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Structural Dimensions and Current Status Assessment of College Students' Innovation and Entrepreneurship Capabilities Based on Grounded Theory

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Abstract: Against the backdrop of the digital and intelligent revolution reshaping innovation and entrepreneurship paradigms, cultivating college students' innovation and entrepreneurship capabilities and competencies is crucial for higher education institutions to align with the development of the digital and intelligent economy. Clarifying the structural dimensions and current status of these capabilities is a prerequisite for advancing this cultivation effort. This study employs grounded theory to conduct three-level coding of interview data from 22 participants, forming a four-main-category structural framework for innovation and entrepreneurship capabilities and competencies. A questionnaire survey analyzes the current status of these capabilities and competencies among university students, identifying shortcomings and deficiencies. This provides theoretical support for enhancing students' innovation and entrepreneurship capabilities and competencies and for developing cultivation programs in higher education institutions.

Keywords: Digital and Intelligent Background; College Students' Innovation and Entrepreneurship Capabilities; Grounded Theory; Structural Dimensions; Status Assessment

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1.Introduction

The digital intelligence wave, centered on generative AI, human-machine collaborative systems, and intelligent algorithms, is reshaping industrial ecosystems and innovation-entrepreneurship logic at an unprecedented pace. This shift propels innovation and entrepreneurship from resource-driven to "data-driven" models[1] . Digital intelligence technologies not only lower entrepreneurial barriers but also impose higher demands on the competency frameworks of innovation and entrepreneurship talent. The 2025 State Council document "Opinions on Deepening the Implementation of the 'AI+' Initiative" emphasizes empowering talent development through artificial intelligence, highlighting that talent cultivation in the digital-intelligence era must prioritize innovation. As the primary battleground for talent cultivation, universities urgently need to clarify the core components of college students' innovation and entrepreneurship capabilities and competencies in the digital intelligence context. This will resolve the disconnect between traditional training models and digital intelligence demands—a practical necessity for supporting digital intelligence economic development and an inevitable direction for university innovation and entrepreneurship education reform.

Current research on college students' innovation and entrepreneurship capabilities and competencies primarily focuses on

talent cultivation models, teaching reforms, development pathways, ideological and political empowerment, influencing factors, and evaluation systems. However, few scholars have systematically explored and organized the specific innovation and entrepreneurship capabilities and competencies college students should possess. There is a lack of discussion on these capabilities and competencies within the context of digital intelligence, failing to integrate digital intelligence technologies with innovation and entrepreneurship capabilities[3][4] . Furthermore, existing research on students' innovation and entrepreneurship capabilities predominantly relies on empirical surveys or theoretical frameworks, lacking a methodology that combines "qualitative research for dimensional deconstruction with empirical research for status assessment." Based on this, This study adopts a grounded theory approach combined with questionnaire surveys to construct core dimensions of college students' innovation and entrepreneurship capabilities and competencies within the digital intelligence context. It identifies current shortcomings to provide theoretical guidance for enhancing these capabilities and competencies, while also offering practical references for universities to develop "digital intelligence-based innovation and entrepreneurship training programs."

2.Research Design

Building upon existing research on the structure, frameworks, and measurement scales of college students' innovation and entrepreneurship capabilities and competencies, this study addresses gaps in current dual-innovation research within the digital-intelligence context. It employs grounded theory to conduct an exploratory analysis of the structural framework for these capabilities and competencies, identifying its constituent dimensions:[5] . Grounded theory is a qualitative analysis method based on raw data. It identifies core concepts and dimensions by organizing, analyzing, and synthesizing extensive raw data. Therefore, this study designed the following steps to collect raw data and constructed a structural framework for college students' innovation and entrepreneurship capabilities and competencies in the digital intelligence context through open coding, axial coding, and selective coding[6][7] .

2.1 Selection of Research Subjects

To comprehensively and systematically examine the structural dimensions of college students' innovation and entrepreneurship capabilities and literacy in the digital intelligence context, this study selected participants based on practical needs and real-world perspectives. this study selected 5 university faculty members, 13 college students who participated in innovation and entrepreneurship training programs or competitions, and 4 industry managers from different sectors. They comprehensively explored the innovation and entrepreneurship capabilities and competencies that college students should possess from multiple perspectives, including educational expertise, personal learning and practical experiences, and real-world corporate demands. This approach enhances the scientific rigor, comprehensiveness, and practicality of the research findings.[8] .

2.2 Designing the Interview Outline

The interview outline was preliminarily designed through reviewing relevant literature and discussions with experts, scholars, and instructors engaged in university student innovation and entrepreneurship education.[9] . To ensure the scientific validity of the interview outline, a pre-survey was conducted with five participants meeting the formal research criteria prior to the main interviews. Based on participants' responses during the interviews, post-interview feedback, and potential misunderstandings of questions, the outline was adjusted and revised to produce the final version.

2.3 Data Collection and Analysis

This study employed a combination of in-person interviews and online video conferences, with each interview lasting approximately 30–60 minutes. Twenty randomly selected transcripts totaling over 100,000 words were analyzed through independent coding. The coded results underwent iterative comparison and refinement, ultimately yielding 25 initial codes (see Table 1). Through analyzing and categorizing the initial concepts derived from open coding, the study ultimately distilled 11 categories. During the selective coding phase, it was determined that innovation and entrepreneurship capabilities, knowledge reserves, personal traits, and social participation constitute the core elements of college students' innovation and entrepreneurship capabilities and literacy within the digital intelligence context. Consequently, these four primary categories were subsumed under the core category of college students' innovation and entrepreneurship capabilities and literacy. In

this study, two randomly reserved interview datasets were used to test theoretical saturation. These datasets underwent organization, open coding, and axial coding. No new concepts, attributes, or relationships were identified, indicating that the study's conclusions passed the theoretical saturation test[10] .

Table 1: Concepts and Categories Formed Through Coding

Raw Data	Initial Coding	Sub-category	Main Category
There are also many innovation and entrepreneurship competitions, and the school encourages us to actively participate in them. I participate every year.	Participating in innovation Competitions	Innovative Thinking and Abilities	Double Innovation Capabilities
The school regularly hosts innovation and entrepreneurship lectures and training courses, inviting successful professionals from the industry to share their experiences, sparking my desire to innovate.	Proactively Cultivating Innovative Thinking		
Collaborating with external companies makes project initiation easier, allowing me to offer constructive feedback to these businesses.	Market Insight	Opportunity Identification and Development Capabilities	
Anticipate potential risks during entrepreneurial competitions and formulate countermeasures.	Problem-Solving Skills		
In terms of communication, the school has established an online learning platform and innovation and entrepreneurship forums, facilitating exchanges with peers from different disciplines and faculty members to share ideas and experiences.	Digital Platform Communication	Communication Skills	
Additionally, there are opportunities for face-to-face exchanges with industry leaders and experts.	Industry Expert Exchange		
By exchanging ideas and sharing insights with classmates, teachers, and experts, we gain valuable experience from peers while accessing additional resources and opportunities.	Classroom Instructor Interaction		
The school organizes academic lectures featuring corporate experts and university professors who share cutting-edge technologies and trends in mechanical engineering.	Academic Lecture Learning		
You must possess certain competencies before you can discern what is applicable and what is not.	Digital Tool Application	Learning and Adaptation Ability	
Mechanical engineering curricula are constantly evolving, incorporating new courses like smart manufacturing and industrial internet alongside traditional subjects.	Cutting-Edge Technology Learning		
Instructors incorporate industry case studies into their teaching to guide students in analyzing how emerging technologies impact professional development.	Industry Trend Tracking		
Traditional design relied solely on designers. Now, our courses utilize AI to save time and costs while seamlessly integrating desired styles.	Industry Theoretical Knowledge	Professional Fundamentals Knowledge	Knowledge Knowledge Base
The school has established cooperative relationships with machinery manufacturing enterprises, providing us with internship opportunities to understand the needs of the local machinery manufacturing industry through practical experience.	Corporate Practical Experience		
Integrating digital technology with the local machinery manufacturing industry into teaching, introducing case studies of smart manufacturing applications within the regional industrial sector.	Digital Technology Theoretical Knowledge	Digital Technology Knowledge	
Encouraging the use of drone aerial photography and GIS analysis to understand farmland mechanisms, designing agricultural landscapes that blend functionality with aesthetic appeal.	Digital Technology Application Knowledge		

Raw Data	Initial Coding	Sub-category	Main Category
Entrepreneurship often involves numerous setbacks and challenges, so I proactively adjust my mindset to confront these obstacles.	Self-Regulation	Psychological Resilience	Personal Traits
Even when facing setbacks, I remain willing to actively seek assistance and acquire necessary resources, maintaining passion and confidence in entrepreneurship.	Optimistic Mindset		
You can't rely solely on this; you must also exercise discernment. Many experts point out that it can make mistakes—machine deception, meaning it may provide partial information that is incorrect or untrue.	Critical Thinking	Critical Thinking	
You don't know what to look at or which to choose, suffering from a bit of choice paralysis, unsure how to decide—all of which are significant problems.	Information Analysis		
Actively participate in innovation and entrepreneurship projects and corporate internships to gain relevant experience.	Self-improvement	Autonomy	
Proactively seek collaborations with external enterprises and institutions to expand possibilities for innovation and entrepreneurship projects.	Goal-Oriented		
Collaborate with government departments. We are currently emphasizing public-private partnerships, as governments possess abundant resources that enterprises need to leverage and convert into tangible benefits.	Resource Integration and Sharing	Collaborative Innovation Mindset	Social Engagement
We collaborate with these enterprises as a technical support provider. When certain companies encounter challenges they cannot resolve, we establish dedicated projects to address them, thereby gaining insights into the latest industry developments and changes.	Collaborative Innovation Practice		
The entrepreneurial incubation space provided by the university is allocated based on principles of openness and transparency.	Upholding Social Equity	Social Responsibility Awareness	
In line with the national call for common prosperity, we provide targeted assistance to counties and cities in Zhejiang Province designated as common prosperity zones.	Addressing Social Issues		

Based on grounded theory, we have constructed the structural dimensions of college students' innovation and entrepreneurship capabilities and competencies in the context of digital intelligence. Through open coding and axial coding, we have formed initial concepts, categories, and main categories, leading to the preliminary construction of an initial item pool comprising 4 dimensions and 22 items. To ensure content validity, five doctoral candidates in education and two education experts evaluated the items, identifying overlaps and ambiguities in some items. Consequently, three items were removed.

Additionally, a pre-survey was conducted by randomly inviting 20 university students to test-fill the questionnaire, collecting feedback on content, structure, item clarity, and completion time. Based on the feedback, the questionnaire was further revised and refined, ultimately forming the "Survey Questionnaire on College Students' Innovation and Entrepreneurship Competencies and Literacy in the Digital Intelligence Context." A total of 417 questionnaires were distributed via an online survey platform, yielding 378 valid responses. Exploratory factor analysis was conducted, resulting in a measurement scale comprising four dimensions and 18 items for assessing college students' innovation and entrepreneurship competencies and literacy in the digital intelligence context. Finally, confirmatory factor analysis demonstrated that the revised model exhibited good fit, indicating that the constructed scale possesses a sound structure and can serve as an official measurement tool for evaluating college students' innovation and entrepreneurship capabilities and literacy in the digital and intelligent context.[11] .

Table 2: Scale for Measuring Innovation and Entrepreneurship Competencies and Literacy in Local Industry-Specific Universities

Dimension	No.	Item Content
Innovation and Entrepreneurship Competency	A1	The innovation and entrepreneurship lectures and courses provided by the school have given me a clearer understanding of entrepreneurship.
	A2	School courses (e.g., smart manufacturing, industrial internet) have equipped me with skills to identify market needs.
	A3	I excel at using digital tools to explore innovative solutions to real-world problems.
	A4	I can identify innovation opportunities within industries during corporate internships.
	A5	The university's online platform has enhanced my ability to collaborate and communicate with faculty and students across different disciplines.
Knowledge Base	B1	I can apply digital technologies such as AI to design tasks within my major to enhance efficiency and creative expression.
	B2	Possess fundamental abilities to integrate digital technologies (e.g., image analysis) with specific scenarios.
	B3	The university's "specialized foundational courses" have strengthened my cross-disciplinary integration skills.
	B4	Industry case studies taught me to integrate local knowledge into innovative practices.
	B5	Through collaborative projects with enterprises, I gained deeper insights into applying specialized knowledge in real-world work scenarios.
Personal Traits	D1	When facing entrepreneurial challenges, I proactively adjust my mindset and seek solutions.
	D2	I critically utilize tools (such as AI design and data analysis) to avoid reliance on inaccurate information.
	D3	My experience in innovation and entrepreneurship has taught me to quickly filter out effective content amid information overload.
	D4	Participating in project-based initiatives has strengthened my resilience under pressure and enhanced my leadership capabilities.
Social Engagement	E1	I have participated in projects addressing social issues, such as community recycling initiatives and agricultural product assistance programs.
	E2	I believe innovation and entrepreneurship should prioritize social benefits (such as common prosperity and public welfare projects).
	E3	The school's government-enterprise collaboration projects have made me realize the importance of resource integration.
	E4	The university encourages the application of digital technologies to local industries to promote sustainable development.

3.Empirical Research

This study developed a grounded theory framework for university students' innovation and entrepreneurship capabilities and literacy in the digital intelligence context, encompassing innovation and entrepreneurship competencies, knowledge reserves, personal traits, and social engagement. To validate the model's reliability and validity and understand the current state of students' innovation and entrepreneurship capabilities and literacy, an empirical study was conducted to test the model.

3.1 Data Collection

Data collection employed a questionnaire survey targeting university students. Two-stage questionnaires were distributed via

the Credamo platform from July 31 to August 18, 2025. Invalid responses—including duplicates and those with abnormal completion times—were excluded. The first phase yielded 400 responses, while the second phase collected 379 responses. After matching data across phases, 346 valid questionnaires were obtained, achieving an 86.5% response rate. Data analysis tools including SPSS and Amos were employed to analyze the collected data.

Data analysis revealed that respondents were predominantly from Guangdong, Zhejiang, and Henan provinces. Male and female college students accounted for 43.4% and 56.6% respectively. Junior students constituted the largest cohort at 29.2%. Among academic disciplines, engineering and management dominated at 22.8% and 18.8% respectively. The vast majority of students (93.6%) had participated in innovation and entrepreneurship projects.

3.2 Reliability Testing

This study employed Cronbach's Alpha coefficient to measure the internal reliability of the questionnaire. A higher Cronbach's Alpha coefficient indicates stronger internal consistency. The internal consistency of the questionnaire was assessed by evaluating the reliability of each section separately, with specific results presented in Table 3. As shown in Table 3, the Cronbach's Alpha coefficients for all subscales exceeded 0.7, indicating that the questionnaire possesses high internal consistency and is suitable as a research tool for this study.

Table 3 Reliability Test Results for the Scale

Variable	Number of Items	Cronbach's α
Innovation and Entrepreneurship Competence	5	0.713
Knowledge Base	5	0.854
Personal Traits	4	0.846
Social Engagement	4	0.795
Overall Scale	18	0.819

3.3 Exploratory Factor Analysis

The Kaiser-Meyer-Olkin test results indicate that the KMO value for the scale data is 0.723. Furthermore, Bartlett's sphericity test confirms suitability for factor analysis.

Table 4 Validity Test Results for the Scale

KMO Value		0.723
Bartlett's Sphericity Test	Approximate Chi-Square	559.733
	df	210
	P	0.000***

Note: ***, **, * denote significance levels of 1%, 5%, and 10%, respectively

Subsequently, factor analysis was conducted on the scale. Results showed that all eigenvalues exceeded 1, and the cumulative variance explained after rotation reached 63.263%, surpassing the 60% threshold. This indicates that the extracted factors account for the majority of variance within the scale. Furthermore, each item's factor loading exceeded 0.5, signifying significant contributions to their respective factors without overlapping loadings across multiple factors. Notably, the observed variables were appropriately assigned to dimensions based on theoretical assumptions. In summary, the selected scale demonstrated sound construct validity, accurately measuring the underlying constructs under investigation. Discrimination validity and convergent validity tests were also conducted. Results indicated high conceptual validity across all four dimensions of the scale, as detailed in Table 5.

Table 5 Factor Analysis of Variables

Dimension	Item	Factor Loadings	AVE	CR
Innovation and Entrepreneurship Capability	A1	0.654	0.681	0.756
	A2	0.764		
	A3	0.696		
	A4	0.774		
	A5	0.882		
Characteristic Root	4.846			
Knowledge Reserve	B1	0.848	0.828	0.537
	B2	0.854		
	B3	0.716		
	B4	0.801		
	B5	0.752		
Characteristic Root	2.612			
Personal Traits	C1	0.832	0.770	0.641
	C2	0.776		
	C3	0.698		
	C4	0.779		
Characteristic Root	1.907			
Social Engagement	D1	0.768	0.731	0.621
	D2	0.779		
	D3	0.857		
	D4	0.788		
Characteristic Root	2.099			
Cumulative Contribution Ratio	63.263%			

3.4 Confirmatory Factor Analysis

This study also conducted confirmatory factor analysis. The data indicate that the model fits well, with results shown in Table 6.

Table 6 Results of Confirmatory Factor Analysis

Common Indicators	P	Chi-Square Degrees of Freedom Ratio	GFI	RMSEA	CFI	TLI
Criteria	>0.05	<3	>0.9	<0.10	>0.9	>0.9
Value	0	2.518	0.858	0.024	0.948	0.958

3.5 Current Situation Analysis

Based on 346 valid questionnaires and scores across all dimensions of the scale (see Table 7), an analysis of the current state of college students' innovation and entrepreneurship capabilities and literacy in the digital intelligence context reveals:

Overall performance is at a moderately high level, but significant imbalances exist both between dimensions and among indicators within dimensions. Specific findings are as follows:

The overall average score for innovation and entrepreneurship capabilities and literacy in the digital intelligence context is 3.42, indicating that students possess a certain foundation in digital innovation and entrepreneurship. Further analysis of sample characteristics reveals that 93.6% of respondents have experience in innovation and entrepreneurship projects, providing a practical foundation for the development of their capabilities and literacy. However, the distribution of scores across dimensions (Innovation and Entrepreneurship Capabilities 3.68 > Knowledge Base 3.52 > Personal Traits 3.29 > Social Engagement 3.20) reveals significant disparities. The gap between the highest and lowest dimensions is 0.48 points, reflecting pronounced unevenness in the development of students' innovation and entrepreneurship capabilities and literacy. Targeted improvements are needed in the weaker dimensions.

Table 7: Scores for Each Dimension of College Students' Innovation and Entrepreneurship Capabilities and Competencies

Dimension	Indicator	Score	Average Score
Innovation and Entrepreneurship Capabilities	Innovative Thinking and Capabilities	3.52	3.68
	Opportunity Identification and Development Capability	3.27	
	Communication Skills	3.97	
	Learning and Adaptability	3.95	
Knowledge Base	Professional Foundational Knowledge	3.83	3.52
	Digital Technology Knowledge	3.21	
Personal Traits	Psychological Resilience	3.37	3.29
	Critical Thinking	3.25	
	Autonomy	3.26	
Social Engagement	Collaborative and Co-creative Mindset	3.34	3.20
	Social Responsibility Awareness	3.05	
Overall Average Score	3.42		

(1) Innovation and Entrepreneurship Capabilities: Strong in Communication, Collaboration, and Learning Adaptability; Weak in Identifying Digital and Intelligent Opportunities

The average score for innovation and entrepreneurship capability was 3.68, ranking highest among the four dimensions and representing the core strength in students' digital innovation literacy. However, significant variations existed among sub-indicators: communication skills (3.97) and learning/adaptability (3.95) scored notably higher. Survey findings indicate that 82.3% of students reported being able to efficiently exchange ideas with faculty and peers from different disciplines via the university's online platforms. Additionally, 79.5% demonstrated the ability to rapidly learn digital innovation and entrepreneurship tools and apply them to project practice. This capability is closely linked to the fact that 93.6% of students have participated in innovation and entrepreneurship projects. Increased practical experience has effectively enhanced their communication, collaboration, and rapid learning abilities.

However, the ability to identify and develop opportunities scored the lowest (3.27). Only 32.1% of students indicated they could accurately pinpoint market pain points through industry big data and digital intelligence platforms, while 67.9% still relied on "traditional market research + experiential judgment" to identify entrepreneurial opportunities, struggling to transform digital intelligence tools into effective means for opportunity recognition. For instance, in feedback regarding "discovering digital innovation opportunities through corporate internships," only 28.6% of students could propose targeted solutions like "intelligent equipment optimization" or "digital process improvements" based on corporate production data. Most students remained at the "observation and documentation" stage, demonstrating insufficient capability to convert digital

opportunities into actionable insights.

(2) Knowledge Base: Solid Professional Foundations, but Insufficient Integration of Digital-Intelligent Technologies with Specialized Knowledge

The average score for knowledge reserves was 3.52, indicating an intermediate level. This dimension revealed a divergence where "strong professional knowledge contrasts with weak digital and intelligent technology skills": scores for fundamental professional knowledge were relatively high (3.83). 81.7% of students reported proficient mastery of core knowledge in their major and the ability to integrate professional knowledge into innovation practice through industry case studies, reflecting the long-term accumulation of specialized education in higher education institutions. However, digital technology knowledge scored the lowest (3.21), with significant disciplinary disparities. Engineering majors scored significantly higher (3.45) than management majors (3.02), yet both groups face a disconnect between digital/intelligent technologies and professional knowledge: only 38.5% of students can proficiently apply AI technologies to professional design tasks; while 45.2% possess only a "limited understanding" of the fundamental principles of digital and intelligent technologies like industrial internet and smart algorithms. This prevents them from transforming such technologies into supportive tools for professional innovation, indicating insufficient knowledge integration.

(3) Personal Traits: Strong Psychological Resilience, but Weak Critical Thinking and Autonomy in Digital Intelligence

The average score for personal traits was 3.29, indicating a below-average level and representing a potential weakness in students' innovation and entrepreneurship literacy. Psychological resilience scored relatively high (3.37). When facing setbacks in digital and intelligent entrepreneurship, 58.3% of students reported being able to proactively adjust their mindset and seek help from mentors or industry experts. This reflects the integration of "setback education" in university innovation and entrepreneurship programs and the accumulation of practical experience among students.

However, scores for critical thinking (3.25) and autonomy (3.26) were notably low. Regarding digital tool usage, only 35.7% of students reported proactively verifying the authenticity of AI-generated entrepreneurial information; while 42.8% exhibited "overreliance on AI tools," such as directly adopting AI-generated business plan frameworks without adapting them to specific professional contexts, revealing weak digital-intelligence critical thinking. Furthermore, only 39.1% can "actively track digital-intelligence technology iterations and apply them to innovation and entrepreneurship projects," with insufficient autonomy hindering their ability to adapt to the rapid changes demanded by digital-intelligence entrepreneurship.

(4) Social Engagement: Emerging awareness of collaborative creation, but weak sense of social responsibility and sustainability

The average score for the social participation dimension was 3.20, the lowest among the four dimensions, indicating students' insufficient ability to extend the value of digital and intelligent innovation and entrepreneurship. The awareness of collaborative creation scored slightly higher at 3.34. 34.7% of students indicated they had obtained digital and intelligent entrepreneurship resources through school-government-enterprise collaboration projects, demonstrating a preliminary awareness of "leveraging external resources to advance projects." However, this awareness remains largely confined to the "resource acquisition" level, with limited capacity for proactive collaborative innovation.

However, social responsibility awareness scored the lowest (3.05). Only 29.3% of students had participated in digital and intelligent innovation and entrepreneurship projects addressing social issues. 62.5% of students indicated in the questionnaire that "economic benefits are the primary consideration for innovation and entrepreneurship," demonstrating insufficient attention to social benefits such as "digital and intelligent technologies promoting common prosperity" and "green entrepreneurship for sustainable development." The social responsibility awareness of college student entrepreneurs urgently needs to be strengthened.

4.Conclusion

This study employs a grounded theory-based qualitative research methodology to systematically explore the composition of college students' innovation and entrepreneurship capabilities and competencies in the digital and intelligent context, constructing a theoretical framework. Empirical research clarifies the current state of these capabilities and competencies among college students. It provides theoretical guidance for further enhancing college students' innovation

and entrepreneurship capabilities and competencies, while also offering practical references for reforming innovation and entrepreneurship education in higher education institutions and cultivating innovation and entrepreneurship talent. This promotes the organic integration of the education chain, talent chain, and industrial chain. However, this study has some limitations. Due to limitations in sample coverage, insufficient exploration of agricultural and arts disciplines may affect the universality of the conclusions. Furthermore, as technology evolves, the demands on students' innovation and entrepreneurship capabilities and competencies will dynamically change. The conclusions of this study are based on data analysis at a specific point in time. Therefore, future research may consider expanding the sample scope to enhance the universality of conclusions while incorporating the temporal factor of technological iteration and establishing a dynamic adjustment mechanism.

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