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Innovative Behavior And Entrepreneurial Competence of Vocational College Students In A Polytechnic Institute In China



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INTRODUCTION

In today's highly competitive global economic environment, innovation and entrepreneurial capabilities are considered core competencies that vocational college students should possess. China's higher education system is increasingly focusing on nurturing students' innovation and entrepreneurship abilities, reflecting a common global concern on this topic. This article will explore global research advancements, China's current efforts in this regard, and the importance of researching the integration of innovation and entrepreneurship capabilities among vocational college students.

Globally, there has been significant progress in researching the integration of innovation and entrepreneurship capabilities. Many colleges and universities in various countries have incorporated innovation and entrepreneurship into their education systems by offering relevant courses and programs. This reflects the recognition of innovation and entrepreneurship as critical 21st-century skills that can promote sustainable socioeconomic development. For example, top universities like Stanford Vocational college and the Massachusetts Institute of Technology (MIT) in the United States have nurtured numerous entrepreneurs and tech leaders through innovative education, driving progress in technological innovation. European countries are also actively promoting entrepreneurship education to encourage students to start their own ventures.

Furthermore, international research institutions and organizations, such as the International Innovation Association and the World Entrepreneurship Organization, play important roles in advancing research and facilitating knowledge exchange on innovation and entrepreneurship capabilities. These organizations gather expertise and experiences from around the world, providing students with more learning opportunities and resources.

China, as one of the world's largest developing countries, has continuously exerted efforts to integrate innovation and entrepreneurship capabilities among vocational college students. Chinese higher education institutions increasingly recognize the importance of nurturing students' innovation and entrepreneurship abilities for the country's innovation-driven development strategy. Therefore, Chinese colleges and universities have actively implemented a series of measures to promote the integration of these capabilities.

Background of the Study

The origin of innovation and entrepreneurial capabilities can be traced back to the early stages of human society. Throughout history, humans have possessed an innate ability to

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solve problems and adapt to their environment. However, these capabilities have evolved and developed over time.

The origin of entrepreneurial capabilities can be traced back to early trade and exchange activities. Merchants and explorers in ancient civilizations established trade networks between different regions, requiring creative solutions to various challenges, including market demands, resource acquisition, and risk management.

As society has developed, innovation and entrepreneurial capabilities have become increasingly complex and diverse. During the Industrial Revolution, technological innovation drove rapid industrialization, generating numerous new business opportunities. Modern society relies even more on innovation and entrepreneurship to address complex issues such as globalization, technological advancement, and market competition ([Devin Harris, 2022](#)).

The origin of innovation and entrepreneurial capabilities can be traced back to the early stages of human society, and over time, these capabilities have evolved and matured, becoming crucial forces driving social and economic development. Today, they remain key factors shaping the world, influencing social progress and prosperity.

The researcher is a faculty member at Hubei Polytechnic Institute. In his teaching experience, he has observed that the education, guidance, and assessment of college students' innovation and entrepreneurial capabilities often lack the integration of innovation. However, integrating innovation into entrepreneurial capabilities is a crucial foundation for fostering innovation and entrepreneurship. Therefore, the researcher aims to explore how to achieve the integration of innovation and entrepreneurial capabilities among college students and apply it to practical teaching. This serves as an essential basis for promoting the development of college students' innovation and entrepreneurial capabilities.

The researcher has been working at Hubei Polytechnic Institute for years, primarily responsible for the cultivation of innovation and entrepreneurship among college students. These courses are fundamental for college students as they prepare to enter the workforce. It is essential to guide different college students in establishing their innovation and entrepreneurial development goals and foundations. However, during the training process, she has noticed that many universities lack a scientifically sound basis for cultivating innovation and entrepreneurship among college students. The planning and reference for such programs are often incomplete and do not yield the expected results.

Therefore, this research is based on the current status of the integrated development of innovation and entrepreneurial capabilities among Chinese college students. It focuses on selected Chinese college students as research subjects. Hubei Polytechnic Institute currently has a total of 18,000 college students. This study selects Hubei Polytechnic Institute students as research subjects.

This study aims to determine the competency model and influencing factors of Chinese college students. The introduction, discussion and synthesis of the above structure-related research and research are the basis of establishing the research.

Wang (2022) points out that in 1995, Johannesburg indicated that competence consists of knowledge, skills, and attitudes that are relevant to an employee's job, closely linked to job performance, can be measured against standards, and can be developed and improved through subsequent learning. Competence refers to the inherent traits that can distinguish outstanding performance from average performance in the same task.

Jiang (2021) emphasized that competence research focuses on assessing an individual's work effectiveness in specific contexts. Different situations and job roles require different combinations of competencies, but the assessment of these competencies is

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influenced by various factors. Different cultural backgrounds have varying perceptions of what constitutes effective work behavior. For example, in some cultures, leadership may be authoritative, while in others, it may lean more towards cooperation and team participation.

Jiang (2021) also pointed out that the size, structure, and culture of organizations can influence their requirements for competence. For example, startup companies may prioritize innovation and flexibility, while large corporations may place greater emphasis on teamwork and coordination.

Wu (2021) pointed out that with the development of technology, many professional roles and requirements have also undergone changes. This necessitates adjustments to competence models to adapt to new work environments.

Luo (2021) highlighted that the quality and accessibility of the education system and training opportunities can influence individuals' capacity development and competence levels.

Yao (2021) noted that economic stability, the state of the job market, and societal expectations and values can all impact competence research. Relevant laws and policies, such as labor laws, equal opportunity laws, and privacy laws, may limit or guide the methods and practices of competence assessment.

College students innovation

Si (2020) pointed out that the concept of "innovation" has its roots in many cultures and typically involves the introduction of novel ideas, methods, or objects. Innovation can be seen as making improvements upon existing foundations or creating entirely new things. Examples of innovation can be found in various fields in ancient societies, including agriculture, craftsmanship, and medical knowledge.

Zhang (2020) highlighted that with the progress of science and industry, innovation began to receive unprecedented attention in the 19th and 20th centuries, especially in the fields of science, technology, engineering, and mathematics. In the 20th century, with the development of globalization, information technology, and the internet, innovation became a key element in economic growth and competitiveness. Enterprises started focusing on research and development, seeking new business models and solutions to adapt to rapidly changing market demands. In this process, innovation extended beyond product or technological improvements to encompass innovations in organizational structures, management methods, and business strategies.

Si (2020) pointed out that the concept of "innovation" has its roots in many cultures and typically involves the introduction of novel ideas, methods, or objects. Innovation can be seen as making improvements upon existing foundations or creating entirely new things. Examples of innovation can be found in various fields in ancient societies, including agriculture, craftsmanship, and medical knowledge.

Lan (2020) highlighted that in recent years, many higher education institutions have begun implementing innovative education programs and courses designed to cultivate students' innovation capabilities by simulating real-world challenges. Moreover, interdisciplinary collaboration and research are considered key to developing innovation capabilities.

College students' competence for innovation and entrepreneurship

Yu (2018) pointed out that innovation and entrepreneurship among college students are widely recognized as key factors driving economic and societal progress in today's era.

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Innovation refers to the act of adopting new thinking, methods, or tools in various fields such as academia, technology, society, and culture, resulting in new products, services, or processes. Entrepreneurship, on the other hand, involves transforming an innovative idea or technology into a business opportunity, establishing new enterprises, and gaining economic returns.

Wen (2017) stated that with the acceleration of globalization and digitization, college students involved in innovation and entrepreneurship face many new opportunities and challenges. How to maintain innovation vitality, adapt to rapidly changing markets and technologies, and address the social and ethical issues associated with innovation and entrepreneurship are important directions for future research.

Li (2017) emphasized that college student innovation and entrepreneurship have become significant topics in today's society and education. To cultivate graduates with an entrepreneurial spirit and entrepreneurial competence, educators, policymakers, and researchers need to continue their efforts to explore the most effective strategies and methods.

Sun (2017) pointed out that students' cultural backgrounds, family upbringing, and the social environment in which they live can influence their attitudes toward entrepreneurship. For example, in cultures that encourage innovation and embrace failure, students may be more willing to try entrepreneurship.

Tao (2017) mentioned that the current economic environment, such as the state of the job market, the pace of economic growth, and the availability of funding, all affect students' willingness and competence in entrepreneurship.

Huang (2017) highlighted that resources provided by schools, such as entrepreneurship incubators, entrepreneurial competitions, and entrepreneurship clubs, can enhance students' entrepreneurial competence. Additionally, the guidance and support of teachers are crucial factors, as their experience and knowledge can help students better understand and address the challenges of entrepreneurship.

Feng (2017) pointed out that certain personality traits, such as adventurousness, resilience, leadership, and self-motivation, are considered closely related to entrepreneurial success. These traits can be nurtured through education and practice but are also influenced by genetics and early environments.

Xiong (2016) emphasized that entrepreneurship often requires teamwork, and students' roles in teams, interactions with team members, and their ability to bridge interdisciplinary boundaries can all affect their entrepreneurial competence.

Theoretical Framework

This research is based on two main theories that will guide and inform the study. These theories are the Innovation Ecosystem Theory and the Innovation and Entrepreneurship Theory.

Innovation Ecosystem Theory:

In China, the Innovation Ecosystem Theory is widely applied to the integration of innovation and entrepreneurship competence among college students. Chinese universities and government bodies recognize that nurturing innovation capabilities requires the construction of an organic innovation ecosystem. Therefore, Chinese higher education institutions actively collaborate with industry, entrepreneurship incubators, government agencies, and other stakeholders to jointly promote innovation and entrepreneurship education. College students can actively participate in the innovation ecosystem through

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involvement in practical projects, innovation competitions, and entrepreneurship incubators, thus gaining practical experience and resource support.

Additionally, the Chinese government has introduced a range of policies to support the development of the innovation ecosystem, including providing financial support, reducing barriers to entrepreneurship, and promoting technology transfer, all aimed at encouraging innovation activities. The application of this theory helps Chinese college students better understand the roles and interactions of various participants within the innovation ecosystem, fostering interdisciplinary collaboration and innovative thinking, thereby enhancing their innovation and entrepreneurship competence.

The Innovation Ecosystem Theory underscores that innovation is a complex systemic process and has been successfully applied in the integration of innovation and entrepreneurship competence among Chinese college students, facilitating the collaborative development of education and the innovation ecosystem and cultivating more innovative graduates.

Innovation and Entrepreneurship Theory:

In China, the Innovation and Entrepreneurship Theory is widely applied to the integration of innovation and entrepreneurship competence among college students. Chinese universities and government bodies recognize the importance of nurturing innovation and entrepreneurship capabilities for students' future employment and economic development. As a result, Chinese higher education institutions actively promote innovation and entrepreneurship education to cultivate students' innovative thinking and entrepreneurial skills.

The theory is used to guide curriculum design and teaching methods, emphasizing the crucial role of innovation in the entrepreneurial process. Students apply theoretical knowledge to practice through participation in entrepreneurial projects, innovation competitions, and corporate internships, thereby enhancing their innovation and entrepreneurship competence. Additionally, the Chinese government encourages innovation and entrepreneurship by providing policy support, entrepreneurial funds, and incubator resources to drive the construction of the innovation and entrepreneurship ecosystem.

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Research Paradigm

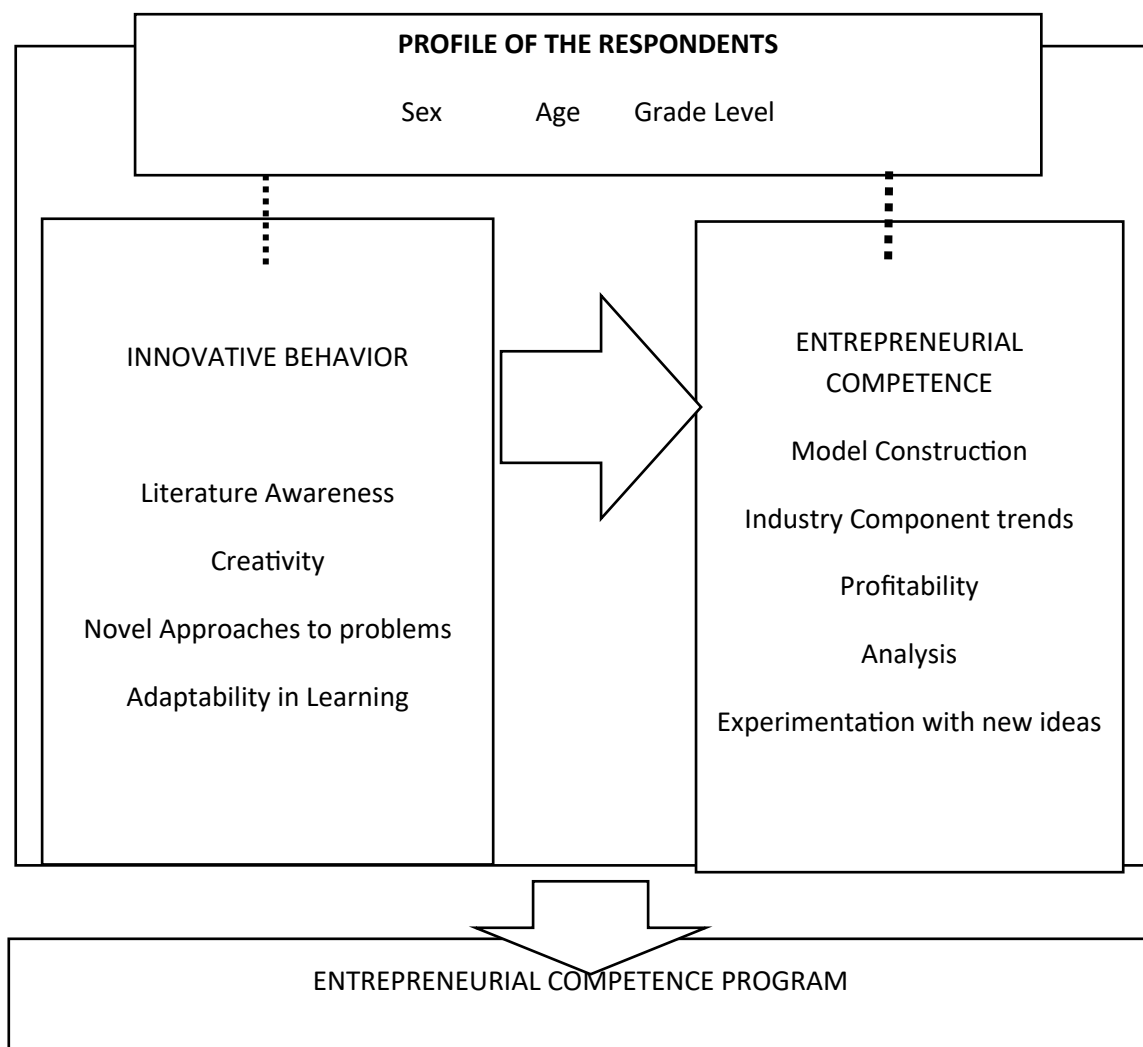


Figure 1: Research Paradigm

The core focus of this study is to understand the overall level of college students' innovative behavior and entrepreneurial abilities. Firstly, it examines the integration level of input factors such as contour variables, college students' innovative behavior, and entrepreneurial abilities. Then, a questionnaire survey will be conducted to evaluate the degree of college students' related indicators, utilizing SPSS software to analyze the differences and correlations in the data. This approach aims to comprehend the real situation of Chinese college students' innovative behavior and entrepreneurial abilities, providing a reference for further cultivation of these skills.

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Statement of the Problem

This study aims to assess the relationship between innovative behavior and entrepreneurial competence of college students at Hubei Polytechnic Institute.

Specifically, this study will answer the following questions:

1. What is the profile of the respondents in terms of:
 - 1.1 Age
 - 1.2 Gender
 - 1.3 Year Level
2. What is the assessment of the college students as regards their innovative behavior in terms of:
 - 2.1 literature awareness
 - 2.2 creativity
 - 2.3 novel approaches to problems
 - 2.4 adaptability in learning
3. Is there a significant difference in the assessment among the college students as regards their innovative behavior when their profile is taken as test factor?
4. What is the assessment of the college students as regards their entrepreneurial competence in terms of:
 - 4.1 Model construction
 - 4.2 Industry component trends
 - 4.3 Profitability Analysis
 - 4.4 Experimentation with new ideas
5. Is there a significant difference in the assessment among the college students as regards their entrepreneurial competence when their profile is taken as a test factor?
6. Is there a significant relationship between innovative behavior and entrepreneurial competence?
7. Based on the findings of the study, what are innovative measures can be incorporated to craft an entrepreneurial competence program?

Hypotheses

The following hypotheses will be tested in this study at 5%:

H01. There is no significance difference in the assessment among the college students as regards their innovative behavior when their profile is taken as test factor.

H02. There is no significant difference in the assessment among the college students as regards their entrepreneurial competence when their profile is taken as a test factor.

H03. There is no significant relationship between innovative behavior and entrepreneurial competence.

Significance of the Study

The research will be beneficial to the following:

College Students: The results of the study helped them understand how to cultivate and enhance their innovative behaviors and entrepreneurial competencies.

School Administrators: The research provided valuable information that assisted them in comprehending the needs of students regarding innovation and entrepreneurship. They utilized this information to adjust school policies and allocate resources accordingly. This

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optimization of the school environment fostered a more conducive atmosphere for nurturing students' innovative and entrepreneurial abilities.

College Teachers: Understanding the students' capabilities and needs in innovation and entrepreneurship enabled teachers to modify their teaching methods and content to better meet these needs. They leveraged the information from the study to enhance their teaching effectiveness and to cultivate a spirit of innovation and entrepreneurship among the students.

Curriculum Planners: The data and insights from the study assisted curriculum planners in designing and optimizing course content to cultivate students' innovative behaviors and entrepreneurial competencies more effectively.

Future Researchers: The study laid a foundation and direction for future academic research, helping them delve deeper into the innovative behaviors and entrepreneurial competencies of college students. Future researchers could build upon this study to explore how these abilities interact with other skills and traits of students and how to cultivate these abilities more effectively.

Scope and Delimitation of Study

This study focuses on the innovative behavior and entrepreneurial competence of college students, with the ultimate goal of improving students' innovation and entrepreneurship ability. Respondents for this study will be the Hubei Polytechnic college students who are on studying or internship.

Definition of Terms

The following terms are defined operationally for this study:

Adaptability In Learning: Adaptability in Learning reflects the capacity of students to tailor their learning approaches to accommodate evolving circumstances and challenges, a critical skill for keeping abreast of changes in innovation and entrepreneurship. This research assesses students' flexibility and resilience in learning, vital for their ongoing development and preparation for the fluctuating demands of the professional world.

College Students: College students are engaged in acquiring specialized knowledge and skills at higher education institutions, focusing on intellectual growth and social responsibility to prepare for future career and civic roles.

Creativity : Creativity is identified as the capacity of college students to generate novel and valuable ideas within innovation and entrepreneurship, involving risk-taking and connecting disparate concepts. It is a critical dimension for assessing students' potential to innovate and create unique business solutions, guiding educational enhancements to foster their creative skills.

Entrepreneurship: Entrepreneurship involves the creation of new ventures through innovative thinking and resourcefulness, facing uncertainty and risk to fulfill market needs and drive economic growth.

Experimentation With New Ideas : Experimentation with New Ideas encapsulates college students' proactive engagement in testing innovative concepts and learning from the results, crucial for practical problem-solving and innovation. Assessing this experimentation is vital in understanding students' abilities to apply theoretical knowledge to real-world scenarios and enhance their entrepreneurial skills.

Innovation: Innovation is the introduction of new ideas, methods, or products across various domains, crucial for societal development and characterized by creative problem-solving and continuous improvement. It requires a supportive environment to thrive and plays

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a key role in economic growth, quality of life, and sustainable development by encouraging adaptation to change.

Literature Awareness : Literature Awareness in this study pertains to an individual's grasp of existing research, including historical developments and current trends in the context of innovation and entrepreneurship. It is used as a metric to evaluate college students' innovative behavior by examining their ability to access, comprehend, and apply scholarly literature.

Model Construction : Model Construction is a critical skill for students in developing systematic frameworks to simplify complex entrepreneurial situations and inform decision-making. Industry Component Trends involve recognizing and understanding evolving factors within an industry, key to guiding strategic entrepreneurial actions and innovations.

Novel Approaches To Problems : The capability of college students to employ Novel Approaches to Problems refers to their use of innovative and unorthodox strategies in solving challenges within the realms of innovation and entrepreneurship. Assessing this skill is essential to gauge their creative problem-solving aptitude and readiness to adopt new solutions, which is fundamental to enhancing their innovative and entrepreneurial competencies.

Profitability Analysis : Profitability Analysis is a key measure for determining the financial health and return potential of entrepreneurial ventures, requiring a deep dive into revenue, costs, and profit margins. This skill is central in assessing students' entrepreneurial abilities, ensuring they can make data-driven decisions and sustain successful business operations.

METHODOLOGY

This describes the research design and methodology. It also presents the description of the study locale and participants, the data collection instruments and procedure, and the data analysis.

Research Design

This study will employ a quantitative research approach. Specifically, it will utilize a descriptive comparative correlational research design, which the researcher considers as appropriate as it pertains to the assessment overview variables of college students' innovation and entrepreneurship. The study aims to assess the relationship between the innovative behavior and entrepreneurial competence of college students with the results serving as a reference for relevant output. A survey method will be employed, using a modified questionnaire as the tool for collecting participants' information. The descriptive design will be considered as the most suitable for this study because compared with other survey methods, it is the most extensive and inclusive tool.

Research Locale

The study will be done in Hubei Polytechnic Institute in Hubei Province, China. Hubei Polytechnic Institute was founded in 1951, It is a national high-quality specialist higher vocational college, a construction unit of the national "Double High Program", a national model higher vocational college, and a national demonstration base for training high-skilled talents.

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The school covers an area of 1,574 mu, and the building area of the school building is 648,000 square meters. There are 867 full-time teachers, including 297 teachers with associate senior titles and above. There are more than 18,000 full-time regular junior college students.

The school has 867 full-time teachers, including 297 teachers with associate senior titles and above, 5 experts enjoying State Council subsidies, 6 young and middle-aged experts with outstanding contributions in Hubei Province, 4 provincial labor models, and national higher vocational teaching guidance. There are 7 experts in the committee, 4 evaluation experts in higher vocational colleges from the Ministry of Education, 1 famous teacher from Hubei Province, 28 famous teachers from Chutian Skills, and more than 100 visiting professors.

Sample and Sampling Technique

The study will select college students from Hubei Polytechnic Institute in Hubei Province, China. The target sample size for this study will consist of at least 377 college students from 18,000 college student population who are actively participating in employment and innovation training courses offered by Hubei Polytechnic Institute in Hubei Province, China.

The researcher will choose at least 377 using the Qualtrics Calculator from 18,000 at 5% margin of error with 95% level of confidence. After data collection will be completed, the data will be organized and subsequently translated into English. The study will employ a random sampling method to select research participants.

Research Instruments

This study will employ two research tools. One will be a questionnaire survey website. The second tool will be SPSS software. The researcher will collect the data obtained in the study, conduct statistical analysis, and then import it into SPSS software for correlation analysis. The results of this study will provide crucial data support.

The first questionnaire will be titled "Survey on the Integration of Innovative Entrepreneurial Competence among Chinese Vocational college Students."

This study will employ a combined approach of quantitative and qualitative research methods, which will include the following specific methods.

Data Gathering Procedure

The researcher will request approval from the president to collect the relevant data needed for the institute. With the approval of the president, the researcher will work with teachers at Hubei Polytechnic Institute in Hubei Province, China. The researcher will administer the questionnaire for the student participants through the Questionnaire.

Data Analysis Procedure

The relevant data needed in this paper will be obtained using the SPSS software using the following statistical treatment.

1. Weighted mean

This will be used in the study to determine the average rating of college students in terms of their innovative behavior and entrepreneurial competence.

2. Frequency and Percentage

This will be used in the study to determine the level of distribution of respondents' basic conditions.

3. Standard deviation

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Scales will be used to measure the innovative behavior and entrepreneurial competence of the student-respondents with statistical differences in each factor.

4. Analysis of variance

This will be used to determine the significant differences between respondents in terms of innovative behavior and entrepreneurial competence when they will be grouped by age, gender and grade level.

5. Pearson's Product Moment of Correlation

This test will be conducted to determine the relationship between respondents' perceptions of their innovative behavior and entrepreneurial competence.

6. Descriptive Equivalent

The data that will be collected from the respondents will be assigned a weight of 1-4, with 1 being the lowest value and 4 being the highest value, to quantitatively measure the relationship between the innovative behavior and entrepreneurial competence of college students in the locale of the study.

The scales that will be used to measure entrepreneurial competence and innovative behavior of college students are as follows.

Scale	Value	Verbal Interpretation
4.00	4	Strongly Agree/Very High Level
3.50	3	Agree/High Level
2.50	2	Disagree/Moderate Level
1.50	1	Strongly Disagree/Low level

Ethical Considerations

Relevant research organizations such as ethics committees work to promote ethical conduct in scientific research. This is not something that should be paid attention to after the fact, but how to supplement relevant matters should be paid attention to during the research process.

It is an integral aspect of research that needs to remain at the very heart of our work.

(1) legality

Using the knowledge of the academic committee of **Hubei Polytechnic Institute**, the current situation of Chinese college students' innovation and entrepreneurship competence and the model construction are studied. Therefore, the method to be adopted in this study is mainly based on the questionnaire survey method, which can well investigate the practical problems existing in the process of innovation and entrepreneurship of college students. This study provides a theoretical basis for improving college students' innovation and entrepreneurship and personal development.

(2) Voluntary participation and consent

Prior to the questionnaire, this study was first conducted by the Emilio Aguinaldo College community. Before studying the relevant students in Hubei Province, they should explain to the relevant subjects, so that the subject can understand the main content of this study and voluntarily participate in the survey, do not participate in the research process, and

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gain trust through any persuasion or deception. The informed consent form states that individuals must explicitly consent to participate in the study.

(3) Sampling

The study sampling method is random sampling to investigate college students from Hubei Polytechnic Institute in Hubei Province, China.

(4) Confidentiality

The third ethical principle of the Social Research Council (ESRC) is: "The information provided by the subjects must be confidential and the anonymity of the respondents must be protected." However, sometimes confidentiality is limited. For example, if participants are at risk of doing harm, we have a responsibility to protect them. This may require us to disclose confidential information. There is a risk of harm, and we should do everything we can to protect the study participants. To do this, we need to focus on the risk-benefit ratio. If the possible risks outweigh the benefits, then we should abandon or redo the study design. The risk of harm also requires us to consider the risk-benefit ratio when conducting the study.

(5) Application for ethics approval

Application for ethical approval varies from institution to institution. Either way, they will focus on the benefits of the study and the risk rewards associated with the participants. So you need to address both issues effectively before gaining approval.

(6) Participants

It is important that individuals be clearly and sufficiently informed so that they can make an informed decision about participation. In addition, you need to explain the ethical issues involved, the risk of harm and related confidentiality if you agree.

(7) Benefits brought by the research

Before the official launch of this study, the expert group demonstrated that this study could promote the behavior of continuing teachers in Hubei Polytechnic Institute in Hubei Province, China based on the behavior planning theory, and the results of this study can enrich and promote the improved effect of continuing education. The study will be conducted in a way that ensures the quality and ethical integrity of the results. The results will be published in a reasonable manner. The research purpose is clear and the method is appropriate

(8) Moral Integrity

Ethical integrity and transparency are essential to the research we conduct. Throughout the course of my work, my research has been free from any actual or potential conflicts of interest. In addition, throughout the approval process and research process, my research and I will always abide by the principles of ethical integrity and transparency.

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