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A Study on the College Students' Entrepreneurial Ability in China

Ni Wen[1] & Songsak Phusee-orn[1]

[1] Faculty of Education, Mahasarakham University, Mahasarakham, Thailand

Correspondence: Songsak Phusee-orn, Faculty of Education, Mahasarakham University, Mahasarakham, Thailand. Tel: 66-087-872-7151. E-mail: songsak.p@msu.ac.th

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Abstract

This study aimed to evaluate the entrepreneurial ability of college students in China. According to the results of the evaluation, the causes of the problems were analyzed, and some suggestions for the reform of the instructional model of entrepreneurship education in China were given. The samples were 608 students in faculty of Entrepreneurship for the Spring 2024 semester. of Sichuan Tourism University, and a total of 570 valid questionnaires were collected. The instrument was Entrepreneurship Evaluation Form. The study was conducted quantitative and qualitative method. The Fuzzy Synthetic Evaluation method was used to obtain the overall evaluation results of college students in China. The results show that college students in China have a high psychological quality and certain motivation for entrepreneurship, but they still need to improve their entrepreneurial skills and knowledge. Based on the results, it shows that the traditional instructional model is no longer suitable for entrepreneurship education. Since entrepreneurship is very practical and situational. When designing the instructional model, we should combine the theory of constructionism and the theory of situational cognition, so that students can go out of the classroom in a practical way and experience the real interaction in the process of entrepreneurship.

Keywords: Entrepreneurship ability, Fuzzy Synthetic Evaluation method, Instructional model, Constructionism, Situated learning

1. Introduction

Entrepreneurship Education was first proposed by Harvard Business School in the 1950s.According to a document issued by the Ministry of Education of China called Basic Requirements for Entrepreneurship Education and Teaching in Ordinary Undergraduate Schools, the teaching content of Entrepreneurship Education is based on entrepreneurial knowledge, and the key is to exercise the entrepreneurial ability. Through Entrepreneurship Education, students can understand the basic knowledge and theories of entrepreneurship, learn the basic processes and methods of entrepreneurship, understand the laws and regulations and related policies of entrepreneurship, and stimulate the awareness of entrepreneurship. Entrepreneurial ability can effectively help students to start their own businesses and find jobs. According to the GEM2016 / 2017 report, 29.8% of Chinese entrepreneurs think they have the ability to start a business, which is far from the global average of 44.86%.

The evaluation of entrepreneurial ability is a subjective evaluation, because there is no clear boundary between "high" and "not high". Ability includes how to understand the knowledge, the processes, the methods, and skills. Entrepreneurial ability is very key to entrepreneurial success. Scholars began to conduct research on entrepreneurial ability at the end of the 20th century, and then many scholars began to pay attention to and study entrepreneurial ability. The tacit knowledge and key skills of the entrepreneurial subject can be called entrepreneurial ability. Entrepreneurial ability is the personal characteristic of the individual, including personal knowledge and skills（Man, 2002). Entrepreneurial ability is equivalent to their characteristics, including personal traits, risk bearing capacity, perseverance, Subject knowledge, attitude, entrepreneurial motivation, self-image, social role, and talent. Entrepreneurial ability is centered on intelligence with higher comprehension and creativity, it can successfully achieve entrepreneurial goals (Shen, 2002). The entrepreneurial ability of university students has four aspects: 1) Basic entrepreneurial ability, such as entrepreneurial knowledge and practical ability. 2) Core entrepreneurial ability, such as innovation and leadership and resource integration and opportunity grasp. 3) Entrepreneurial personality, such as perseverance confidence, and steadiness. 4) Social skills, such as interpersonal communication and teamwork skills (Jin, 2016). Entrepreneurial ability can be divided into four dimensions: 1) Personal characteristics 2) knowledge, skills, and opportunity development

ability, 3) Management and operation ability 4) Team collaboration ability (Liu, 2017). Entrepreneurial ability also can be divided into entrepreneurial knowledge, opportunity identification ability, achievement transformation ability, and resource integration ability (Song, 2022). Therefore, entrepreneurship is a concept with fuzzy characteristics. In view of this fuzzy characteristic, it is a practical method to choose the fuzzy synthetic evaluation method to evaluate it. Evaluation of college students' entrepreneurial ability and its influencing factors have become a new hot spot in entrepreneurship education research. Although "some studies have explored the key influencing factors of entrepreneurial ability for general entrepreneurs, and how these factors affect the generation and improvement of entrepreneurial ability", college students are different from general entrepreneurs and have their own uniqueness. Therefore, this study uses Entrepreneurship Evaluation Form made by Zhang Haiyan to select 608 students' data to evaluate the development level of college students' entrepreneurial ability, and puts forward suggestions for the teaching mode of college entrepreneurship education.

The researchers used Zhang Haiyan to compile the college students' entrepreneurial ability assessment form. Using a combination of quantitative and qualitative research methods, 608 people were randomly selected for a questionnaire survey to study the entrepreneurial ability level of college students. Through the questionnaire survey, the problems of college students' entrepreneurial ability were found. By analyzing the causes of the problem of entrepreneurship, this paper explores what is the appropriate theory for the development of entrepreneurship education instructional model.

2. Methodology

2.1 Samples

The samples were 570 students in the faculty of Entrepreneurship for the Spring 2024 semester. Random sampling was employed in participant selection.

2.2 Instruments

In this study, the "Entrepreneurship Ability Evaluation Form" created by Chinese scholar Zhang Haiyan. She invited 10 successful entrepreneurs and entrepreneurship education experts to evaluate the importance of each indicator and calculated the weights of the entrepreneurship evaluation index system through MATLAB (Table 1).

In this research, the Cronbach's Alpha coefficient of the overall scale of this study was 0.962 and the KMO values were 0.961, and the chi-square value of Bartlett's spherical test was 12766.786, $P<0.05$. Scale had good structural validity and reliability.

2.3 Data Collection

The researchers conducted a 15-day questionnaire survey on the entrepreneurial ability of college students at Sichuan Tourism University. The questionnaire was distributed to students through an online link, and a total of 608 questionnaires were received. The selection criteria for the questionnaire are as follows: the response time is less than 30 seconds (including 30 seconds) and the full score of the questionnaire will be screened. After data screening, 570 valid questionnaires were obtained. Response rate of the questionnaire was 93.75%.

2.4 Data Analysis

This study was conducted using a combination of quantitative and qualitative methods. The statistical data of college students' entrepreneurial ability in China were analyzed as a fuzzy synthetic evaluation matrix.

2.4.1 Evaluation Indicators

$U=\{U_1, U_2, U_3\}$. U is the evaluation index of entrepreneurial ability, U_1 is Personal traits, U_2 is entrepreneurial skills, and U_3 is entrepreneurial knowledge.

$U_1=\{U_{11}, U_{12}, U_{13}\}$, U_{11} is the sense of innovation, U_{12} is the motivation of entrepreneurship, and U_{13} is the psychological quality. $U_{11}=\{U_{111}, U_{112}, U_{113}\}$, U_{111} is spirit of adventure, U_{112} is the reform willingness, U_{113} is the spirit of questioning; $U_{12}=\{U_{121}, U_{122}, U_{123}, U_{124}\}$, U_{121} is the entrepreneurial intention, U_{122} is the career-mind, U_{123} is the sense of achievability, U_{124} is self-confidence; $U_{13}=\{U_{131}, U_{132}, U_{133}\}$, U_{131} is credibility and integrity, U_{132} is psychokinesis, U_{133} is responsibility.

$U_2=\{U_{21}, U_{22}, U_{23}, U_{24}\}$, U_{21} is the ability to explore opportunities, U_{22} is the ability to integrate resources, U_{23} is the ability to build and lead teams, and U_{24} is the ability to conduct scientific research. $U_{21}=\{U_{211}, U_{212}\}$, U_{211} is opportunity identification and U_{212} is opportunity evaluation, $U_{22}=\{U_{221}, U_{222}\}$, U_{221} is resource identification and U_{222} is resource use, and $U_{23}=\{U_{231}, U_{232}, U_{233}\}$, U_{231} is communication, U_{231} is leadership, and U_{233} is

decision-making. U_{24}= {U_{241}, U_{242}, U_{243}}, U_{241} is the ability to identify problems, U_{242} is the ability to analyze data, and U_{243} is the ability to think creatively.

U_3= {U_{31}, U_{32}}, U_{31} is industry knowledge and U_{32} is legal policy knowledge. U_{31}= {U_{311}, U_{312}, U_{313}}, U_{311} is knowledge of enterprise management, U_{312} is knowledge of entrepreneurial industry domains, and U_{313} is knowledge of company creation and operation. U_{32}= {U_{321}, U_{322}}, U_{321} is legal knowledge, U_{322} is entrepreneurial policy knowledge.

2.4.2 Determine the Review

Determine the evaluation factors and establish a collection of comments. The evaluation index set is U= {B_1,B_2,B_3}. V={V_1,V_2,V_3,V_4,V_5}, V_1 is very non-compliant, V_2 is non-compliant, V_3 is average, V_4 is compliant, and V_5 is very compliant.

Based on matrices B_{i1}-B_{ij}, the relationship matrix of the fuzzy comprehensive evaluation was determined.

Establish a fuzzy evaluation relationship matrix R according to B_1, B_2, B_3.

Fuzzy evaluation matrix:

$$R_{ij} = \begin{pmatrix} R_{ij1} \\ R_{ij2} \\ \vdots \\ R_{ijl} \end{pmatrix} = \begin{pmatrix} r_{ij11} & r_{ij12} & \cdots & r_{ij1m} \\ r_{ij21} & r_{ij22} & \cdots & r_{ij2m} \\ \cdots & \cdots & \cdots & \cdots \\ r_{ijl1} & r_{ijl2} & \cdots & r_{ijlm} \end{pmatrix}$$

The fuzzy synthesis operation:

$$B_{ij} = A_{ij} \times R_{ij}$$

B_{ij}—One-way fuzzy evaluation

A_{ij}—Factor weights

R_{ij}—Evaluation matri

According to 50 points for very disagreeable, 60 points for non-conformity, generally 70 points, 80 points for conformity, and 90 points for very much agreement, the score of college students' entrepreneurial ability is obtained. Set a score of 80 and above as Good, 70-80 as Medium, and 60-70 as Pass.

3. Results

Table 1. Participants' Entrepreneurship ability

Level 1	Level 2	Level 3	V_1	V_2	V_3	V_4	V_5	S
Traits A_1=0.34	Innovation A_{11}= 0.32	Adventurous A_{111}=0.30	0.030	0.057	0.493	0.311	0.107	73.07
		Willingness to reform A_{112}=0.16	0.025	0.047	0.512	0.319	0.097	
		Spirit of question A_{113}=0.54	0.026	0.102	0.546	0.268	0.058	
	Entrepreneurial motivation A_{12}=0.53	Entrepreneurial desire A_{121}=0.45	0.028	0.083	0.491	0.291	0.107	75.78
		Enterprise A_{122}=0.29	0.012	0.030	0.365	0.402	0.191	
		A sense of accomplishment A_{123}=0.15	0.009	0.011	0.293	0.451	0.237	
		Self-assurance A_{124}=0.11	0.016	0.035	0.416	0.393	0.140	
	Psychological qualities A_{13}= 0.15	Integrity A_{131}=0.34	0.012	0.018	0.335	0.404	0.232	76.57
		willpower A_{132}=0.39	0.01	0.046	0.472	0.349	0.114	
		Responsibility A_{133}=0.27	0.009	0.030	0.384	0.425	0.153	
Skills A_2=0.50	Opportunity discovery A_{21}=0.22	Opportunity identification A_{211}=0.53	0.012	0.049	0.491	0.340	0.107	72.97
		Opportunity evaluation A_{212}=0.47	0.032	0.154	0.514	0.244	0.051	
	Resource integration A_{22}=0.28	Resource identification A_{221}=0.56	0.021	0.074	0.516	0.316	0.074	73.37
		Resource usage A_{222}=0.44	0.023	0.061	0.556	0.288	0.072	
	Team building and leadership A_{23}=0.35	communication A_{231}=0.21	0.019	0.079	0.523	0.305	0.074	72.90
		leadership A_{232}=0.34	0.023	0.084	0.574	0.260	0.060	
		Decision-making A_{233}=0.45	0.018	0.065	0.577	0.281	0.060	
	Scientific research capabilities A_{24}=0.15	Problem identification A_{241}=0.17	0.023	0.061	0.579	0.275	0.061	72.15
		Data analysis A_{242}=0.36	0.025	0.083	0.573	0.260	0.056	
		Creatively Thinking A_{243}=0.47	0.021	0.104	0.584	0.246	0.046	
Knowledge A_3=0.16	Expertise A_{31}=0.67	Knowledge of business management A_{311}=0.34	0.044	0.146	0.546	0.226	0.039	70.53
		Domain knowledge of the entrepreneurial industry A_{312}=0.50	0.039	0.158	0.544	0.216	0.044	
		Knowledge of the establishment and operation of the company A_{313}=0.16	0.061	0.186	0.523	0.190	0.040	
	Legal Policy	Legal knowledge A_{321}=0.43	0.056	0.167	0.554	0.184	0.039	69.8

A_{32}=0.33	Knowledge of entrepreneurship policy A_{322}=0.57	0.054	0.174	0.551	0.183	0.039

Note. S= Score.

The weight vectors of the criterion layer factors are extracted from Table 1: *A= (0.34, 0.50, 0.16)*, and the comprehensive evaluation is calculated.

$$B=A*R=(0.34,\ 0.50,\ 0.16)\begin{pmatrix}0.021 & 0.057 & 0.449 & 0.341 & 0.132\\ 0.021 & 0.080 & 0.544 & 0.286 & 0.068\\ 0.048 & 0.162 & 0.545 & 0.205 & 0.041\end{pmatrix}$$

$$=(0.025\ 0.086\ 0.512\ 0.292\ 0.085)$$

According to 50 points for very disagreeable, 60 points for non-conformity, generally 70 points, 80 points for conformity, and 90 points for very much agreement, the score of college students' entrepreneurial ability is obtained. Set a score of 80 and above as Good, 70-80 as Medium, and 60-70 as Pass. Scores are presented in Table 2.

Table 2. Score of college students' entrepreneurial ability

	V_1	V_2	V_3	V_4	V_5	Score	Level
Entrepreneurial ability	0.025	0.086	0.512	0.292	0.085	73.22	Medium
Entrepreneurial traits	0.021	0.057	0.449	0.341	0.132	75.03	Medium
Entrepreneurial skills	0.021	0.080	0.544	0.286	0.068	72.93	Medium
Entrepreneurial knowledge	0.048	0.162	0.545	0.205	0.041	70.27	Medium

It can be seen from Table 2 that the entrepreneurial ability of college students in China is Medium. The score of entrepreneurial trait was highest, followed by entrepreneurial skills, and the score of entrepreneurial knowledge was the lowest. It shows that the students have a relatively strong sense and interest in entrepreneurship. Students aspire to success and have the passion, dreams and adventurous spirit to start a business. At the same time, they are responsible and willful. Students lack opportunities to explore their abilities and cannot integrate their own resources well. Students lack leadership, decision-making and communication skills. Students lack knowledge of business management and do not know much about the legal and policy knowledge required for entrepreneurship.

4. Discussion

4.1 Analysis of the Entrepreneurial Ability of College Students in China

4.1.1 Entrepreneurial Traits are Deficient

Personal goals, desires, and motivations all influence and shape entrepreneurial ability (Lans.et al, 2010). As can be seen from Table 1, the total score of entrepreneurial traits is 75.03, which is higher than the total score of entrepreneurial ability. Students have certain psychological characteristics required for entrepreneurship, and have the intention to start a business and the spirit of daring to question. Among them, the score of psychological quality is the highest, indicating that students have a strong sense of responsibility, pay attention to integrity, and have a strong will. This is a must for successful entrepreneurs. La. Chman found that college students with entrepreneurial qualities such as self-control and self-confidence were more willing to engage in entrepreneurial activities. Krueger et al. argue that there are many key factors that influence entrepreneurs' choice to start a business, one of which is the perception of the individual, that is, the perception of self-efficacy. Generally speaking, the more confident an entrepreneur is in himself/herself, the greater the probability of entrepreneurial success.

The score of entrepreneurial motivation is higher, indicating that students have the desire to start a business and are eager to have their own business. Score of innovation is lower, indicating that students still lack a certain sense of risk-taking and questioning, and their willingness to reform is not particularly high.

On the one hand, students hope to realize their entrepreneurial dreams, but on the other hand, they are not firm in their hearts, afraid of entrepreneurial failure, and their willpower is not strong enough. Most students have a limited understanding of entrepreneurship and understand entrepreneurship as a business and social practice. In fact, entrepreneurship involves many aspects such as marketing, human resource management, finance and

taxation. In addition, students are not able to plan activities or tasks scientifically. Due to the lack of certain experience, they often ignore market research and cannot accurately grasp the market direction and identify social needs.

4.1.2 Entrepreneurship Skills are Lacking

The overall score for entrepreneurial skills is low. In the evaluation index system of entrepreneurial ability, entrepreneurial skills account for the highest weight. Entrepreneurial skills occupy a fairly important place in entrepreneurial ability. The lowest score on the ability to identify and evaluate entrepreneurial opportunities indicates that students are not able to identify and evaluate entrepreneurial opportunities well. Students' resource integration, team building, and leadership skills also need to be improved. Students should objectively assess their own entrepreneurial ability and explore other ways to accumulate entrepreneurial ability, such as accumulating network resources through practical activities. It is agreed that the application of games and other activity-based tools in the classroom promotes collaboration, interaction, and active learning (Reuben, 1999). In an interactive and participatory classroom, students are able to demonstrate more advanced problem-solving skills (Hake, 1998).

4.1.3 Lack of Entrepreneurial Knowledge

The lowest score in entrepreneurial knowledge indicates that students do not have an understanding of the basics of business management and law. The majority of respondents also reported that they did not know much about the industry expertise they were interested in. Therefore, the cultivation of subject expertise should be strengthened. And subject matter expertise should keep pace with the times and make necessary adjustments with the changing times and changing needs. College students usually have strong practical skills and should not be confined to the classroom. Teachers should be student-centered and help students build subject knowledge.

4.2 What is the Suitable Theory for Developing the Instructional Model of Entrepreneurship ability Teaching?

4.2.1 Constructionism

Entrepreneurship is highly practical. Entrepreneurship education emphasizes students' ability to identify opportunities, the operational ability of enterprises and the ability to deal with crises, which can not be solved by traditional instructional models.

According to the survey results of this study, the students who have participated in the entrepreneurial activities organized by the school have higher entrepreneurial ability than those who do not participate in the entrepreneurial activities. Entrepreneurial experience has a significant impact on the formation and promotion of entrepreneurs' entrepreneurial ability (Rasmussen, 2010). The core view of constructionism holds that knowledge is constructed, not taught. The basic assumption is that people are active learners and must construct knowledge for themselves. Therefore, learning is defined by constructionism theorists as a meaning construction process realized through collaborative activities between people in the socio-cultural context. In the learning process, teachers create an environment suitable for students to actively construct. Through the learning materials provided by teachers and the learning materials prepared by themselves, through the cooperation between students and students and students, students and teachers, they exchange their feelings and gains, and finally achieve the purpose of meaning construction. Xu Xiaozhou built an entrepreneurial learning community based on entrepreneurial experience learning and constructionism, so as to achieve the goal of improving entrepreneurial attitude, improving entrepreneurial knowledge and enhancing entrepreneurial skills.

Constructionism also has its shortcomings. It emphasizes too much on the role of direct experience on students' cognitive results, thus ignoring the learning of indirect experience and book theoretical knowledge. Constructionism often has a better teaching effect for the subjects with poor structure, but for the subjects with a very careful structure, the effect is not necessarily obvious. That is to say, the constructionism theory is not necessarily suitable for the teaching paradigm of all situations, and only those suitable for the characteristics of the teaching objects can achieve the best teaching effect.

4.2.2 Situated Learning

The entrepreneurship instructional model needs to have certain scenarios, such as social environment and market changes. Harrison In his classic book "Interactive Research on Entrepreneurship Learning and Entrepreneurship Situation", etc., he introduced the concept of entrepreneurship situation and proposed that entrepreneurship situation is an important factor affecting the theory of entrepreneurship learning. Contextual learning is a socio-cultural phenomenon, and learning is produced in specific situations, including the social and natural environment. Contextual learning aims to transfer learning that may occur in the classroom to real scenarios and put students in a specific context. The key feature of adopting situational learning in teaching is to provide real

situations (Herrington, 1995). Real environments are not only limited to outdoor learning activities (Brown, 1989). Conversely, if indoor learning activities can bring the same effect as outdoor learning activities, then it can also be seen as a real context. Situational learning can make students in a real and easy to immerse themselves in the learning environment, helps students learn how to build connections between knowledge and existing experiences and cognitive structures, and promote the continuous development of learners' cognition. Learning situations will enable learners to actively participate in complex, real, problem-centered activities to support the acquisition of required knowledge. In a learning environment close to the reality, students can practice and apply the knowledge they learn, eventually linking prior knowledge with newly acquired knowledge and further apply it to the real world. Teachers can combine theoretical concepts and principles with specific situations, establish a two-way interactive learning model with students, and extensively carry out heuristic, discussion and participatory teaching methods.

5. Conclusion and Study Limitations

5.1 Entrepreneurial Ability of College Students in China

In this study, using fuzzy comprehensive evaluation method, the results show that the entrepreneurial ability of college students in China is at the middle level of 73.22. Students have a high psychological quality required for entrepreneurship, and have a certain entrepreneurial motivation, but their entrepreneurial skills and entrepreneurial knowledge still need to be greatly improved. It is concluded that men have more entrepreneurial ability than women; Students who have taken entrepreneurship courses and have not taken entrepreneurship courses have higher entrepreneurial ability, and their entrepreneurial ability who have participated in entrepreneurship activities is significantly higher than those who have not participated in entrepreneurial activities.

5.2 What is the Applicable Theory of Developing Entrepreneurship ability Teaching Model?

Due to its strong practical and situational entrepreneurship, the traditional entrepreneurship education and instructional model can not meet the educational needs. When designing the instructional model, we should focus on how to get students out of the classroom through practice and experience the real feedback from stakeholders in the process of entrepreneurship.

Constructionism is based on entrepreneurial personality traits, entrepreneurial ability and entrepreneurial knowledge, and students can participate in the process of entrepreneurship education through internal learning, practice and reflection, so that students can participate in the process of learning environment construction and the improvement of their own entrepreneurial ability.

Scene cognition theory can enable students to identify with the role identity, truly participate in entrepreneurial actions, and acquire knowledge in entrepreneurial actions. Through social practice, simulation experiment, entrepreneurial project exercise and other ways, students can improve students' innovation and entrepreneurship ability in practical situations, and provide students with opportunities to apply theory to real situations.

5.3 Limitations

Due to the limitations of my research level and objective conditions, there are still many deficiencies in this study. Only one school was investigated in this study, and there may be circumstances where it may not be applicable to other schools. In addition, how to construct a more authoritative and comprehensive evaluation system for talent entrepreneurship and how to use it correctly is the future research direction.

6. Research Recommendations

This study points out potential areas for future research. It affirms the value of research and calls for continued intensive research to address legacy issues or expand the scope of knowledge. By making suggestions, the article aims to provide direction for future research work and contribute to the development of the field.

1. Longitudinal study: Carry out longitudinal research to build a more authoritative and comprehensive entrepreneurial ability evaluation system.

2.Develop the instructional model：Develop the instructional model for entrepreneurial ability teaching to identify best practices for improving entrepreneurship.

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Authors contributions

Ni Wen was responsible for study design and responsible for data collection. Prof. Songsak Phusee‑orn revised the manuscript. All authors read and approved the final manuscript.

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No additional data are available.

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