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CONNOTATION CONSTRUCTION AND EXPERIENCE ENLIGHTENMENT OF INNOVATIVE EDUCATION IN COLLEGES AND UNIVERSITIES – CASE STUDIES FROM THREE UNIVERSITIES IN CHINA

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Abstract. *Colleges and universities are the cradle of high-level talents. How to cultivate talents who can meet the needs of social development and have innovative thinking has become one of the focuses of extensive discussion. On the basis of summarizing the connotation and implementation goals of innovative education, this paper takes Zhejiang University, Harbin Institute of Technology and Dalian University as examples to analyze innovative education. And put forward countermeasures and suggestions for implementing innovative education in colleges and universities.*
Keywords: Innovative education, Quality, Consciousness, Ability

1. **Introduction.** Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping has always placed innovation at the core of the overall national development. And attach great importance to scientific and technological innovation, focus on implementing the innovation-driven development strategy, and accelerate the comprehensive innovation with scientific and technological innovation as the core. Put forward a series of new ideas, new judgments, and new requirements, and point out that "China insists on innovation as the primary driving force for development". Mu et al. [1] proposed that the research results needed by the society created by colleges and universities can be transformed by enterprises to realize the mission of innovative education in colleges and universities. Park [2] pointed out that universities, industry, government and social citizens all play a great role in the society. His ideas have great implications for developing countries and explain the importance of innovation. When analyzing the ideological and political education system in colleges and universities, Wu and Jin [3] discussed the challenges and opportunities brought by the Internet to ideological and political education in colleges and universities from the perspective of Internet innovation, and emphasized the necessity of innovation in ideological and political education methods in colleges and universities. Based on the previous researches, this paper discusses the actual connotation of innovative education, and puts forward some countermeasures to implement innovative education with university students as the research object.

It can be seen that most scholars in the past carried out research on innovative education in colleges and universities from the theoretical level, and few conducted case studies. Although the research content obtained is extensive, schools with different development should carry out targeted research on innovative education. Therefore, on the basis of previous scholars' research, this paper deeply discusses the actual connotation of innovative education, and carries out case analysis on three typical innovative development schools

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as research objects, in order to put forward the development path of innovative education in colleges and universities.

2. **The Chinese Connotation of Innovative Education.** As early as 1912, the Austrian American economist Peter Schumpeter put forward the concept of "Innovation" for the first time in his theory of economic development. At that time, it was mainly put forward by economists from the perspective of technology application, which mainly refers to the introduction of new ideas and methods in economic life to achieve a new combination of production factors. With the continuous development and change of the society, the connotation of the word innovation is also expanding and deepening. Broadly speaking, innovation means creating or creating something new.

Regarding the definition of innovative education, there are many definitions in the academic and educational circles. Chinese scholars generally believe that innovative education is to train students' innovative ability through educational and teaching activities, so as to realize the above innovative education [12]. That is to train people's innovative spirit and innovative ability as the basic value orientation of education. The author agrees with this point of view, and further summarizes that innovation education is based on the principle and law of innovation, with the cultivation of students' innovative consciousness, innovative spirit, innovative thinking, innovative ability and innovative personality as the main goal of education. It should enable students to fully develop their creative ability while systematically and firmly grasping scientific and cultural knowledge. And innovation education is the deepening and sublimation of quality education.

The implementation of China's innovative education is based on the basic concept of "student-centered". The "student-centered" educational view is not exactly the same as the "teacher-led, student-centered" educational view, but they are similar. It should be pointed out that "student-centered" does not mean blindly condoning students' "misbehavior", or letting them run their own way. We must attach great importance to the organizational work in teaching. However, this kind of organizational work must adopt a positive way to make teachers and students live in harmony and communicate closely. The history of innovation is as long as the history of human beings; human beings are always looking for new and good ways to solve problems, and strive to achieve them. The connotation of innovation is also gradually developing with the evolution of society. As shown in Table 1, with the continuous deepening of the connotation of innovation, innovation education is gradually endowed with the characteristics of the times in the development.

The ultimate goal of implementing innovative education is to cultivate innovative talents. In higher education, it is mainly to cultivate students' innovative ability and shape students' innovative character [5]. Among them, the innovative ability includes the ability to perceive and discover problems driven by strong ideological and emotional motivation, the ability to analyze comprehensive problems, the ability to propose new hypotheses and the ability to invent and discover new methods to solve problems, etc. The so-called innovative character is to break through the shackles of utilitarian thinking, to have a dedication to the cause of mankind, a strong thirst for knowledge and curiosity, enterprising spirit and hard work, strong self-confidence, not restricted by hardships and trivial matters, independent [6], with personality of, good at thinking, good at discovering problems, courage to solve various problems, not bound by traditional conventions and fixed concepts, constructive and critical spirit, not conservative, flexible in understanding, willing to accept various experiences, full of belief, perseverance, etc.

3. **Case Analysis of Innovative Education in Three Chinese Universities.** In order to analyze the reform of innovative education in colleges and universities more concretely, the study selects Zhejiang University, Harbin Institute of Technology and

Table 1. Evolution of the connotation of innovation

Time	The connotation of innovation
1912	Schumpeter, in The Theory of Economic Development, defines innovation as the application of something new in business or industry. These include a new product, a new process or production method, a new market, a new source of supply, a new type of organization, that is, the introduction into the production system of a "new combination" of factors and conditions of production [9].
After the second world war	The research on technological innovation has been deepened, and the innovation theory has been extended to many disciplines. From the perspectives of economics, management, technology management, knowledge management, and science, technology and engineering, nearly 60 definitions of innovation have been proposed [12].
After the reform and opening up	Some domestic scholars began to positively cite Schumpeter's innovation theory [13], the status and role of innovation rose rapidly, technological innovation became the main field of innovation, and the understanding and practice around innovation continued to deepen.
Current	The role of innovation in the competition of comprehensive national strength has become increasingly prominent, and innovation has become the primary driving force for high-quality development. "Researchers from different disciplines and academic backgrounds are engaged in innovation research" [14]. All walks of life are innovating, and more and more innovation is returning to the original meaning of "creating or creating new things".

Dalian University as cases for analysis. Zhejiang University focuses on strengthening the construction of innovative teams through the teacher-student co-creation model. Harbin Institute of Technology focuses on reforming and innovating the educational model, fully exploring the potential of students, and realizing the common improvement of ability and quality. Dalian University continues to improve the innovative education system and mechanism, so that the whole school forms a good atmosphere for innovative education. The main contents of innovative education in the three schools are shown in Table 2.

4. **Inspiration to China's Innovation Education through Case Analysis.** From a macro perspective, the implementation of innovation education is carried out around the creation of an environment and atmosphere for innovation. Updating educational concepts, establishing innovative mechanisms, adjusting educational methods, expanding innovative educational methods, and comprehensively creating an innovative environment are necessary ways to implement innovative education.

4.1. **Strengthen the awareness of innovation, update educational concepts, and establish an innovative educational mechanism.** At present, the innovative consciousness of college students in our country is generally not high. Some schools have conducted surveys on college students' creativity and found that the proportion of students' creative inclination is quite high, but students' self-evaluation is very low, and students are skeptical of their own innovative ability. Think that innovation is a very remote thing, even some teachers cannot correctly understand the creative potential of college students. In fact, innovation is common to everyone, and it is a potential natural attribute of students. It can penetrate into every field of study, life and work for everyone. As long as you do not stick to the law, you do not stick to the rules, and you can think and solve problems independently, it can be regarded as a performance of innovation [4].

TABLE 2. The main contents of innovative education in Zhejiang University, Harbin Institute of Technology and Dalian University

School	Innovative educational model	Main content
Zhejiang University	The innovative double helix model of education created by teachers and students	Through the co-creation of teachers and students, we will build four platforms of project leadership, resource gathering, course learning, and entrepreneurial cultivation, linking the knowledge chain and practice chain of innovation and entrepreneurship education, so that the double-chain linkage and deep integration will build a micro-ecology for the healthy development of teachers and students' innovative teams.
Harbin Institute of Technology	Teaching model innovation	The integration of theory and practice, the combination of classroom and project, the driving of problem solving, the intersection and parallelism of learning and practice, the coordination of multi-school teaching, the whole process of agile teaching, the strong improvement of multiple rounds of iterations, and the coexistence of ability and quality.
Dalian University	System construction innovation	The school has introduced a number of innovative systems. The school has also formulated teaching workload and scientific research workload calculation methods for teachers to guide students to participate in various innovation and entrepreneurship projects. Through system construction, teachers and students can clarify the content, scope, procedures and management methods of innovation and entrepreneurship education, and guide innovation and entrepreneurship education. It is standardized and systematic promotion of work.

Establishing an innovative education mechanism is a behavioral manifestation of strengthening the awareness of innovation and renewing educational concepts. The innovative teaching mode of Harbin Institute of Technology has inspired the innovation of colleges and universities to combine theory with practice to promote the innovation enthusiasm of students. The implementation of innovative education should be guaranteed by an open and flexible mechanism. Combining innovative education with the reform of the credit system, starting with teaching reform, formulating a reasonable and contemporary teaching and training plan, changing the professional setting is too narrow, the humanities education is weak, and the training model that lacks broad knowledge is single. Reform the curriculum, reduce the number of hours, soften or eliminate the rigid boundaries in the curriculum, and focus on cultivating scientific thinking methods. Basic theory is the pillar of cultivating innovation. Cultivating students' innovative ability is not to weaken the foundation, but to reform the teaching of basic courses and unify the teaching process with the process of cultivating students' creative thinking. In addition, open more courses that are closely integrated with social practice, innovative, and can develop students' imagination and creativity. And increase the time for internship and practice, and students can choose the content of practice according to their own interests and hobbies. Cultivate students' ability to integrate theory with practice and analyze, express, communicate, cooperate and solve practical problems as the focus of social practice.

4.2. **Establish an innovative incentive mechanism and form a flexible management system.** People's creative potential is innate, but in most cases this potential can only be manifested when induced by acquired factors. However, the current innovation incentive mechanism of colleges and universities is not sound, mainly manifested in the lack of a good environment for young college students to create personality development. In teaching, new scientific research results and new scientific concepts are incorporated into textbooks in a timely manner to help students establish a basic concept of a developing and changing rather than isolated and static objective material world, and guide them to explore newer knowledge and cultivate their innovative spirit. Teachers should encourage students to think critically, allow them to be creative and challenge boldly, and encourage students to challenge teachers and experts. The ability to evaluate students cannot be evaluated solely on the basis of test scores, but based on whether students have the ability to question, whether students' answers to problems are reasonable, and whether they are logical, so that a soft environment for innovative education is comprehensively formed. In addition, rigid constraints are formed by requiring students to obtain innovation credits before graduation.

The implementation of innovative education will have many characteristic problems due to the different personality characteristics of students. The innovative education model of Dalian University points out the importance of school system construction for innovative education [11]. Therefore, it is necessary to form a flexible management system as a basic guarantee. In teaching management, it is necessary to reflect the "student-oriented" thinking, change the past dogmatic management methods, and establish a flexible management system based on the premise of adapting to the needs of student development. For example, the course of building a basic platform in the credit system allows students to choose a major or direction based on their professional knowledge, choose courses independently, choose teachers voluntarily, and choose the time of graduation and practice entrepreneurship. Any behavior that is conducive to cultivating students' innovative ability is considered to be reasonable and feasible.

4.3. **Reform teaching methods and expand innovative educational methods.** The original teaching methods must be reformed to implement innovative education. "It's better to teach a man fishing than to give him fish." [7]. Teachers should integrate the teaching of scientific knowledge with the spirit of scientific exploration and scientific values in teaching. Of course, encouraging students to put forward different opinions is a great challenge for teachers. Teachers must devote more energy to deal with different problems from students. However, this will play a role in mutual promotion, not only to make students dare to break through the stereotypes of thinking, but also to achieve the purpose of improving the quality of teaching. Therefore, Yiyantang is changed to Qunyantang (orderly), which is conducive to the cultivation of innovative thinking. The innovative education of Zhejiang University has done this well. The main inspiration of the innovative model of the school is the good relationship between teachers and students. Through teachers' inspiring teaching, students are encouraged to ask questions, so as to mobilize students' initiative and consciousness, stimulate positive thinking, and cultivate the ability to analyze and solve problems. For example, teaching should start from observation and questioning instead of instilling ready-made answers. Require students to actively use hypotheses, collect and apply evidence. And encourage students' curiosity and creativity, and appropriately adopt discussion styles and seminars. Guide students to carry out extracurricular invention and creation activities, set up interest groups, holiday social practice activities and other colorful second-class activities. This is an effective way to improve students' awareness of innovation, stimulate their desire for innovation, and give full play to their innovative abilities [8].

5. **Conclusions.** At the present stage, the focus of implementing innovative education in colleges and universities in China is to cultivate students' innovative consciousness and ability. In a sense, the cultivation of innovative consciousness, innovative thinking and innovative ability are mutually integrated [14]. Therefore, in order to cultivate innovative talents, colleges and universities need to start from three main aspects: teachers, students and teaching system, so as to realize the fundamental transformation of teaching concepts, teaching methods and teaching management methods. Only in this way can we cultivate innovative talents who keep pace with the times and make important contributions to the society.

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