

"Broad-Spectrum" Innovation and Entrepreneurship Education System Framework and Theoretical Value Analysis of Design Specialty in China's Higher Education

Fan Jinchao

Foshan University, China

Email: 1007874210@qq.com

Anis Amira Binti Abu Rahman

Universiti Malaysia Kelantan, Kelantan, Malaysia

Email: anisamira@umk.edu.my

Fan Jintao

Foshan Polytechnic, Foshan, Guangdong, China

Email: 373417093@qq.com

Abstract—In Chinese higher education, "broad-spectrum" innovation and entrepreneurship education for design majors is a new teaching model for design majors, with creative entrepreneurship as the core, combining innovation and entrepreneurship content, and with certain special, professional, and extensive integration characteristics. It is a new way for China's innovation and entrepreneurship education to be professionalized and systematized in design majors. Therefore, this paper briefly analyzes and elaborates on the system construction of "broad-spectrum" innovation and entrepreneurship education in Chinese higher education design majors and the corresponding theoretical values, hoping that it will have some guiding effect on the further development of specialized innovation and entrepreneurship education in colleges and universities.

Index Terms—"broad-spectrum" innovation and entrepreneurship education for design majors, system construction, theoretical value

I. INTRODUCTION

Innovation in the 21st century has become the main way for countries to promote social production and technological progress. With the continuous development of new technologies such as big data, cloud computing and the Internet of Things, Chinese higher education is also ushering in new changes with Chinese characteristics and social needs in the new era. In 2015, the State Council issued the "Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Higher Education", which clearly put forward that: deepening the reform of

innovation and entrepreneurship education in higher education is an important measure to implement the national innovation-driven development strategy and promote high-quality economic development [1]. It is an important measure to promote comprehensive reform of higher education and to promote higher quality entrepreneurship and employment of graduates. The Ministry of Education of China also held a conference on undergraduate education in higher education in June 2018 and proposed the idea of "focusing on strengthening innovation and entrepreneurship education and integrating it into the whole process of talent cultivation in a comprehensive and deeply manner". In 2015, Professor Wang Zhanren of Northeast Normal University proposed a "broad-spectrum" innovation and entrepreneurship education theory [2], which was recognized by educators, and he was one of the early scholars to study innovation and entrepreneurship education in China. He is also one of the early scholars to study innovation and entrepreneurship education in China. The author's research is to explore the innovation and entrepreneurship education of design majors in higher education under this theory. Design is an active factor in the field of innovation, an important part of the productive service and manufacturing industries, and an important force in the realization of "mass entrepreneurship and innovation" in China. According to Roberot Verganti (2003), an Italian expert in innovation management, design-driven innovation is the third innovation model that is different from market-driven innovation and technology-driven innovation [3]. Therefore, the combination of innovation and entrepreneurship education and design education to form

Manuscript received August 15, 2022; revised November 22, 2022.

a complete education system needs to be further deepened and explored.

The "broad spectrum" innovation and entrepreneurship education is a new theory of entrepreneurship and employment education in China, and is a new entrepreneurship and innovation education model, while the "broad-spectrum" education system for design majors is built based on this system, integrating innovation and entrepreneurship education. According to the special characteristics of design majors, according to the characteristics of such students, with creativity and innovation as the core and entrepreneurship education as the focus, the comprehensive training of students' comprehensive ability, promoting the independent entrepreneurship and job entrepreneurship of professional students, which meets the actual needs of China's social development. The outstanding feature of "broad-spectrum" innovation and entrepreneurship education is that it is oriented to students at different levels and carries out specific curriculum education at different stages and sub-groups, while there are certain special characteristics of design professional disciplines, so compared with other majors, "broad-spectrum" innovation and entrepreneurship education for design majors. Therefore, compared with other majors, the "broad spectrum" innovation and entrepreneurship education of design majors needs to be more targeted, specialized and extended based on hierarchical, phased and sub-groups.

II. MAIN BODY

A. Analysis of the System Framework of "Broad-Spectrum" Innovation and Entrepreneurship Education for Design Majors

The author believes that the overall framework of "broad-spectrum" innovation and entrepreneurship education for design majors in China's higher education is mainly divided into three levels.

1) Enlightenment education, namely basic general education

In the author's opinion, the basic innovative entrepreneurial behavior is creative development based on a full understanding of a field, industry, job, or social life. For design students, if they lack knowledge about various fields, it will lead to the lack of creative and innovative consciousness and the loss of entrepreneurial direction, and the innovative and entrepreneurial behavior that lacks vitality [4]. Therefore, general knowledge education must be taken as the initiation education for entrepreneurship and innovation in design majors.

The content of basic general knowledge education should include two aspects: one is the level of spiritual consciousness, cultivating students' curiosity and curiosity and stimulating them to think about life; the second is the level of specific knowledge, which should include traditional Chinese culture, human history, industrial manufacturing and basic natural science. Colleges and universities should rationalize their curricula to showcase expertise in all walks of life.

Innovation and entrepreneurship education should be based on reality and development.

2) Strengthen the education stage, namely "embedded" education and teaching

The most prominent problem of innovation and entrepreneurship education in design majors at present is the systematic problem between academic education and entrepreneurship education [5]. Many universities in China choose to combine professional education with entrepreneurship and innovation education, or integrate entrepreneurship and innovation education into the mechanism of extracurricular learning, and promote the reform of education and teaching in this way. This kind of education model has certain problems, such as the purpose of talent cultivation is not clear, innovation and entrepreneurship education is too conceptual, and the teaching effect of fragmented knowledge is poor, etc. At the same time, it is obvious that adjusting professional academic education with the orientation of innovation and entrepreneurship is not feasible in China.

Therefore, it is very necessary to build a "gantry" entrepreneurship and innovation education curriculum system. Firstly, the original designed professional curriculum will be split, then the content of innovation and entrepreneurship education will be embedded into the professional curriculum system, then the professional knowledge and innovation and entrepreneurship knowledge will be connected through the designed curriculum, just like a skeleton connecting the body, supporting the entrepreneurship knowledge through professional knowledge, connecting and unblocking the creative innovation knowledge. Finally, a new educational system will be formed. Its educational content includes areas such as entrepreneurship curriculum, creative thinking stimulation, innovation capacity development, and design skills application. It meets both the requirements of professional education and the needs of society.

3) Extended education, namely vocational knowledge education

In the late stage of innovation and entrepreneurship education for design majors, the focus should be on extended education with vocational knowledge as the main orientation for personalized education. The extended education contains two parts of teaching content, one is to provide entrepreneurial skills, creative development, and other education in the late stage of design students receiving innovation and entrepreneurship education, so that students can choose course content in different directions according to their future development after receiving initiation and intensive education; the second is to provide enterprise management, job innovation, policy analysis and other courses for graduates in the early stage of entrepreneurship and employment for a period time The second is to provide courses on enterprise management, job innovation, policy analysis, etc. for graduates in the early stage of entrepreneurship and employment.

Building an entrepreneurial and innovative education system for design majors is a complex project, which

requires research and discussion in talent training, teaching philosophy, curriculum construction, teaching methods and teacher training in addition to the overall framework [6]. At the same time, all university departments must work together to effectively shoulder their due responsibilities and complete the system construction.

B. Construction of a "Broad-spectrum" Innovation and Entrepreneurship Education

1) Incubation approach to education

Incubation is a reflection of the transformation of the results of innovation and entrepreneurship education, and the incubation approach to innovation, and entrepreneurship education is a practical teaching model that translates design results into social applications [7]. It has three main focuses:

First, in the education process, it focuses mainly on innovation training, entrepreneurial activities and forms of independent learning. At the same time, it covers professional knowledge, skills and practical applications. In this process, firstly, the basic theoretical knowledge of the design profession should be the focus of teaching, secondly, the theoretical knowledge should be integrated with the corresponding social examples and specific requirements of the job, and the theoretical knowledge should be expressed in the way of "skills" and "abilities". Finally, quantitative assessment and evaluation should be developed based on the criteria required by the occupation or job. The purpose is to let students better grasp the social needs-oriented learning method, improve the practical application of students' design expertise, and accelerate their role change from a design student to a designer. This method is used to improve the traditional teaching on the boring and theoretical teaching mode. Innovation and entrepreneurship education results serve the society, which is the basic requirement of modern society for education [8].

Secondly, it is necessary to apply the existing design industry development problems and industrial entrepreneurship models to teaching by using actual cases or problems as a guide. Teachers can guide students to analyze various problems and development status of actual entrepreneurship or different fields, understand the causes, influencing factors and development trends of the problems, and simulate solutions or learn from the successful experiences of others. This approach is used to improve students' general skills such as observation, problem analysis, and logical thinking. At the same time, this approach also allows students to better understand how the design industry or entrepreneurial model works and gradually increase the incubation rate of design outcomes. Lastly, in the process of implementing incubation innovation and entrepreneurship education in universities, corresponding teaching contents should be developed for the development and application of design in enterprises in various industries to improve the timeliness of incubation innovation and entrepreneurship education. The next subsections provide instructions on how to insert figures, tables, and equations in your document.

2) Diversified educational channels

If "incubation" is a specific approach in the "broad-spectrum" innovation and entrepreneurship education model for design, then its educational channels must be "diversified". Diversified education is mainly based on the cooperation between Chinese universities, government and enterprises, to which more social institutions such as recruitment agencies, research departments, design industry associations, etc. are added, thus forming a composite education channel [9]. In this educational process, educators should actively play the functions of various institutions, pay attention to the education of the functions of various institutions in social life, and cultivate students' ability to actively seek help and solve problems when they encounter difficulties.

This educational model requires educators to go beyond standing at the podium to teach and case study, but also to go into companies and institutions to simulate various problems and provide students with appropriate entrepreneurial guidance or design guidance.

3) Evaluation of practical training

From the above-mentioned information on specific educational approaches and educational channels, it is easy to see that the educational model is oriented towards social needs and practical applications. Therefore, in the final educational evaluation, the educational effect should be assessed by means of practical training. Practical training also does not necessarily require successful entrepreneurship, but can also be evaluated through existing innovation competitions, design contests, entrepreneurship competitions, copyright patents or specific job internship experiences in Chinese higher education[10], which requires educators to actively build good innovation and entrepreneurship platforms for students. A part of universities with outstanding research capabilities can optimize the management and supervision of projects such as entrepreneurship competitions and design competitions, so that students can participate more in the competitions. A part of schools with rich social resources can use the Internet or government resources to establish online entrepreneurship simulation platforms, entrepreneurial communities, etc., and develop corresponding quantitative assessment standards, so that educators can observe the entrepreneurial process, supervise entrepreneurial behavior and assess the value effectiveness. Another part of universities with close relationship with design industry and enterprises can send students to corresponding cooperative enterprises, and teachers and enterprise designers form mentors to train students together.

Finally, work performance and work effectiveness are used as the basis for assessment. In general practical training assessment is to guide students to deepen their professional knowledge and strengthen their innovative and entrepreneurial skills in practice, so as to achieve the purpose of education [11]. However, attention must be paid to ensure the quality of practical training, which requires universities to accurately match the way of practical training assessment for students according to

their own personality characteristics and advantages on the one hand, and to standardize the supervision of relevant competitions and entrepreneurial practices on the other hand, focusing on the training, supervision and assessment of relevant managers and teachers.

C. Analysis of the Theoretical Value of "Broad-spectrum" Innovation and Entrepreneurship Education System for Design Majors

Influenced by factors such as social productivity and economic development, the characteristics of design disciplines and the national professional talent training model, the innovation and entrepreneurship education system of design majors has its own special characteristics compared with other majors. It is mainly manifested in the following aspects:

First, with the development of China's mass economy and advanced manufacturing industry, design gradually moves from the marginal position of China's social development to the mainstream position, while design education obviously fails to keep pace [12]. One of the most prominent manifestations is the mismatch between most design graduates and social needs, and their employment difficulties are becoming increasingly serious. How to improve the competitiveness of students from the source of design education has become an important issue of education reform.

Secondly, compared with other developed countries, China's design development is relatively late, especially in the fields of industrial design and product design [13]. For a long time in the past, design in China was extended and developed from disciplines such as humanities, aesthetics, and art. As a result, it often lacked the practicality of society and the rationality of natural science. Innovation and entrepreneurship education is precisely the educational orientation proposed by Chinese higher education from the perspective of social needs, and the innovation and practicality it advocates well make up for the shortcomings of traditional Chinese design education.

Finally, most of the current design students in Chinese universities come from students studying art and painting. At the high school stage, they need to spend a lot of time on practicing their drawing skills in order to enter university to ensure that they can pass the skill level test. Therefore, their cultural foundation is relatively weak and their knowledge level is relatively narrow. At the same time, most high schools tend to over-emphasize the skills of drawing and lack education on the knowledge of different subjects in the process of training them for the sake of promotion rate. These factors lead to the fact that most students have restricted eyesight, limited creative thinking and possess relatively traditional creative skills. In addition, a small number of students may possess great ideas, but are unable to present them in a way that meets the requirements of modern manufacturing. Therefore, it is of great relevance and value to conduct targeted research on the innovation and entrepreneurship education system of design majors in Chinese higher education.

1) Fitting the actual needs of China's development

With the continuous improvement of China's economic development and productivity, China's development strategy has changed to innovation-driven development. Various documents and policies promulgated by the state have clearly stated that innovation is the key force to promote high-quality economic development, improve people's happiness and satisfaction in life and achieve national rejuvenation. Local governments and education departments have launched innovation and entrepreneurship-related policies to assist in the implementation and promotion of innovation and entrepreneurship education reform. Innovation and design have a natural and close connection, innovation is the core and soul of design, and design is the carrier and expression of innovation.

In China, design majors have been developing rapidly in the past five years, and now there are more than 1,000 colleges and universities in China offering design majors, with more than 100,000 design graduates every year. Improving the construction of innovation and entrepreneurship courses for design majors, strengthening the innovation and entrepreneurship awareness and ability of these future designers, so that they can better integrate into society, contribute precisely to the production and service industries, and promote the innovative development of the country.

2) Supplement and improve the construction of discipline courses in colleges and universities

The development of design majors in Chinese higher education originated from aesthetics, art and humanities. Although it has formed a complete training system with a wide range of specialties and abundant teaching resources, it still lags far behind other developed countries in terms of social practicality and support for the basic manufacturing industry. At present, most Chinese universities train students through the curriculum of "drawing skills + design theory + design skills + practical training".

This kind of curriculum has two disadvantages, on the one hand, it is not conducive to the cultivation of students' original innovation ability. As we all know, innovation is the core competitiveness and professional vitality of a designer, and a designer who lacks innovation ability is just a draughtsman or imitator, which is not conducive to students' career development and will also hinder the progress of social production and manufacturing.

On the other hand, this way of training emphasizes too much on the "design profession" itself, which lacks the interaction with other science and technology knowledge, and naturally lacks its role as a basic discipline for social production and manufacturing [14]. It is not conducive to the improvement of students' comprehensive ability, and it cannot meet the basic requirements of "design" in today's Chinese manufacturing industry. Education is the basic project of a country's development, and the backwardness of "design" education has been the key concern of many universities and scholars, combined with the "innovation and entrepreneurship" oriented education idea proposed by the Chinese government,

design majors The "broad-spectrum" innovation and entrepreneurship education system is a powerful supplement to the curriculum construction of design majors.

3) Effectively realizing the match between vocational education in universities and social needs

With the development and reform of socialist market economy, many industries in China are in the critical period of transformation and upgrading, and the requirements for design talents in various fields and industries are higher and more comprehensive. The design industry has also changed from the early product or visual design to designing that meets the needs of people. Design to meet the needs of people is a complex multi-dimensional system, which includes people, products, environment, society and many other elements, so modern designers have design skills is only the basic ability, but also have the ability to innovate, interdisciplinary knowledge and high personal comprehensive quality [15]. When we observe the job content of many design positions, we will find that they require designers to be able to design not only the function and structure of the product but also to judge its feasibility in combination with the production capacity, product cost and market operation of the enterprise. This way of thinking about the combination of design, manufacturing and business services is one of the manifestations of entrepreneurial thinking. When we observe the job requirements, we will find that companies hope that designers can have certain market insight, teamwork spirit and courage to take responsibility, which can also be summarized as entrepreneurial skills and qualities. This fully illustrates the importance of entrepreneurial consciousness and ability for designers, in addition to professional skills and innovation awareness. Innovative and entrepreneurial education for design majors is the education to cultivate the comprehensive ability of design students to engage in social activities, and to cultivate new-age talents with creative thinking, innovative spirit and independent working ability. The "broad-spectrum" innovation and entrepreneurship education model takes pragmatism as the starting point and leads the reform of disciplinary education, better linking academic education with the practical needs of various fields and industries.

On the basis of the design professional curriculum, the course content embeds basic general education, vocational education and entrepreneurship education into the design discipline, emphasizing the basic and practical nature of design in social production, promoting design graduates to better meet the needs of society, integrating professional knowledge and skills into the innovative and entrepreneurial activities of society, and allowing academic education to better connect with the actual needs of various fields and industries.

III. CONCLUSION

To sum up, this paper briefly analyzes and elaborates the system framework and value theory of "broad-spectrum" innovation and entrepreneurship education for

design majors. The author believes that the system framework of "broad-spectrum" innovation and entrepreneurship education for design majors is a progressive logical framework, which takes general knowledge as the initiation education, innovation and entrepreneurship knowledge embedded in professional knowledge as the strengthening education, and vocational education as the education system of extension education. It's a reform approach to promote design professional education to meet the needs of society, and a basic idea to promote innovation and entrepreneurship education embedded in discipline education.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Fan Jinchao is mainly responsible for investigating the specific situation of China's higher education and writing the main content of the article. Anis Amira Binti Abu Rahman is mainly responsible for revising and supplementing the education system.

ACKNOWLEDGMENT

The authors wish to thank Chen JiaJing, Foshan University. Chen Jiajing assisted the author in modifying the format. Foshan University has provided a lot of research materials for the project.

REFERENCES

- [1] Office of the State Council. The General Office of the State Council on Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities May 13, 2015. [Online]. Available: http://www.gov.cn/zhengce/content/2015-05/13/content_9740.htm
- [2] W. Zhanren, "System architecture and theoretical value of "broad spectrum" innovation and entrepreneurship education," *Educational Research*, vol. 5, pp. 56-63, 2015
- [3] R. Verganti, "Design meanings, and radical innovation: A meta-model and a research agenda," *Journal of Product Innovation Management*, vol. 25, no. 5, pp. 436-456, 2008.
- [4] Y. Ying and W. Bing, "Design of practical teaching system of innovation and entrepreneurship education," *Innovation and Entrepreneurship Education*, 2016.
- [5] Y. Jiping, "Reform and practice of training mode of innovative talents in art and design," *Popular Literature and Art: Academic Edition*, 2011.
- [6] Y. Yuan, "On the significance of research on innovation and entrepreneurship education system for art students in higher vocational colleges," *Science and Technology Outlook*, 2014.
- [7] L. Zhiyi, "Results-oriented teaching design," Chinese University, 2015.
- [8] S. Weizu, "Public entrepreneurship, innovation, design is the method, In decoration," Total No. 281., 2016.
- [9] L. Zhang, W. Ge, L. M. Li, and S. J. L. Zhong, "Definition, category, method and development trend of industrial design," *Machine Design*, vol. 30, no. 8, 2013.
- [10] L. N. Michel, "How to become the best for designer," *Journal Mechanical Design*, vol. 3, p. 92, 1999.
- [11] W. Zhanren, "System architecture and theoretical value of "broad spectrum" innovation and entrepreneurship education," *Educational Research*, vol. 5, pp. 56-63, 2015.
- [12] C. Qingchun, "Research on the framework and theoretical basis of "broad spectrum" innovation and entrepreneurship education

system,” *Educational Science: Full Text Edition*, vol. 12, pp. 00215-00215, 2016.

- [13] R. Verganti, “Design meanings, and radical innovation: A meta-model and a research agenda,” *Journal of Product Innovation Management*, vol. 25, no. 5, pp. 436-456, 2008.
- [14] Z. Xiuwen and M. Li, “Research on “broad spectrum” innovation and entrepreneurship education,” *Research on Continuing Education*, vol. 12, pp. 24-26, 2015.
- [15] W. Zhanren, “Analysis on the construction of “broad spectrum” innovation and entrepreneurship education system,” *Research on Education Development*, vol. 3, pp. 54-58, 2012.

Copyright © 2022 by the authors. This is an open access article distributed under the Creative Commons Attribution License ([CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)), which permits use, distribution and reproduction in any medium, provided that the article is properly cited, the use is non-commercial and no modifications or adaptations are made.



Fan Jinchao was born in Anlu City, Hubei Province, China. He received a master's degree from Central South University of China in 2015 and is now studying at the Universiti Malaysia Kelantan for PHD.

Fan works at Foshan University in Foshan City, Guangdong Province, China. He is a lecturer of Marxism college, mainly studying innovation and entrepreneurship education and values education. He has published many research papers such as "a study on the two

way construction system of College Students' innovation and entrepreneurship education and ideological and political education".