit significant differences in development trajectories, psychological mechanisms, and key transformation factors.

(4) Different educational support systems have differentiated impacts on students' innovation and entrepreneurship ability development. The Traditional Education Model strengthens professional depth but neglects the cultivation of innovative thinking (2.8 points) and market awareness (2.4 points). The Integrated Education Model achieves organic integration of professional education and innovation and entrepreneurship education, forming comprehensive and balanced cultivation effects. The Innovative Education Model particularly emphasizes innovative thinking (4.6 points) and psychological resilience (4.5 points) cultivation, but has relatively weaker professional foundations (3.8 points).

(5) Social resource integration ability is a key success factor for vocational art students' sustainable innovation and entrepreneurship. The social networks of high-success group students present characteristics of "high density, diversity, and cross-boundary nature," demonstrating clear resource-oriented awareness and strategic social behaviors. Social self-confidence (4.2 points) and resource integration self-efficacy (4.3 points) are key psychological variables affecting resource acquisition, explaining 47.8% of the differences in students' resource integration abilities.

6.2. Future outlook

Based on the findings of this study and reflections during the research process, future research can be further expanded in the following five aspects:

(1) Expand the scope of research subjects and conduct comparative studies of different types of art students. This research primarily focused on vocational institution art students. Future research could extend the sample to undergraduate and graduate-level art students, exploring differences in innovation and entrepreneurship abilities and their formation mechanisms across different educational levels. Additionally, specialized research on students from various art disciplines (such as visual arts, music, dance, drama, etc.) could be increased to analyze in depth the unique influence of artistic specialization characteristics on innovation and entrepreneurship abilities.

(2) Strengthen longitudinal tracking research to explore the long-term development trajectories of art students' innovation and entrepreneurship abilities. Future research should adopt longitudinal tracking designs with longer time cycles, covering the complete process from enrollment to post-graduation entrepreneurial practice, revealing the dynamic development patterns and key turning points of art students' innovation and entrepreneurship abilities, with particular attention to adaptive challenges and coping strategies during the transition from campus environment to market environment.

(3) Deepen experimental research on social psychological mechanisms to explore the intervention effects on innovation and entrepreneurship ability development. Future research could design targeted experimental intervention programs, such as identity integration workshops, social resource integration training, and innovative thinking cultivation projects. Through comparison between experimental and control groups, the effectiveness of specific interventions in enhancing art students' innovation and entrepreneurship abilities could be verified, providing stronger empirical support for educational practice.

(4) Expand cross-cultural comparative research to explore the influence of cultural factors on artistic innovation and entrepreneurship. Future research could conduct cross-cultural comparisons of innovation and entrepreneurship abilities between Chinese and foreign art students, analyzing the integration models of artistic value concepts and market value concepts under different cultural backgrounds, as well as the profound influence of cultural factors on artistic innovation and entrepreneurship behaviors, providing an international perspective for art innovation and entrepreneurship education with Chinese characteristics.

(5) Establish correlation research between innovation and entrepreneurship abilities and entrepreneurial outcomes to explore predictive indicators of sustainable success. Future research should strengthen tracking studies of art graduates who have successfully started businesses, analyzing the correlations between innovation and entrepreneurship ability indicators and actual entrepreneurial outcomes (such as enterprise survival rate, profitability, social impact, innovation sustainability, etc.), identifying the most predictive ability indicators, and establishing a predictive model for success in artistic innovation and entrepreneurship, providing directional guidance for the precise cultivation of art students' innovation and entrepreneurship abilities.

(6) Expand cross-disciplinary application research to explore the applicability of research findings in other educational contexts and vocational disciplines. The 'three-dimensional innovation and entrepreneurship capability' framework constructed in this study possesses certain universality, and in the future could be applied to other vocational education fields such as science and engineering, business, and medical science to verify the cross-disciplinary effectiveness of the three-dimensional structure of cognitive ability-behavioral skills-psychological qualities. Specific indicators can be adjusted according to different disciplinary characteristics; for example, science and engineering fields may strengthen technical innovation

thinking and engineering practical abilities, while business fields might emphasize market insight and business model construction capabilities. Additionally, the research should explore the application value of the 'social psychological observation method' in other educational research by establishing standardized observation scales and analysis procedures, thereby providing new methodological tools for educational psychology research.

6.3. Policy and practical recommendations

Based on the findings of this study, we propose the following specific recommendations for educational institutions and policy makers:

(1) National level: We recommend that education departments establish "Innovation and Entrepreneurship Capability Standards for Vocational Arts Education," incorporating three-dimensional capability indicators into professional evaluation systems, and establishing special funds to support "Arts + Entrepreneurship" integration projects; create cross-departmental coordination mechanisms to integrate resources from cultural, educational, and technological departments to construct an innovation and entrepreneurship ecosystem for vocational arts.

(2) Regional level: Developed eastern regions can focus on building digital art entrepreneurship incubation bases, strengthening industry-education integration by leveraging market advantages; central and western regions should develop distinctive art entrepreneurship projects based on local cultural characteristics, narrowing regional disparities through policy inclinations; establish regional cooperation and exchange mechanisms to promote sharing of quality educational resources.

(3) Institutional level: Adjust curriculum design by integrating innovation and entrepreneurship education into core professional courses, establishing a "1+1+1" training model (1 year of professional foundation + 1 year of integrated practice + 1 year of entrepreneurship incubation); develop "dual-skilled" faculty teams, requiring professional teachers to have industry practical experience and entrepreneurship mentors to possess arts professional backgrounds; construct university-enterprise collaboration platforms, jointly building practical training bases and entrepreneurship incubators with cultural and creative enterprises.

(4) International promotion: Promote Chinese vocational arts innovation and entrepreneurship education models through international cooperation frameworks such as the "Belt and Road" initiative; establish international exchange mechanisms to conduct faculty and student exchanges and project collaborations with overseas art institutions; develop online education platforms to transform research outcomes into digital teaching resources, exporting educational experiences to developing countries. Implementation of these recommendations requires phased progression: completing policy frameworks and standard systems in the short term (1-2 years), establishing demonstration projects and promotion models in the medium term (3-5 years), and forming mature vocational arts innovation and entrepreneurship education systems with international promotion in the long term (5-10 years).

Conflict of interest

The authors declare no conflict of interest.

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