

# The Strategy of Innovation and Entrepreneurship in College Physics Teaching

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**ABSTRACT.** *Under the background of innovation and entrepreneurship, the integration of innovation and entrepreneurship education in university physics teaching is a beneficial teaching attempt. The content of university physics teaching is wide, and the relevant physics principles and physicist's innovation experience can provide good materials for innovation and entrepreneurship education, so as to enlighten college students' Innovation and entrepreneurship thinking. The "two-stage" teaching mode is adopted. To reveal the profound meaning of physics principle and physicist's innovation experience, to see the profound connotation of innovation and entrepreneurship thought, can help college students grasp the innovation and entrepreneurship methods and establish good entrepreneurship quality. The teaching method of combining theory with practice and guiding college students' innovation and entrepreneurship practice can improve the teaching effect of College Students' innovation and entrepreneurship education.*

**KEYWORDS:** *College physics teaching; Innovation and entrepreneurship; Innovation quality; Entrepreneurship methods*

## 1. Introduction

Since the slogan of "mass entrepreneurship and innovation" was put forward, hundreds of millions of Chinese people have been inspired. In the era of innovation, many people actively practice, such as big data, cloud computing, artificial intelligence and a series of innovation hotspots and achievements linked with "Internet +". Under the background of large innovation and entrepreneurship, universities should make a difference. Therefore, universities launched In the new economic normal, the society needs to integrate resources, stimulate innovation potential, create more employment opportunities and create new value. Therefore, advocating innovation and Entrepreneurship of college students will help to improve the driving force of the whole social and economic development. The innovation and entrepreneurship ability of college students, colleges and universities specially set up the innovation and entrepreneurship education course, which has played a

universal role in the formation of the innovation and entrepreneurship concept of college students. The theory and practice of innovation and entrepreneurship education at home and abroad show that innovation and entrepreneurship education should run through the whole process of college education, involving almost all teaching courses and teaching links. College physics as a college of science and Engineering The basic compulsory course of the industry carries the main task of basic concept cognition and basic physics principle application in professional course teaching. As the basic position of science and engineering teaching, university physics has always been valued by domestic and foreign universities, and the reform of university physics teaching is constantly changing with the development of social economy. Based on the characteristics of university physics teaching and innovation and entrepreneurship. In the new situation of education, it is of practical and long-term significance to explore and practice the integration of innovation and entrepreneurship in college physics teaching[1].

## **2. The Mining of Innovation and Entrepreneurship Materials**

The history of physics development is a history of innovation. From classical mechanics to relativity and quantum theory, new concepts and principles have been put forward constantly, and every major innovation has pushed human civilization to a new height. Corresponding to innovation and entrepreneurship education, the foundation of entrepreneurship is innovation, which is to break through the original limitations, seize new opportunities, put forward new ideas and create. Create new value. In terms of innovation, college physics course and innovation and entrepreneurship education are essentially the same, and college physics teaching can use the innovation achievements of physics to inspire students' innovative thinking. In a broad sense, innovation and entrepreneurship refers to the social practice activities that people in all fields of social life are engaged in for the purpose of innovation, and it is the society with the subject in the initiative. It is a kind of specific spirit, ability and behavior mode embodied in practice. Therefore, the innovation embodied in physics is exactly a kind of "entrepreneurial" activity. The teaching content of college physics mainly includes mechanics, thermology, optics, electromagnetics and quantum and atomic physics. It covers a wide range of contents, involving many basic principles of physics and contributions of physicists, so it can Based on the principles of physics and the experience of physicists' innovation, this paper refines the materials of innovation and entrepreneurship. On the basis of in-depth analysis of the teaching materials, a series of materials of innovation and entrepreneurship in physics are extracted, including the principles of physics, the experience of physicists' innovation and Its Enlightenment to College Students' innovation and entrepreneurship. These principles of physics and the experience of physicists' innovation can be embodied in specific teaching. Learning content[2].

### 3. Exploration of Teaching Mode

The Enlightenment of physics principle and physicist's innovation experience to college students' innovation and entrepreneurship must be implemented in the specific teaching process. The traditional college physics classroom teaching often starts from the basic concepts, the teachers explain the basic laws and theorems, and then the teachers and students discuss, analyze, give examples and practice. In order to integrate the innovation and entrepreneurship ideological education in college physics teaching, we adopt the "two principles". The former part discusses and analyzes the basic concepts and principles of physics, defines the meaning and application of the basic concepts and principles of physics, and then extends from the basic principles of physics, the innovation experience of physicists, and cuts into the ideological education of innovation and entrepreneurship[3].

For example, the teaching of the statistical significance of Clausius entropy and the second law of thermodynamics. First, the concept of Clausius entropy and Boltzmann entropy and the principle of entropy increase are explained. Then, four thermodynamic "entropy principles" are summarized: (1) entropy is a measure of order and disorder; (2) entropy increase of isolated system; (3) negative entropy flow principle; (4) the intervention of nonlinear mechanism on entropy. Secondly, the entropy principle of thermodynamics is extended from the field of natural science to the field of social science, which is further connected with the innovation and Entrepreneurship of college students, specifically integrating four viewpoints: (1) college students' innovation and entrepreneurship is the negative entropy flow of social and economic development; (2) College students' innovation and entrepreneurship embodies the intervention of non-linear mechanism on entropy; (3) college students' innovation and entrepreneurship is a process from disorder to order; (4) the innovation and Entrepreneurship of college students should start with innovation. For example, Einstein's teaching of special relativity. After explaining and discussing the coordinate transformation and speed transformation of special relativity, it naturally cuts into Einstein's life introduction and the background of special relativity, and extends Einstein's contribution to science. Based on Einstein's philosophy, this paper puts forward a question. Problems are often more important than solving a problem; the talent of fantasy is more important to me than my ability; people who have never made mistakes never try new things and other philosophical quotes, and further use analogy method to extend to Einstein's "innovation and entrepreneurship view": advocate to put forward new problems with rich imagination and fantasy; advocate the publicity of personality and try new things To be a pragmatic, diligent, inclusive and tenacious entrepreneur[4].

In the introduction of new courses, we should try our best to diversify, not only from the physical knowledge points, but also from the innovative and entrepreneurial deeds, so as to achieve the teaching purpose. In the arrangement of content, we should simplify the content of university physical knowledge points in each course. If there are too many knowledge points, we can allocate part of the content to explain in the last course, so as to have enough time to arrange innovative and entrepreneurial ideas. Education. In the arrangement of after-school work, we do

not stick to the calculation type practice, but arrange some problems related to the ideological education of innovation and entrepreneurship. For example, what is the inspiration of thermodynamics “entropy principle” to the innovation and Entrepreneurship of college students? From Einstein's philosophy to see how college students innovate and start their own businesses? And so on[5].

#### **4. Improvement of Teaching Methods**

##### ***4.1 Connect with People Who Are Successful in Innovation and Entrepreneurship***

For example, Ma Yun and Alibaba, Yu Minhong and New Oriental Education, Bill Gates and Microsoft, Li Jiacheng and Hong Kong real estate, etc. compare the innovative ideas and methods of these characters with the innovative spirit of physicists to find out the common ground between them. For example, contact physicist Newton in the later period of money manufacturing supervision, improve the coining methods, and greatly improve the coining. We have come to the conclusion that innovation is the foundation to achieve success on the road of entrepreneurship, so as to improve students' understanding of the relationship between innovation and entrepreneurship[6].

##### ***4.2 Connecting with the successful examples of College Students' entrepreneurship, let students start from the innovation and entrepreneurship stories around them***

For example, graduates of our university set up information media companies, education live broadcast companies, performance rental service companies, etc., and talk about their future business plans in combination with research-based learning and innovation and entrepreneurship training, etc. Let students actively go online to collect examples of successful entrepreneurship of college students, as the materials for students to discuss, for example, Chen Fengwei, a sophomore of Nanjing University of Posts and telecommunications, set up it sales, Hua Fengwei, etc. Xu shaohuang of the school of computer software of South University of technology founded the website platform, Zhou Qiang, a junior at Shanghai Institute of foreign trade, founded the University Town online service, etc., to guide students to discuss their successful innovation and entrepreneurship methods and quality. On the other hand, contact with the innovative spirit and quality of physicists, and make clear the direction and way of innovation and entrepreneurship, such as contact with Planck Tu. Breaking through the scientific dilemma and putting forward the energy sub hypothesis, it enlightens college students' innovation and entrepreneurship should have the old and new entrepreneurial quality; connecting with Newton's achievements, it puts forward the inertia law and other deeds, it enlightens college students' innovation and entrepreneurship need to choose the appropriate project and direction of struggle[7].

#### ***4.3 Guide the innovation and entrepreneurship training program of college students and participate in a number of provincial and national discipline competitions***

By guiding students to complete the innovation and entrepreneurship training program, students' innovation ability will be improved and their entrepreneurship quality will be improved. In the process of guiding students to participate in the discipline competition, students will be encouraged to put forward new ideas, achieve innovation goals and cultivate their spirit quality of brave exploration and cooperative innovation. At the same time, some students will gain and innovate. Industry - related excellent results can set up image and provide examples for other students[8].

#### **5. Teaching Effectiveness**

After two years of teaching exploration, we have accumulated valuable experience in the practice of integrating innovation and entrepreneurship in college physics teaching. In order to understand the effect of teaching practice, we have compiled a set of questionnaires for 140 students. The survey results show that 99% of the students think that it is meaningful to combine university physics with innovation and Entrepreneurship of college students. The spirit of innovation and the principles of physics have a guiding role in college students' innovation and entrepreneurship, and students' ideological understanding has been improved to a certain extent. At the same time, the teachers who organized classroom teaching have guided six college students' innovation and entrepreneurship training at the national and provincial levels, and achieved outstanding and good results. They have guided many students to participate in national and provincial subject competitions and won the national and provincial subject competitions. There are two first prizes at the provincial level and two first prizes at the provincial level. These achievements fully show that the integration of innovation and entrepreneurship education in college physics teaching is a useful teaching attempt, adding new connotation and new materials for college physics teaching.

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