Study on Innovation and Entrepreneurship Education Model with Interdisciplinary Integration under the Concept of STEM Education

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Abstract: Vigorously promote the innovation and entrepreneurship education, training to adapt to the needs of economic and social development of the innovative talent has risen as a national strategy, but at present, entrepreneurship education innovation in China appears not to follow the rules of education make people worry about the implementation process, too much emphasis on allowing students to engage in invention, open studio, but the lack of learning and accumulation basic scientific knowledge, the innovation and entrepreneurship education from the right track, into the school show, forming a serious bubble. Based on the analysis of the internal consistency and synergy of STEM education idea and innovation and entrepreneurship education, this paper puts forward a new interdisciplinary integration innovation and entrepreneurship education mode under the STEM education concept. This not only strengthens the cognition and understanding of STEM education, but also provides a good way to achieve innovation and entrepreneurship education, so as to ensure its effectiveness.

1. Introduction

In the new era of "popular innovation and business start-up" as the benchmark, colleges and universities should actively promote innovation and entrepreneurship education reform, and integrate innovation and entrepreneurship education into the entire process of personnel training. Vigorously promote innovation and entrepreneurship education, training to adapt to the needs of economic and social development of innovative entrepreneurship has risen to a national strategy. However, at present, there are many problems in the practice of innovation and entrepreneurship training in colleges and universities. The concept of innovation and entrepreneurship education is not sufficiently implemented. The integration of innovation and entrepreneurship education and professional education is not enough. The innovation and entrepreneurship education activities are often floated on the surface. Emphasizing that enabling students to engage in inventions and inventions, setting up studios and becoming mere formalities, instead of having the support of basic scientific knowledge, innovation and entrepreneurship education has deviated from the right track and has created a serious bubble. This fully shows that there are flaws in the training model of innovative entrepreneurship and needs continuous improvement. STEM education combines the characteristics of science, technology, engineering and mathematics. It integrates the acquisition of knowledge, the application of methods and tools and the process of innovation to promote the formation of comprehensive literacy education. STEM education and innovation and entrepreneurship education have inherent consistency in their goals and strong synergies in their implementation. The STEM education concept has been introduced into innovation and entrepreneurship education so as to achieve an interdisciplinary innovation and entrepreneurship education model that is conducive to students' Diversified knowledge structure, enhance their practical ability and ability of innovation and entrepreneurship.

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2. STEM Education and Innovation and Entrepreneurship Education

2.1. STEM education

STEM is short for the four disciplines Science, Technology, Engineering and Mathematics. It does not represent a simple overlay of four disciplines, but emphasizes the intersection and integration of multiple disciplines. The goal of STEM education is that students have a certain basic knowledge of science, technology, engineering and mathematics and so on, so as to cultivate students' comprehensive accomplishment and ability to solve practical problems. STEM Education originated from American education. The concept of quality education in the United States in the 1950s was universally accepted by science educators. They believed that the key to promoting the comprehensive national strength of the country and promoting the social development of the society lies in improving the science of the people Literacy. In the 1950s, American scientists in science education put forward the concept of scientific literacy and got the general approval of scholars from other countries. They believed that raising the scientific literacy of the nation is the key to enhancing the overall national strength. In the 1990s, the National Science Foundation first proposed the concept of STEM and used STEM to describe policies, programs, practices, and events that involve one or more disciplines (Byhee, 2010). Into the 21st century, STEM as a new concept of education continue to appear in the United States education reform projects and laws and regulations (Zhao Zhongjian, 2012). In August 2007, in the passed National Competitiveness Act, the U.S. Congress approved a total investment of 43.3 billion U.S. dollars for the federal-level STEM research and education program from 2008 to 2010. In 2014, the U.S. Department of Education proposed a national talent training program based on STEM education and put forward specific strategies for implementing state STEM education, including innovative network cooperation, training excellent STEM teachers, establishing STEM expert teacher groups, increasing STEM research funding and funding STEM priorities Schools and other practical concrete planning (Yang Guangfu, 2014).

The domestic research on STEM education started relatively late, the previous research mainly focused on the introduction of STEM education concepts and localization work. The existing researches related to STEM education in China mainly involve the introduction of foreign STEM education research, the implementation of foreign STEM education and the integration of STEM into the domestic classroom. The 2nd STEM International Education Conference was held in Beijing Normal University in November 2012. As a seminar reflecting the international advanced level of STEM education and research, it brings together well-known domestic and foreign STEM experts and scholars as well as the most innovative STEM education research results and practical experiences. The convening of this conference also indicates that the research and application of STEM education in our country has entered a completely new stage.

2.2. Innovation and entrepreneurship education

Schumpeter, an economist at the beginning of the 20th century, put forward an innovative theory which holds that economic development is due to innovation. The idea of innovation and entrepreneurship education originated from Schumpeter's innovation theory. The integration of innovation theory into education is the result of the in-depth development of quality education in the market economy and the general rule of education evolution. Under the influence of the theory of innovation and entrepreneurship, quality education has entered a new stage and formed an innovation and entrepreneurship education. It was born in the 1940s and the rapid rise and popularization of developed countries in Europe and the United States in the late 1970s. Foreign countries started the research and practice of innovation and entrepreneurship education earlier, the United States is the earliest country to carry out innovation and entrepreneurship education, the United States colleges and universities for the construction of innovation and entrepreneurship education has matured. In the United States, innovation and entrepreneurship education in colleges and universities is regarded as a direct driving force for the country's economic development and

overall national strength improvement. The first innovation and entrepreneurship education in the United States was conducted at Harvard University in 1947, and the Babson School of Business also set up an entrepreneurial course in 1967 to constantly improve the training programs for innovative entrepreneurship and entrepreneurship. At present, the United States has incorporated innovation and entrepreneurship education into the entire system of national education and covers the entire process from primary school to university education and even continuing education. For the beginning of innovation and entrepreneurship education in China, it is generally agreed that the first entrepreneurial plan competition was held in Tsinghua University in 1999. After the reform and opening up, China's innovation and entrepreneurship education has made great progress under the concept change and the policy encouragement. At present, innovation and entrepreneurship education has become a social development and economic restructuring and upgrading needs, has risen to a national strategy. Innovation and entrepreneurship education can cultivate innovative and talented people who adapt to the needs of social development so as to enhance the driving force of innovation and economy. At present, college students have become the main force of China's science and technology entrepreneurship and the main driving force of innovation-driven education.

3. Integration of STEM Education and Innovation and Entrepreneurship Education

3.1. The inherent consistency of goals

STEM education emphasizes the interdisciplinary and integration of multi-disciplines. In order to better help students not be bound by a single subject knowledge, STEM education continuously improves students' ability to analyze and solve problems based on the accumulation of interdisciplinary knowledge. The combination of science, technology, engineering and mathematics is conducive to enhancing students' interdisciplinary thinking skills and comprehensive practical ability. The concept of STEM was introduced into China at the beginning, and scholars of education discussed the essence of STEM concept. The debate between "integration" and "segmentation" is prevalent. The former holds that the core of STEM education is interdisciplinary integration. It emphasizes the cultivation of students' qualities and abilities and solution to practical problems in the process of subject integration. The latter holds that STEM education should carefully analyze the effective ways of interdisciplinary integration and find out the types of combinations that suit the needs of social development. In our opinion, the essence of STEM education is to enhance students' overall accomplishment through interdisciplinary integration, which is an effective form of quality education. Through this mode of education, STEM students should constantly cultivate the necessary qualifications that students should have in order to meet their lifelong development needs And the key ability. Emphasis on individual self-cultivation of students, independent development, improvement of comprehensive literacy, excluding "right and wrong", mistakes, scores, mechanical memory, the problem of sea tactics and irrational competition for the "erosion" of student literacy. Such higher education can release the potential of students and enhance the teaching effect on the basis of protecting the nature of students.

Innovation and entrepreneurship education is not only an urgent requirement for higher education to take the initiative to adapt to economic and social development, but also an urgent requirement for the reform and development of higher education itself. The improvement of teaching quality is the lifeline of higher education. The cultivation of innovative entrepreneurship is the core of innovation and entrepreneurship education in colleges and universities. The most accurate measure of the quality of personnel training in colleges and universities is whether the personnel trained by them meet the needs of economic and social development and national strategies. The core of innovation and entrepreneurship education is to cultivate the creative spirit, entrepreneurial awareness and entrepreneurial ability of college students, to guide the colleges and universities to adapt to the needs of economic and social development, to constantly change their concepts of education, reform their personnel training mode, and improve the teaching content and teaching methods. Innovation and entrepreneurship education is the result of continuous deepening of quality education under the conditions of market economy. It is a realistic pursuit of quality

education based on "innovation, creation and entrepreneurship" as the core. Innovation and entrepreneurship education is by no means an instant-based elite education, but a quality education with full participation and full coverage. Its purpose is also to improve the quality of personnel training and provide highly qualified personnel for economic and social development.

3.2. Coordination of the implementation process

Innovation and entrepreneurship education is the sublimation of professional education based on general education, which is the result of the common role of general education and professional education. It is a forward-looking and innovative embodiment of education in the era of knowledge-based economy and is consistent with the general law of educational development Is the inevitable choice of deepening education reform in colleges and universities in the new era. The development of innovation and entrepreneurship education needs a wealth of basic knowledge and professional knowledge support. The solid basic knowledge and professional knowledge are the deep foundation of students' entrepreneurial spirit, innovative awareness and entrepreneurial ability generation. At the same time, the process of students' ability to innovate and start their undertakings will also promote professional education and respond to the development of theoretical knowledge of the foreword in this field of specialization and enhance the research results of the industries and industries involved in this major and related interdisciplinary studies. The core of STEM education lies in interdisciplinarity. In order to better help students master the basic knowledge and cutting-edge theories that are conducive to the long-term development and ability improvement of students, the interdisciplinary integration is emphasized in the teaching process so as to encourage students to master interdisciplinary analysis problems, Ability to solve problems. The combination of science, technology, engineering and mathematics is conducive to enhancing students 'ability of interdisciplinary thinking and students' comprehensive literacy.

The synergy of the two in practice is that students need knowledge of different disciplines in the process of innovation and entrepreneurship education and there must be abundant interdisciplinary knowledge behind the successful innovation and entrepreneurship programs. For example, the design of a remote control door locks requires not only scientific, technical, engineering and mathematical knowledge, but also, in some cases, knowledge of arts and crafts. This process is also a process of practicing STEM education. STEM education can provide a good support platform for innovation and entrepreneurship. Innovation and entrepreneurship education also provides the impetus for STEM education and makes the development of STEM education more purposeful. Both of them have a good systematicness in implementation and can be deeply integrated.

4. A New Model of Innovation and Entrepreneurship Education under the Concept of STEM Education

The deep integration of STEM education and innovation and entrepreneurship education in the new era has provided a new path for the development of innovation and entrepreneurship education in colleges and universities, which will bring about a new growth point for university students in their ability of innovation and entrepreneurship and practical ability improvement. The concept of interdisciplinary integration of STEM education and the teaching methods based on problems or projects make the innovation and entrepreneurship activities more in line with the training of innovative talents in colleges and universities, making the orientation of university innovation and entrepreneurship development, training objectives and implementation process clearer. The following will be from the basic concepts, teaching content, evaluation system, faculty and social resources in five aspects of STEM education concept of innovation and entrepreneurship education mode.

4.1. Basic idea

The integration of STEM education and innovation and entrepreneurship education must firstly combine ideological level with the core concepts of interdisciplinarity, cooperation and design of STEM education so as to guide the practice of innovation and entrepreneurship education. Sub-

teaching in science and technology and information technology highly developed in today's society, showing great drawbacks, STEM education put forward the concept of "meta-disciplines", which represents a unified knowledge of many disciplines, interdisciplinary requirements in innovation and entrepreneurship In the education process, we will focus on specific problems and improve students' abilities to solve problems by using interrelated knowledge. The same core concepts of STEM education collaborative, design and empirical are worth learning from innovation and entrepreneurship education, STEM education problems are real, problem solving needs and other students, teachers and experts work together; through the design Works, to achieve the integration and transfer of knowledge, can better enable students to understand the work done to solve the problem of openness; positivism is an important feature of science education, STEM education requires students to verify the hypothesis based on evidence found and reached a solution to the problem Program.

4.2. Teaching content

In the process of innovation and entrepreneurship education in colleges and universities, not only to open the corresponding innovation and entrepreneurship courses, but also should pay attention to the general curriculum and STEM related courses on students' ability of innovation and entrepreneurship. The professional curriculum system of colleges and universities in our country is relatively fixed, and the teaching of sub-department has been a long time, which has posed a great obstacle to the development of STEM education and innovation and entrepreneurship education. How to break the limitation of professions, effectively achieve the interdisciplinarity between different disciplines and improve the overall accomplishment of students A big challenge. In the construction of curriculum system, schools should abide by the principle of "integrating science, engineering, economics, management, culture, law and art", enrich the theoretical classroom and practice class, and provide rich online learning resources for students. In the theory class, we should carry out the dissemination of related knowledge with specific projects, pay attention to the feedback from students and take the form of seminars to achieve a good interaction between teachers and students so as to improve the teaching effect. In the process of practice teaching, we should pay attention to the excavation of students' personalities, give full play to the potential of students' autonomous learning, adopt various forms of practical teaching, enhance the effectiveness of practical teaching through subject competitions, project training and entrepreneurial practices to cultivate students' practical ability and innovation and entrepreneurship ability.

4.3. Evaluation system

The evaluation method of innovation and entrepreneurship education should focus on the improvement of students 'innovative awareness, practical ability and entrepreneurial ability, while STEM education focuses on the consideration of the quality of students' interdisciplinary thinking. The traditional assessment methods and quantitative standards have not meet the requirements of STEM education and innovation and entrepreneurship education, because the learning outcomes of both are not only simple knowledge points, the topics studied are also more open, so the educators need to make corresponding assessment system Adjust and adopt a combination of process evaluation and result evaluation. The content of evaluation should include course study evaluation, project achievement evaluation, teacher evaluation, student peer evaluation and social evaluation. Effectively guide students through the evaluation of the formation of interdisciplinary thinking, guide students to learn independently, and constantly strive to achieve their own creativity.

4.4. Education team

To carry out STEM education and innovation and entrepreneurship education, teachers are a must, our country should be in line with international standards, improve the quality of STEM teachers and innovative entrepreneurship teachers, and cultivate innovative talents. STEM education poses higher requirements for teachers, requiring teachers to master interdisciplinary knowledge, enhance the ability of comprehensive utilization of knowledge, and collaborate with different subject teachers; it is necessary to pay attention to the interdisciplinary knowledge needed

for students' comprehensive literacy promotion and take Effective teaching methods; need to pay more attention to student learning and project progress, to help students better interdisciplinary analysis and problem solving. When conducting teacher training, we should adopt an inter-college co-cultivation strategy of STEM teachers. All colleges and universities should establish an interdisciplinary and cross-school STEM education team to better implement STEM education.

4.5. Community resource

Use of social resources to improve STEM and innovation and entrepreneurship education. STEM education is interdisciplinary and comprehensive. The innovation and entrepreneurship education is open and collaborative. All these require the participation of schools and society. STEM education in colleges and universities can work together with community enterprises and other units or organizations to build multi-disciplinary resources, build a practical teaching platform and promote the improvement of teaching standards. They can invite successful members of the society into the campus and short-term employ people from different fields , Expand the contact surface of students. Innovation and entrepreneurship education can invite successful cases of social innovation and entrepreneurship to share, and even allow students to participate in their projects to complete together to enhance students' level of innovation and entrepreneurship.

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