

Research on Mechanisms for Cultivating Innovation and Entrepreneurship Abilities of Medical Graduate Students in the Context of Innovation and Entrepreneurship Competitions: A Case Study of Youjiang Medical University for Nationalities

Ningguì Duan¹, Tingjiang Pan^{2*}

¹*School of Public Health and Management, Youjiang Medical University for Nationalities, Baise, 533000, China*

²*School of Language and Culture, Youjiang Medical University for Nationalities, Baise, 533000, China*

382512480@qq.com

**corresponding author*

Keywords: Medical Graduate Students, Innovation and Entrepreneurship Ability, Innovation and Entrepreneurship Competition

Abstract: The innovation and entrepreneurial ability of medical graduate students is an important indicator of their academic and creative prowess, contributing significantly to the overall scientific and technological development of the country. This paper, based on a literature review, takes the medical graduate students at Youjiang Medical University for Nationalities as an example to identify current issues and propose reform measures. The results indicate that the mechanism for cultivating innovation and entrepreneurship among graduate students has achieved certain effectiveness, promoting the development of their innovation and entrepreneurship abilities and the conversion capability of the school's scientific research.

1. Introduction

The "Internet Plus" College Student Innovation and Entrepreneurship Competition (hereafter referred to as the Innovation and Entrepreneurship Competition), jointly organized by twelve central ministries and commissions including the Ministry of Education, has rapidly become the most influential and prestigious national competition for college students since its inception in 2015

[1]. The performance in the competition has become a symbol of the scientific research and innovation strength of various universities and an important indicator for evaluating university performance. The competition aims to deepen the comprehensive reform of higher education, stimulate students' creativity, adhere to learning through competition, cultivate a new force for "mass entrepreneurship and innovation," and promote the growth of college students into talented individuals with both morality and ability by fostering wisdom and skills through innovation and entrepreneurship. The competition also promotes the transformation of competition results and the close integration of industry, academia, and research, facilitating the formation of new business formats under the "Internet Plus" model, serving the high-quality development of the economy, and striving to create a new situation where university graduates engage in higher quality entrepreneurship and employment. Therefore, in the new era where the country proposes the strategy of innovation-driven development and entrepreneurship-driven employment, the importance of cultivating innovation and entrepreneurship abilities among graduate students is becoming increasingly prominent.

This research holds certain theoretical and practical significance, demonstrating that it can promote the transformation of graduate research and serve society. Graduate students are currently the most highly educated talents in our country. They possess a pioneering and innovative spirit and profound scientific theoretical knowledge. How to transform the knowledge they possess into wealth? Entrepreneurship is the most ideal way of employment. Implementing innovation and entrepreneurship education for graduate students is an inherent requirement for the transformation of university concepts, a strategic need for national construction, and a practical need for alleviating the employment problems of graduate students [4]. Graduate students have the ability to engage in entrepreneurship through innovation in scientific projects and the transformation of achievements, thereby driving more graduates into employment. This is an inevitable choice for our country to cultivate competitive entrepreneurs [5]. On the other hand, it can guide graduate students in project design and implementation, enhancing their competitiveness in participating in the "Internet Plus" innovation and entrepreneurship competition. Innovation and entrepreneurship are not arbitrary subjective imagination and novelty but are rooted in the practical multidisciplinary, multi-technology, and multi-method process. Strengthening innovation and entrepreneurship education for graduate students, implementing scientific research results to serve social development, and achieving practical results are effective. Transforming the economic structure and building an innovative country are strategic measures to deepen the reform of higher education teaching [3]. Encouraging graduate students to participate in various innovation and entrepreneurship competitions to improve their competitiveness and play a leading role.

2. Literature Review

2.1 Overview of Foreign Research

Entrepreneurship education has been highly valued by developed Western countries for over half a century, with rich and diverse literature. Originating in the United States, entrepreneurship education has provided a template for other countries, with institutions like Massachusetts Institute of Technology (MIT), Stanford University, and Babson College being exemplary in the successful implementation of innovation and entrepreneurship education globally. Professor Jeffrey Timmons's work "New Venture Creation" serves as a framework and standard for entrepreneurship education in the United States and even worldwide [6]. Robinson's "Assessment Model of Innovation and Entrepreneurship Education in Major Universities in the United States" evaluates innovation and entrepreneurship education in major US universities from six perspectives. Compared with other

European universities, Cambridge University has more early European entrepreneurship education projects, with a tendency to offer entrepreneurship education courses to graduate students. It has successfully introduced the entrepreneurial spirit onto campus and pioneered systematic entrepreneurship courses [7].

At the end of the 1980s, UNESCO proposed the new educational concept of "entrepreneurship education" at a seminar on international education development trends for the 21st century. UNESCO requires higher education institutions to elevate entrepreneurial skills and entrepreneurial spirit to the same level of importance as academic research and vocational education [2]. Currently, over 600 renowned universities worldwide offer at least one course in entrepreneurship education for graduate students. In the United States alone, approximately 1100 colleges and universities offer graduate entrepreneurship courses, yielding significant results. Today, 95% of the wealth in the United States is created by the revolutionary "entrepreneurial generation" who received excellent entrepreneurship education after 1980. Graduate entrepreneurship education also plays a leading role in technological innovation in Japan. Studies in Japan indicate that half of the technological innovations in companies are accomplished by entrepreneurial small businesses. Foreign scholars such as Adrianna Kezar and Susan Elrod believe that interdisciplinary education enables graduate students to benefit from the integration of knowledge and methods from different disciplines and acquire relevant knowledge and skills. Zain S.M. and others point out that continuous innovation and 3R entrepreneurship provide opportunities and space for graduate entrepreneurship and sustainable development education. PR Gutierrez and SMS Caizares advocate using graduate teaching innovation to promote entrepreneurship innovation as the main business innovation [8].

2.2 Overview of Domestic Research

2.2.1 Research on Entrepreneurship Competitions

Entrepreneurship education in Chinese universities and graduate entrepreneurship activities started 15 years later than in the United States and are still in the exploratory stage of development. To some extent, entrepreneurship education in Chinese universities and graduate entrepreneurship activities imitate and replicate those in American universities. In 1998, Tsinghua University hosted China's earliest entrepreneurship plan competition. In 1999 and 2000, Tsinghua University and Shanghai Jiao Tong University respectively hosted the first and second "Challenge Cup" China College Students' Entrepreneurship Plan Competition. The successful hosting of the competition sparked a wave of innovation and entrepreneurship across the country's universities, leading to significant social impact. Since 1999, the Ministry of Education has led several entrepreneurship education seminars, and nine universities including Beihang University and Shanghai Jiao Tong University have been piloting entrepreneurship education comprehensively [2]. Currently, 130 universities nationwide have joined the China Industry-Education Cooperation Association and are conducting cooperation education in various forms. Peking University Founder Group, Tsinghua Tongfang, Fudan University Alps, and Jiangzhong Pharmaceuticals are exemplary cases of industry-education-research cooperation. It should be noted that entrepreneurship education and cooperative education complement each other. Cooperative education has relative advantages over entrepreneurship education in terms of time, breadth, depth, and theoretical framework, while entrepreneurship education injects vitality into cooperative education in terms of independent innovation [2]. The first "Internet Plus" Innovation and Entrepreneurship Competition was held in 2015 and gradually integrated and replaced some of the aforementioned entrepreneurship competitions, forming the largest, highest-level, and most influential entrepreneurship competition nationwide.

2.2.2 Research on Mechanisms for Cultivating Entrepreneurship among Graduate Students

Currently, universities in China are vigorously conducting innovation and entrepreneurship education [9]. However, most universities mainly target undergraduate students in their innovation and entrepreneurship education efforts, while the innovation and entrepreneurship education system for graduate students (including master's and doctoral students) has not received much attention, resulting in the absence of a mature system of innovation and entrepreneurship courses for graduate students [4]. At present, innovation and entrepreneurship education for graduate students at various universities is still separate from professional education, and the concepts, course content, and credit settings of innovation and entrepreneurship education have not been integrated into the talent training of various majors. The task of entrepreneurship education is still challenging, and various conditions need continuous improvement.

Hu Chunping et al. argue that graduate students have significant advantages over undergraduate students in independent entrepreneurship in four aspects: mature psychological qualities, rich social experiences, access to certain startup capital, and possessing certain professional knowledge [4]. Cao Suqun et al. propose the establishment of interdisciplinary teams and the formation of multidisciplinary mentor groups, focusing on cultivating graduate students' ability to achieve innovative results. Through practical training projects and entrepreneurship incubation guidance, they aim to enhance graduate students' innovation and entrepreneurship abilities. Gao Lei and Zhao Wenhua draw on the experience of conducting interdisciplinary graduate education in the United States and propose establishing interdisciplinary research and talent training entities to cultivate talents. Cheng Shiping believes that research in interdisciplinary fields is conducive to cultivating graduate students' creative thinking, improving or even generating research and innovation methods, and fostering good innovation characters. Xiong Yongqing et al. believe that currently, graduate students have insufficient understanding and weak subjective willingness regarding interdisciplinary knowledge sharing, and there is a relative lack of platforms and corresponding institutional measures for interdisciplinary knowledge sharing [8]. Furthermore, some domestic universities, such as Hunan University, have successively issued documents like the "Guiding Opinions on the Comprehensive Reform of Graduate Education," integrating innovation and entrepreneurship education into the core objectives of talent training and the entire process of graduate education [9].

2.2.3 Research on Factors Influencing Graduate Entrepreneurship

Research by Fan Wenxiang et al. shows that among the seven dimensions of graduate innovation and entrepreneurship education, the top three factors influencing it are the allocation of innovation and entrepreneurship resources in universities, the degree of attention paid by universities to graduate innovation and entrepreneurship education, and the motivation and willingness of graduate students to innovate and start businesses [10]. Currently, there are significant deficiencies in the cultivation of practical capabilities for innovation and entrepreneurship. Universities should reform and improve the goals of graduate innovation and entrepreneurship education and take effective measures to strengthen the cultivation of graduate students' practical entrepreneurship capabilities. By driving enterprise development through innovative scientific projects, they can improve entrepreneurial economic performance and success rates, gaining an advantageous position in international business competition [5]. Zhang Haiyan's survey of 230 graduate students from a certain university confirms that graduate students have the lowest score in entrepreneurial knowledge [6]. During their graduate education, they focus only on studying professional courses and lack education in entrepreneurship knowledge, which is related to the current lack of integration

of entrepreneurship knowledge education into professional courses by university teachers. In addition, abilities such as finance, marketing, and negotiation are also difficult to develop. The practical nature of entrepreneurial activities determines that purely learning entrepreneurship in schools cannot form a comprehensive and profound understanding of entrepreneurship. Only through situational practical learning can a deeper understanding of entrepreneurship knowledge be achieved [11].

2.2.4 Research on the Transformation of Graduate Innovation Achievements

In 2018, Professor Chi Fulin, Dean of the China Institute for Reform and Development and Vice President of the China Economic System Reform Research Association, pointed out in a report that China's technology transfer rate is less than 30%, while developed countries have reached 60%-70%. In the Internet Plus era, the active involvement of venture capital and other investment institutions has led to the exit of entrepreneurial models like "betting everything" and "sinking all assets." The online food ordering platform "Ele.me," valued at \$9.5 billion, originated from a few graduate students at Shanghai Jiao Tong University who saw business opportunities in the traditional food delivery industry while hungry in their dormitory and developed an online ordering system, realizing their entrepreneurial dream. Although graduate students have a certain degree of entrepreneurial ability during their academic careers, entrepreneurship is a comprehensive reflection of abilities, requiring comprehensive qualities and abilities in all aspects. Ignoring the cultivation of comprehensive abilities may lead to insufficient entrepreneurial capabilities [6]. Additionally, there are issues such as low utilization rate of scientific and technological achievements and insufficient actual application. Most graduate students conduct research to meet the graduation requirements or complete their master's thesis. Once they graduate, they rarely consider transforming their research results into practice, thus lacking the ability to apply research results practically [12].

Based on the above literature research, it is evident that research on graduate innovation and entrepreneurship in Chinese universities has achieved certain results, but there are still some gaps: Firstly, the empirical evidence is not strong. Many studies discuss entrepreneurial forms, with more theoretical research and less practical investigation, lacking research that combines the actual situation and training objectives of various universities. Secondly, the integration is not strong. Local universities have unique advantages in innovation and entrepreneurship education, but they have not fully utilized supporting measures to train innovative and entrepreneurial talents. Thirdly, there are few and uneven research quantities. There are relatively more studies on graduate entrepreneurship policies, theoretical guidance, and curriculum construction, while research on entrepreneurship ability cultivation is scarce, especially concerning industrial development paths. Therefore, conducting research on the cultivation of graduate innovation and entrepreneurship abilities in local universities is an objective requirement of the times and an urgent problem to be solved in the field of educational reform.

3. Current Status of Graduate Innovation and Entrepreneurship

Active Promotion by Relevant National Departments: The Party Central Committee and the State Council attach great importance to innovation and entrepreneurship education in universities. The "Opinions on Deepening the Reform of Graduate Education" jointly issued by the Ministry of Education and other national ministries in 2013 explicitly stated the need to strengthen vocational development education and employment guidance for graduate students, aiming to enhance their entrepreneurial capabilities. It emphasized that universities are the implementers of graduate entrepreneurship capability cultivation, and deepening the reform of innovation and

entrepreneurship education in universities is an urgent need for the country to implement the strategy of innovation-driven development and an important measure to improve the quality of entrepreneurship and employment for university graduates. In May 2015, the General Office of the State Council of China issued the "Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Higher Education Institutions," which emphasized the need to cultivate the scientific research innovation spirit and entrepreneurial practical abilities of graduate students, actively promoting their innovation and entrepreneurship [10]. Currently, our university's graduate entrepreneurship education is still in its infancy, lacking a formal curriculum system and related institutional documents and regulations, thus making this research highly necessary.

Inevitable Choice in the Internet Plus Era: In the era of the Internet, facing the demand and development trend of "double innovation and entrepreneurship" for graduate students in new circumstances, universities need to carry out diversified innovation and entrepreneurship education for graduate students in different disciplines, training categories, and levels. Guided by the development strategy of "mass entrepreneurship and innovation," elite-educated graduate students need to have a profound understanding of the significance of innovation and entrepreneurship and actively support and integrate into the national "double innovation" development strategy through practical actions. The purpose of innovation and entrepreneurship education is not to make every student start a business. Its core is to cultivate students' innovative spirit, entrepreneurial awareness, and entrepreneurial ability, closely integrating talent training with scientific research and social needs, effectively improving the quality of talent training in universities [10].

Failure to Fundamental Change Traditional Views of Graduate Students and Supervisors: For a long time, research workers in Chinese universities, especially graduate supervisors, have focused only on research and neglected the social benefits transformation of research results. According to statistics from 2020, China's research funding expenditure accounted for 2.4% of GDP, and the number of scientific and technological personnel continued to grow. However, the allocation of scientific and technological resources is unreasonable, and the utilization efficiency is low. China's technology transfer rate is only about 10%, far below the 40% level of developed countries. The problem of a large number of research results not being converted into applied technology is very prominent [5]. Most graduate students and supervisors do not understand the social transformation rate of technological research and development, so it is necessary to conduct research on the reform of graduate entrepreneurship education [15-16].

4. Solutions for Enhancing Graduate Innovation and Entrepreneurship Abilities

4.1 Implementation Measures

Understanding the Current Entrepreneurship Intentions of Graduate Students: Conduct surveys and research to analyze the influencing factors affecting the entrepreneurship of medical graduate students. Identify key factors to guide and intervene in policy formulation, curriculum system construction and implementation, and the entrepreneurship process, and provide guidance for cultivating innovative thinking, entrepreneurial awareness, and entrepreneurial ability in university students.

Building a First-Class Teaching Team for Graduate Innovation and Entrepreneurship: The effectiveness of entrepreneurship education depends on the educators' awareness and ability to nurture students and the guidance of graduate supervisors. Therefore, it is proposed to eliminate the prejudices of mentors and graduate students towards innovation and entrepreneurship courses by participating in special lectures, off-campus entrepreneur sessions, and seminars on characteristic

project research, and to clarify the rules of the "Internet Plus" Innovation and Entrepreneurship Competition. In addition to external learning, inviting entrepreneurs from outside the school and outstanding alumni to participate in teaching will help build an excellent entrepreneurship education team.

Production of Micro-Courses for Entrepreneurship Courses and SPOC Teaching Platforms: Build a learner-led interactive learning and communication platform. Design and develop more than 50 micro-courses on entrepreneurial knowledge and collect characteristic projects such as traditional Chinese medicine to summarize about 100 entrepreneurship case studies related to health care, which will be stored in the SuperStar FanYa SPOC platform for self-study by students.

Building a Graduate Innovation and Entrepreneurship Course System: Combining the history of entrepreneurship in our school's rooted ethnic regions, preliminary design a set of elective course systems. Combining entrepreneurship course materials with the school's characteristics, actively carry out research integration and industry-education integration in entrepreneurship course teaching to maximize the transformation of medical research.

Developing an Entrepreneurship Course Evaluation System: Mainly including modules for assessing research capabilities and innovation and entrepreneurship capabilities, using participation in the "Internet Plus" Innovation and Entrepreneurship Competition results as an important evaluation criterion for the entrepreneurship courses of graduate students. Put student development first and permeate the correct entrepreneurial and success concepts throughout the teaching process. Use evaluation to promote competition and learning, form a targeted course evaluation system, and cultivate a group of innovative and entrepreneurial talents familiar with entrepreneurial rules.

4.2 Key Factors in Addressing the Issues

Low Conversion Rate of Graduate Research Achievements: Due to the lack of practical experience in social practice, it is inevitable that the practicality and prospects of their innovative projects are not easily accepted by customers, leading to a low conversion rate. Market acceptance of innovative projects requires a time process, and as start-ups, lack of experience for entrepreneurs is a common issue. Therefore, universities need to strengthen the dual cultivation of graduate students' project innovation ability and entrepreneurial practice ability.

Simultaneous Focus on Internal and External Entrepreneurship Education and Support: This project not only focuses on imparting entrepreneurial knowledge to graduate students but also emphasizes the transformation of entrepreneurial scientific and technological achievements. A good campus technology practice environment will play a boosting role in improving graduate students' entrepreneurial awareness and entrepreneurial ability. Additionally, efforts should be made to continuously improve the external entrepreneurship education ecosystem, laying the foundation for graduate entrepreneurship education.

5. Innovative Reform Achievements

Innovative Integration of Professional Education and Entrepreneurship: By actively combining professional education with entrepreneurship education, the project explores the combination of professional education and entrepreneurship education, making full use of the school's characteristics, local characteristics, and the characteristics of medical students. This results in distinctive reforms in graduate entrepreneurship education with unique features.

Establishment of a Multi-Entity Entrepreneurship Interactive Platform: The project has created a SPOC platform for entrepreneurship education, providing a network learning and communication platform for multiple entities such as entrepreneurship course teachers, graduate students, mentors,

managers, and entrepreneurs. This platform offers comprehensive resources for medical graduate students, assisting them in realizing their entrepreneurial dreams.

Impact on Graduate Students: This project provides educational guidance and services to over 1,000 medical graduate students at the university, with an additional 400 students benefiting directly each year. The resources available on the SPOC platform can also be used by other students at different levels, thereby generating significant social benefits.

6. Conclusion

Through various reform measures, the university has transformed its approach to graduate education, emphasizing entrepreneurship education and service. This shift guides disciplines and mentors to grasp the significance and opportunities of entrepreneurship in the current era, aligning closely with technological advancement and societal needs to cultivate entrepreneurial talent. Encouraging innovative thinking and skills enhancement among graduate students, the initiative urges those with entrepreneurial aspirations, knowledge, and teams to actively engage in entrepreneurial practices, fostering confidence and sustainability in entrepreneurship. Furthermore, the project champions a path of "integration of expertise and entrepreneurship" and "integration of science and education." It promotes collaboration between graduate students' innovative technologies and research outcomes, mentors, and regional enterprises, fostering a robust momentum in the development of entrepreneurial ventures within the medical field.

Funding

This work is partially supported by the 2023 Guangxi Degree and Graduate Education Reform Projects (JGY2023304) and (JGY2023289).

References

- [1] *Internet+ Competition Official Website: National College Students Entrepreneurship Service Network*. Retrieved from <https://cy.ncss.cn/> on November 12, 2021.
- [2] Sun, J., Yuan, H., Wang, P., et al. (2021). *Exploration of the Cultivation Mode of Innovative Education for Medical Graduates*. *China Continuing Medical Education*, 2021(29), 113-116.
- [3] Hu, C., Liu, M., Ge, B. (2016). *Problems and Countermeasures of Innovation and Entrepreneurship Education for Postgraduates in Chinese Universities: A Case Study of Jilin University*. *Heilongjiang Higher Education Research*, 2016(2), 77-80.
- [4] Li, S., Xiong, G., Wu, T., et al. (2017). *Research on the Construction of Postgraduate Innovation and Entrepreneurship Education Curriculum System*. *Graduate Education Research*, 2017(4), 45-50.
- [5] Yang, F. (2020). *The Impact of Graduate Entrepreneurial Ability on Entrepreneurial Performance*. *Tsinghua University Educational Research*, 41(6), 114-121.
- [6] Jin, W. (2019). *Cultivation of Graduate Entrepreneurial Ability in the Context of Educational Internationalization*. *Contemporary Youth Research*, 2019(2), 123-128.
- [7] Zhang, W., Hao, T., Niu, J. (2018). *Mechanisms for Cultivating Graduate Entrepreneurial Ability in British Universities and Their Enlightenment: A Case Study of the University of Cambridge*. *Degree and Graduate Education*, 2018(8), 68-72.
- [8] Xiong, Y., Hu, J. (2017). *Cross-disciplinary Training Model for Postgraduate Innovation and Entrepreneurship Qualities: An Investigation and Analysis Based on Current Postgraduates*. *Graduate Education Research*, 2017(2), 40-46.

- [9] Li, S., Li, J., Liu, T. (2018). *Models and Teaching Practices of Graduate Innovation and Entrepreneurship Education: A Case Study of Hunan University*. *Degree and Graduate Education*, 2018(9), 22-26.
- [10] Fan, W., Ma, Y., Liu, C. (2017). *Analysis of Influencing Factors of Graduate Innovation and Entrepreneurship Education: An Empirical Study Based on SEM*. *Heilongjiang Higher Education Research*, 2017(1), 126-128.
- [11] Huang, Y., Zhang, S., Gu, J. (2017). *Research on the Impact of Entrepreneurship Education on the Entrepreneurial Intention of Professional Master's Degree Graduate Students*. *Graduate Education Research*, 2017(1), 36-42.
- [12] Liang, C., Chen, Q. (2018). *Survey on Graduate Entrepreneurship Based on Relay Innovation*. *Degree and Graduate Education*, 2018(4), 66-72.
- [13] Chen, W. (2017). *Transformation of Academic Capital in Entrepreneurship Education: Positioning, Value, and Realization Path*. *Graduate Education Research*, 2017(4), 25-29.
- [14] Yin, C., Lei, L. (2014). *American Graduate Entrepreneurship in the Perspective of Academic Capitalism and Its Enlightenment*. *Tsinghua University Educational Research*, 35(5), 23-28.
- [15] Li, S., Wu, Y., Ma, Y. (2017). *Strategic Research on Scientific and Technological Entrepreneurship Education for Postgraduates in China: An Empirical Analysis Based on Entrepreneurial Board Listed Companies with Founders as Postgraduates*. *Graduate Education Research*, 2017(3), 47-53.
- [16] Huang, Y., Zhang, S., Gu, J. (2016). *Research on the Synergistic Effect of Entrepreneurship Education and Social Capital on the Entrepreneurial Intention of Postgraduates*. *Education Academic Monthly*, 2016(7), 73-80.